FINANCIAL SERVICES ASSESSMENT

The Poor and Their Management of Shocks

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Financial Services Assessment project can be found on the web at http://www.fsassessment.umd.edu/

ABOUT THE PROJECT

The *Financial Services Assessment* project is designed to examine the impact of financial services on the lives of poor people across the developing world. This project is funded by the Bill & Melinda Gates Foundation, which is committed to building a deep base of knowledge in the microfinance field. The IRIS Center at the University of Maryland, College Park, together with its partner, Microfinance Opportunities, will assess a diverse range of innovations in financial services. The results of this project will shed light on the design and delivery of appropriate financial products and services for the poor and the potential to scale up successful innovations to reach larger numbers of low-income households.

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REPORT SERIES

This report is part of a series that will be generated by the *Financial Services Assessment* project. The reports are disseminated to a broad audience including microfinance institutions and practitioners, donors, commercial and private-sector partners, policymakers, and researchers.

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ABSTRACT

This paper, based on a survey of 2,459 households in rural Malawi, documents the major types of negative shocks observed, and the determinants of the use of coping devices, to understand the roles played by external finance and social networks. Almost all households were exposed to some idiosyncratic shock. Access to savings was associated more with the use of savings as a coping device than with the access to loans for the use of loans as a coping device. Borrowing money, if used as a coping tactic, was almost exclusively from informal sources. There are some initial indications that with increased access to formal finance, especially savings services, the use of coping devices to deal with shocks could be increased and irreversible asset depletion, which may lead to reduced household welfare in the long run, could be averted. Also of note is that significant expenses were incurred to pay for education and funerals. These expenses were met through cash savings kept at home and/or with external agents.

OTHER NOTES

An exchange rate of MWK148.5/1US$ was used in this report except where otherwise indicated.

TABLE OF CONTENTS

INDICES OF FIGURES & TABLES

ACRONYMS

BMGF	Bill & Melinda Gates Foundation
CUMO	Concern Universal Microfinance Organization
DEMAT	Development of Malawian Enterprises Trust
EA	Enumeration Areas
EU	Economic Union
FINCA	Finance for International Community Assistance
GDP	Gross Domestic Product
GoM	Government of Malawi
HFIAP	Household Food Insecurity Access Prevalence Scale
HFIAS	Household Food Insecurity Access Scale
MFI	Microfinance Institution
MFO	Microfinance Opportunities
MoAI	Ministry of Agriculture and Irrigation
MoF	Ministry of Finance
MRFC	Malawi Rural Finance Company Ltd.
MSB	Malawi Savings Bank
MSE	Micro and Small Enterprises
MUSCCO	Malawi Union of Savings and Credit Co-Operatives Ltd.
MWK	Malawi Kwacha
NABW	National Association of Business Women
NASFAM	National Smallholders Farmers' Association of Malawi
NBM	National Bank of Malawi
NBFI	Non-Bank Financial Institution
NGO	Non-Governmental Organization
OIBM	Opportunity International Bank of Malawi
PPP	Purchasing Power Parity
RBM	Reserve Bank of Malawi
ROSCA	Rotating Savings and Credit Association
SACCO	Savings and Credit Cooperatives
SEDOM	Small Enterprise Development Organization of Malawi

EXECUTIVE SUMMARY

The *Assessing the Impact of Innovation Grants in Financial Services* project (the *Financial Services Assessment* project), jointly undertaken by the IRIS Center at the University of Maryland and Microfinance Opportunities, is assessing the impact of grants provided by the Bill & Melinda Gates Foundation (BMGF) to microfinance organizations for the design and development of innovations in providing financial services in developing countries. The research intends to assess the impact of new financial products, services, and delivery systems on outreach and client welfare. Through the use of baseline and end line quantitative surveys and qualitative studies, the research examines if, and how, the financial innovations supported by BMGF improve access to, and use of, financial services by the poor and impact client welfare. The research helps reveal the value proposition of financial innovations: the unique value added by the innovations to clients through the grantee institutions.

In 2007, the Bill & Melinda Gates Foundation provided funding to Opportunity International Bank in Malawi (OIBM) to purchase a mobile bank. The mobile bank is a roving bank, fitted with the latest information technology mechanisms, that provides rural Malawians with increased access to financial services. The mobile bank was introduced in August 2007 to serve three districts in central Malawi: Lilongwe, Mchinji and Dedza. As part of the *Financial Services Assessment* project, this study was designed to assess the welfare impacts on households of the OIBM mobile bank.

This paper is based on a study that collected quantitative data from 2,459 households in three rural districts of Central Malawi from February to April of 2008. In it, we discuss the welfare-reducing shocks experienced by the sampled households and look at the role of financial services provided by external agents as a coping device during the initial stages of OIBM mobile bank operations. The major foci of this paper include the following:

- What are the major types of negative shocks that affect the rural population?
- How do rural households cope with these shocks?
- How does access to external finance affect responses to shocks?
- What is the role of social networks as a coping device?

The study results are intended to inform OIBM of the potential clientele for its services. Combining this data with the end line data to be collected in 2010 from the same sampled households, we intend to assess whether the presence of OIBM's mobile banking van has increased the use of financial services in the study areas and if financial instruments, especially those of OIBM, are used to cope with the shocks experienced by households.

Below, the major findings of the study, based on baseline data, are summarized to draw implications for the potential role and impact of financial services, especially those provided by OIBM, in managing shocks in rural Malawi.

A. MAJOR FINDINGS OF THE STUDY

A total of 2,459 households from three districts of Lilongwe, Mchinji and Dedza, where the OIBM mobile van was introduced in August of 2007, were randomly selected and interviewed from January to April of 2008. The interviews were conducted using a 31-page structured questionnaire developed for the study and pre-tested in the field prior to the survey.

Among the sample, average annual income was US$182. About 93% of the sample were engaged in farming, while 66% also raised livestock and 44% also worked as wage laborers. Nearly 40% of the sample fell below the poverty line of PPP $2 a day, while only 4% were below the PPP $1 a day poverty line. Only 8% of households were food secure and about 45% of the sample were severely food insecure.

One-third of the sampled households used external financial services. Among financial services users, twice as many households reported an outstanding loan as those that reported using a savings account. Informal loans were much more common than formal loans. Of the total 866 loans, only 152 (17%) were from formal institutions, while 714 (82%) were informal. The most common lending agent was a borrower's friend or relative. Average loan sizes from formal and informal sources were about US$122 and US$14, respectively.

Only 343 households (14% of the sample) reported having at least one savings account. The average deposit balance with formal institutions was about US$140, while the average deposit balance with informal sources was about US$29 . Most of the accounts (84%) were with formal institutions.

Remittances were both received and sent. About 320 households (13% of the sample) received remittances from friends and family outside the community over a period of a year. About 316 households (13%) sent remittances to other parts of Malawi, primarily to family members for paying school fees and medical bills. Most of these households were either remittance receivers or senders.[1] The average remittance amount received and sent was, respectively, MWK 7,384 (US$50) and MWK 5,769 (US$39).

Shocks were very common in the sample. Almost all households in the sample (96%) reported experiencing at least one severely welfare-reducing shock in a year. Over a period of 12 months preceding the survey, 2,339 households reported a total of 7,605 shocks that affected their welfare. This is an average of three negative shocks per household in the study year. Most households experienced between one and five severe welfare-decreasing shocks, with a little more than 20% of all households reporting two shocks and another 20% reporting three shocks.

The most commonly reported shock was the theft or death of livestock and poultry. About 56% of households reported loss of livestock or poultry within the twelve months prior to the interview date. The second most common shock was a large rise in the price of food (47%), followed by illness or an accident affecting a household member (39%).

Three-fourths of the shocks directly lowered household incomes. Most shocks were idiosyncratic, affecting only individual households, but many shocks also affected the community. Food price hikes were the only major shock that affected most of the community, while livestock and poultry loss affected only one-third of the community.

Two-thirds (4,968) of the reported 7,605 shocks were followed by some coping response from the household to try to restore its former welfare level. The four most prominent responses accounted for 91% of the primary coping mechanisms used: spent cash savings, worked more, sold animals, and sold more crops.

Medium-stress coping devices such as savings and loans were used by the majority of the households. Use of cash savings accounted for 80% of all four primary coping devices. These savings were held with external agents and/or at home. While borrowing was listed as a coping device for approximately 80 different shocks, most of these were loans from informal sources. Of the 343 households that experienced shocks and had access to external savings accounts, about 74% used savings as coping devices. Of the 757 households that experienced shocks and that could access loans, only 40% reported using loans as coping devices. While 43% of those who had access to loans reported using savings as coping devices, only 4% of those that had access to savings used loans as coping devices.

High-stress coping devices, such as sale of assets, were also reported in the sample. The average reported value of assets, livestock, or farmland sold in response to a shock was about MWK 5,200 (US$35). Households that used such

[1] Of the 320 households that reported receiving remittances, about 260 did not send any remittances. Similarly, 231 households that sent remittances did not receive any remittances. Only 57 households both received and sent remittances.

high-stress coping devices, compared to households using low- and medium-stress devices, owned slightly higher levels of assets in land and houses but also received more cash and food aid from external sources, such as governments and churches. A greater percentage (31%) of such households had current outstanding informal loans than medium- and low-stress device users (25%). They were also less connected with social networks. Households exposed to a larger number of shocks, that had a larger household size, and which engaged in farming, were more likely to use high-stress coping mechanisms compared to low- or medium-stress coping mechanisms.

Households with better access to formal finance and social networks were more likely use low- or medium-stress coping mechanisms than high-stress coping devices that may have resulted in a reduction of household welfare in the long run.

Non-coping device users had slightly worse food-security scores and owned slightly lower levels of assets than households using at least one coping device to address shocks. While 32% of device-using households had outstanding loan balances, 27% of non-device users had outstanding loans. They also appeared to have weaker social capital. Increased access to informal savings accounts was associated with a reduction in the likelihood of using a coping device. But access to formal loans or savings accounts was positively associated with the use of coping devices.

Life-cycle events such as births, weddings, schooling, and funerals were common. Three-fourths of the sample reported some life-cycle event occurring during the one-year period prior to the survey date. There were a total of 2,945 life-cycle events reported in the sample, averaging 1.5 events per household. About 95% of the life-cycle events required that households use some of their cash savings to pay for related expenses. The highest-valued asset sales came from costs associated with secondary school fees (MWK 4,000/US$27), followed by funeral rites and weddings (MWK 2,000/US$13). Households with savings may not sell their assets to pay for life-cycle events, but those with loans may deplete their assets to pay for such events.

B. CAN ACCESS TO FORMAL FINANCE HELP HOUSEHOLDS COPE WITH SHOCKS?

The above findings show that most sampled households exposed to shocks used medium-stress coping devices that included use of finance, especially savings, including savings kept at home and/or with external agents.

Access to savings was associated more with the use of savings as a coping device than with the access to loans as a coping device. Savings were defined as savings accounts held by the household with external agents currently, and/or in the past two years prior to the survey and loans were defined as loans outstanding for the household with external agents currently, and/or taken in the past two years prior to the survey. Borrowing money, if used as a coping tactic, was almost exclusively from informal sources.

The results also show that with increased access to formal finance and social networks, the probability of households using high-stress coping devices declined.

Also, increased access to informal savings accounts was associated with a reduction in the likelihood of using a coping device. But, while not statistically significant, access to formal loans or savings accounts was positively associated with the use of at least one coping device.

It is also notable that about 95% of the life-cycle events required that households use some of the cash savings kept at home or with external agents, mostly formal, to pay for related expenses. Interestingly, asset sales to pay for expenses were only reported by households that did not hold any savings accounts with external agents, formal or informal, although about 30% of these households had an outstanding loan with an informal source.

The study results provide some initial indication that with increased access to formal finance, especially savings services, the use of coping devices to deal with shocks could be increased and irreversible asset depletion, which may lead to reduced household welfare in the long run, could be averted. Also of note is that significant expenses were incurred to pay for education and funerals. These expenses are currently met through cash savings kept at home or with external agents.

C. WHAT ROLE FOR OIBM?

OIBM is a savings-led formal institution that is increasing its presence in the study area using the mobile bank that stops at six trading centers. The majority of formal institutions that mobilize deposits are located in only two of these trading centers, thus offering more market space for OIBM. The savings kept at home could potentially be mobilized by OIBM with appropriate savings products. There is considerable scope for developing short-term commitment savings to meet life-cycle events. OIBM could also develop products that could help households save for education. Funeral insurance introduced by OIBM in September 2008 could help with meeting expenses incurred by such events.

Further inquiry is required to clearly assess the potential of formal finance to help households in rural Malawi cope better with shocks. Additional data from the same households, collected in another year, will help address the issues. Also, a companion study using financial diaries, which captures the cash flows of 200 rural households that are users and nonusers of OIBM finance will help address the role of formal finance, especially products provided by OIBM.

STUDY BACKGROUND

The *Financial Services Assessment* project, undertaken by the IRIS Center at the University of Maryland and Microfinance Opportunities, is assessing the impact of grants to microfinance organizations provided by the Bill & Melinda Gates Foundation (BMGF), for the design and development of innovations in providing financial services in developing countries. The research will assess the impact of new financial products, services, and delivery systems on outreach and client welfare. The *Financial Services Assessment* project addresses issues such as access to financial services and the role of the enabling environment. Through the use of baseline and end line quantitative surveys and qualitative studies, the research examines if, and how, the financial innovations supported by BMGF affect access and use of financial services by the poor and impact client welfare. In this way, the research helps reveal the value proposition of innovations: the unique added value of the innovations to the poor through the grantee institutions.

In 2007, the Bill & Melinda Gates Foundation (BMGF) funded the purchase of a mobile bank by Opportunity International Bank in Malawi (OIBM) to increase access to financial services in rural Malawi. This study was designed to assess the impacts on household welfare of the OIBM mobile bank funded by BMGF. The mobile bank is a roving bank fitted with the latest information technology to bring financial services to the rural areas. The mobile bank was introduced in August 2007 to serve three districts in central Malawi: Lilongwe, Mchinji and Dedza.

The research findings of the study are disseminated through a series of topical reports that: (i) examine access to and use of financial services provided by the grantees, and (ii) identify the value proposition of grantees' innovations in terms of welfare improvements. Collectively these studies will allow us to understand the outcomes and impact of financial-service interventions. This paper, based on the findings from the baseline quantitative survey in Malawi, is one of several topical papers in the series. Other papers prepared in this series are listed in Annex 1.

I. INTRODUCTION

Rural populations in developing countries are often faced with welfare-reducing shocks or negative shocks[2]. In order to reduce their likelihood and frequency, as well as lessen the severity of their effects when they do occur, households often engage in preventive and preparatory measures through risk-management strategies. Once a negative shock has occurred, households may apply a variety of coping tactics in order to survive and recover (Sebsted and Cohen, 2001; Rutherford, 2000; Collins et al., 2009). Since preventive mechanisms are limited in many rural areas, people tend to rely on many *ex post* coping mechanisms, such as a reduction in food intake, asset depletion, and the use of financial services and social networks. Prevalence and use of different shock-coping mechanisms depends partly on the nature of the shocks, as well as the array of coping mechanisms to which rural households have access.

Rural Malawi provides an ideal location to better understand the important roles played by various shock-coping mechanisms in the lives of the rural poor, including social networks and financial services. Located in south-central Africa, this densely populated agrarian country of 14 million is among the poorest in the world. The rural sector dominates the economy and society, with 85% of the population living in rural areas, most of the labor force engaged in small-scale farming on less than one hectare per household and more than three-quarters of the country's exports from agriculture (mostly burley tobacco), (Diagne and Zeller 2001).

A single unpredictable rainy season and just one yearly harvest leaves the country's inhabitants heavily exposed to an annual risk of crop failure. Malawi has been a major recipient of food aid in the past to help address food shortages caused by droughts and pests. It is also among the top countries in terms of HIV/AIDS prevalence, as well as AIDS and malaria-related deaths. Formal insurance mechanisms to help manage shocks, such as crop insurance (by the World Bank in July 2007) and micro insurance targeted at the poor in terms of funeral insurance (by OIBM in August 2008), were recently introduced into the country.

The study was carried out in the service areas of the OIBM mobile bank. The mobile bank is an armored vehicle that serves as a roving bank branch that can carry out transactions in real time. It was introduced in August 2007 to serve three rural districts in central Malawi: Lilongwe, Mchinji and Dedza.[3] Clients make deposits and withdrawals , as well as loan installment payments, through a bank officer or built-in automatic teller machine (ATM) in the van. Loan products are managed in part by loan officers who reside in the communities of the bank stops, while loan approvals are done at headquarters in Lilongwe.

This study posits that rural households face many shocks and that the poor have few mechanisms, including access to financial services, to cope with these shocks. They must therefore frequently resort to high-stress coping devices, such as asset depletion, which can lead to significant welfare losses in the long run. It is expected that innovations such as OIBM's mobile bank, which is intended to increase access to financial services, will provide the poor with better tools to manage their shocks.

To this end, during the period from February to April of 2008, the IRIS Center at the University of Maryland, College Park, conducted a baseline survey in three rural districts of Central Malawi to gather quantitative data from

[2] While most shocks are negative, causing reduction in welfare, some shocks, such as winning a lottery, could be positive.

[3] The mobile bank stops along two routes originating in Lilongwe: (1) Lilongwe to Mchinji; and (2) Lilongwe to Dedza. (Mchinji is a border town located next to Zambia. Dedza borders Mozambique.). There are two stops along each road, in addition to stops in town at the end of each route.

2,459 randomly selected households. Detailed information was collected on various shocks affecting the sampled households and mechanisms used to manage them. The data used in this study are drawn from this baseline survey. This paper only discusses the shocks experienced by the sampled households and the role of financial services provided by external agents as a coping device, during the initial stages of OIBM's mobile bank operations. At this point, the research does not capture the impact of OIBM on households' ability to cope with shocks. The end line survey of the same respondents is planned for January to April of 2010 to construct panel data. Analysis of the panel data will help assess whether the presence of OIBM's mobile banking van has increased the use of financial services in the study areas and if financial instruments, especially those of OIBM, are used to cope with the shocks experienced by households.

The major foci of this paper include the following:

- What are the major types of negative shocks that affect the rural population?
- How do rural households cope with these shocks?
- How does access to external finance affect responses to shocks?
- What is the role of social networks as a coping device?

The next section describes the study area, the framework used to draw the sample for the study, and a demographic and basic socioeconomic description of the sampled households. In Section III, the report presents the study findings on types of shocks. In Section IV, coping mechanisms, including use of finance and social networks, are discussed. In Section V, we examine the characteristics of users of high-stress coping mechanisms and in Section VI, the characteristics of nonusers of any coping mechanisms are discussed to understand if formal financial services play a role as a coping device. In Section VII, the mechanisms used to manage life-cycle events are presented. The implications of the study's findings for the potential role and impact of financial services in managing shocks in rural Malawi, especially those services provided by OIBM, are discussed in the concluding section.

II. THE STUDY SAMPLE

A. STUDY AREA DESCRIPTION[4]

Malawi is located in southern Africa, with a land area of 98,080 sq km and a population of about 13.9 million. The economy is dominated by the agricultural sector: 85%of the population lives in rural areas and 90% of the labor force derives its income from agriculture. Crop production provides 73% of rural household income.

Malawi is one of the poorest countries in the world, ranking 166 out of 177 on the Human Development Index. Its estimated GDP per capita is PPP US$600. As shown in Table 1, in 2005 about 52% of the population lived below the national poverty line, while 22% of the population was considered ultra-poor, defined as households with incomes below a level necessary for adequate food consumption. In terms of the international poverty line, 28% of the population lived on less than PPP $1/day.

Poverty rates in the study districts of Mchinji, Dedza, and rural Lilongwe in Central Malawi show that the Lilongwe Rural district has lower than national-level poverty rates, while Mchinji and Dedza have higher than the national rates. Mchinji also appears to have a much higher proportion of ultra-poor than the other two districts.

TABLE 1: POPULATION AND POVERTY RATES IN STUDY AREA (BY NATIONAL POVERTY LINE), 2005

District	Number of Households	Poverty Rate	Ultra-Poverty Rate
Lilongwe Rural	251,640	38%	12%
Mchinji	86,092	60%	30%
Dedza	135,849	55%	21%
Malawi TOTAL	2,731,346	52%	22%

Source: IHSS 2004/2005.

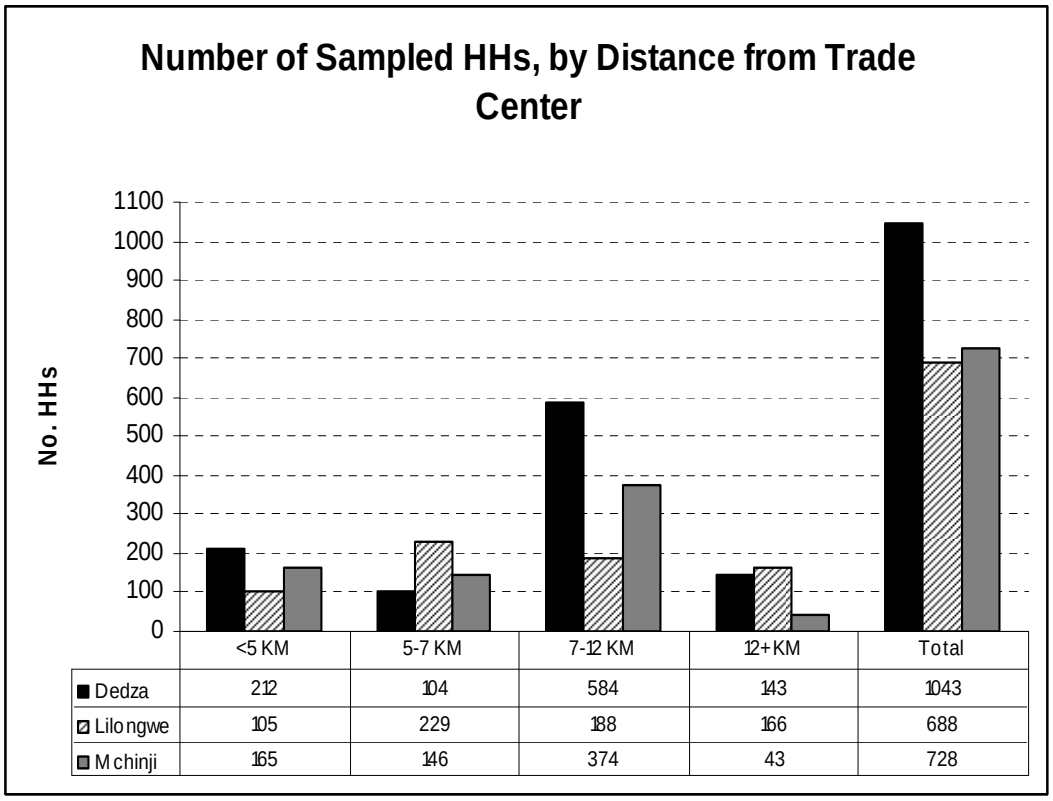
B. THE SAMPLE

The sample for the study consists of 2,459 randomly selected households in Lilongwe, Dedza, and Mchinji, interviewed between late January and mid-April of 2008. The households were drawn from a total of 118 "enumeration areas" (EAs) randomly selected in the three study districts. These EAs are located within a 12 km radius of each of the six trading centers where the OIBM mobile banking van stops every week. The EAs were randomly selected from lists based on population and distance from the trading center. Within each EA, about 20 to 24 households were randomly selected for the survey. The response rate was very high, with 97% of selected households agreeing to participate. Figure 1 shows the sample size in each district by the distance of the EA from the trading center where the OIBM van stops.[5]

[4] This section is adapted from McGuinness, 2008.

[5] Due to variations in population density, a larger proportion of our sample comes from Dedza district (1043) than either Lilongwe (688) or Mchinji (728). Additionally, since Mchinji trading center is very close to the Zambian border (west) and a mountain (northeast), the population living 10 km from the call point was very small, leading to a limited sample size for that area. We used appropriate weights in our analysis to account for variations in populations.

FIGURE 1: SAMPLE SIZE FOR THE STUDY, BY DISTRICTS AND DISTANCE FROM TRADING CENTER (WHERE OIBM VAN STOPS)



	<5 KM	5-7 KM	7-12 KM	12+KM	Total
Dedza	212	104	584	143	1043
Lilongwe	105	229	188	166	688
Mchinji	165	146	374	43	728

C. SURVEY INSTRUMENT [6]

The survey instrument used to gather data for the study was a 31-page structured questionnaire with eleven sections, including household demographics, economic activities, poverty status, food security, physical assets, income, use of financial services, shocks experienced and mechanisms used to cope with shocks, and social capital. The instrument was thoroughly pre-tested in the field prior to the survey.

The section on shocks included queries to capture all household shocks that led to a reduction in income and the timing of the shocks over the last year. For the most recent negative shocks experienced during the past two months, data were gathered on ways households coped with the shocks, such as whether they used cash savings, financial services, or informal insurance, or whether they liquidated assets (including estimated values) or if some other mechanism was used. We also gathered data on the use of social networks to help manage shocks. Information was also collected on the frequency and amount spent on life-cycle events such as births, funerals, and weddings.[7]

To assess the poverty status of the study sample, the IRIS research team designed a Poverty Assessment Tool (PAT) based on the methodology originally developed by IRIS. The PAT gathers household data using a short survey with indicators that have been identified as the best predictors of whether a given set of households is poor or very poor.[8] The survey collected information to predict the share of

[6] The survey instrument is available upon request in both English and the local language, *Chichewa*.

[7] The most recent shock was gathered two months prior to the survey to capture risk coping during the hungry season when most households are highly stressed for cash. This also helps match the responses obtained for food security status of the household where data are gathered for a period of 30 days prior to the survey date (recall for a longer time period than a month is very challenging for many food security questions).

[8] The indicators were captured through a series of 33 questions that included information on individual household members (e.g., level of education, health status), characteristics of the

respondent households living below four poverty lines: the local median poverty line, the local national poverty line, the $1/day PPP international poverty line fixed at US$1.08, and the $2/day PPP line fixed at US$2.16.[9] In addition to poverty levels of the sample, the study also included a module on food security that collected information over a 30-day day period prior to the survey. The USAID Household Food Insecurity Access Scale (HFIAS), designed for measurement of food security by Coates, Swindale, and Bilinsky in 2007, was modified to fit the Malawi context. Based on a set of questions about the frequency of food-insecurity "domains" in the previous month, households were grouped according to the Household Food Insecurity Access Prevalence (HFIAP) categories, which classify households into four categories: food secure, mildly food insecure, moderately food insecure, and severely food insecure. Moderately and severely food insecure households have problems with adequate food intake (or seriously lack access to quality food). Mildly food-insecure households usually have enough food, but may have poor food quality at times (See Adelman and Nagarajan, 2009).

D. SELECTED CHARACTERISTICS OF SAMPLED HOUSEHOLDS

As shown in Table 5, the households were, on average, composed of five members with heads of household that were about 41 years old. The average distance of sampled households from the nearest trading center where OIBM's mobile van stops is 8 km.

TABLE 2: DEMOGRAPHIC, ASSET AND INCOME DETAILS OF SAMPLED HOUSEHOLDS

Characteristics of Sampled Households; Averages (Standard Deviations in Parentheses)

District	Age of Household Head (in years)	Household Size (#)	Farm Size (in hectares)	Asset Value (in MWK)	Business Income (MWK)	Farming + Business+ Other Incomes (MWK)	Distance from Mobile Bank Stop (in km)
Dedza	40	5.1	2.5	65,500	645	15,750	8.1
	(38)	(5)	(2)	(31,100)	0	(6,800)	(8.4)
Lilongwe	41	4.9	2.6	66,449	719	23,051	8.0
	(37)	(5)	(2)	(38,548)	0	(8,800)	(7.2)
Mchinji	43	5.4	2.7	119,237	2,375	40,587	7.8
	(40)	(5)	(2)	(56,155)	0	(11,000)	(7.6)
ALL	41	5.1	2.6	81,758	1,178	26,277	8.0
	(38)	(5)	(2)	(39,970)	0	(8,700)	(7.8)

Households reported, on average, MWK 26,277 (US$183) as annual income in 2007 from farming, business, and other sources, including rents, remittances, and grants. Mchinji households were observed to report more than twice that of incomes in Dedza. This does not appear to conform to the average national

household's dwelling (roofing material, source of drinking water), household possessions (number of beds, chairs, and bicycles owned by household), and the behavior of household members (participation in waste/water groups and possession of a savings or checking account) See http://www.povertytools.org for more details on PAT methodology.

[9] The national poverty line was computed on the basis of food plus basic needs, that is, the cost of a minimal caloric consumption basket plus the non-food consumption of those who have approximately this level of food consumption. The median line is the value that defines the bottom 50% of those below the national poverty line.

annual incomes reported for the three districts. According to the 2005 Integrated Household Survey (IHS) published by the Office for National Statistics: the average household income in Mchinji was about $US291 while it was US$222 in Dedza and US$324 in Lilongwe Rural. Note that Mchinji and Lilongwe are primarily tobacco-growing areas while Dedza grows less tobacco and more potatoes (referred to as Irish potatoes), cassava, and vegetables. It is possible that the lower levels of agricultural production and prices obtained in 2007, compared to 2005 when the IHS was conducted, could have attributed to the lower levels of income reported in our sample.

The majority of sampled households were engaged in farming (Table 3). On average, households owned about 2.5 of land. As shown in Table 3, 93% of the households were engaged in farming, while a number of households also participated in livestock rearing (66%) or casual daily wage *(ganyu)* labor (44%). The main staple crop was maize, while tobacco was the most significant cash crop. Other crops included groundnuts (peanuts) and vegetables. About a quarter of households owned businesses that included trading in produce or groceries, brewing and selling beer, petty trading, food processing, street-food sales, or collecting and selling firewood. Fifteen percent of households reported a salaried member with employment in local government, schools, or hospitals.

TABLE 3: ECONOMIC ACTIVITIES OF SAMPLED HOUSEHOLDS

Items	Items	(% of households reporting)
Types of Employment	Business	26%
	Salaried	15%
	Ganyu – day labor	44%
	Farm work	93%
	Animal Husbandry	66%

About half the sampled households lived below the national poverty line. As shown in Table 4, only a small percentage of households fell below the extreme PPP $1 per day poverty line (4%), though substantially more fell below the PPP $2 per day line (40%). Eleven percent of households fell below the median national income and 43% were below the national poverty line. Recall from Table 1 that the poverty rate based on national poverty line was about 52% in Malawi. In all measures, the national poverty line appears to benchmark well with the PPP $2 per day measure.

TABLE 4: POVERTY RATES IN THE SAMPLE: PERCENTAGE OF HOUSEHOLDS UNDER THE POVERTY LINES

Poverty Lines	Sample Poverty Rate (% households below the line)	National Poverty Rate (% households below the line)
$1/day PPP (MWK 945)	4%	Not available
$2/day PPP (MWK 1,889)	40%	Not available
Median poverty line (MWK 1,074)	11%	22%
National poverty line (MWK 1,559)	43%	52%

Figures in parentheses indicate the income levels that correspond with poverty lines in Malawi (in Kwacha).

The majority of households were food insecure, particularly with respect to food quality (Table 5). Forty-five percent of households were severely food insecure, meaning that they had significant problems with food access. An additional 41% of households were moderately food insecure, meaning that they had frequent problems with accessing quality foods or some problems accessing food at all. Only 8% of households were categorized as food secure. Households in Mchinji and Dedza districts appeared better off overall than those in Lilongwe, though Dedza had significantly more severely food-insecure households than Mchinji. Given the timing of the data collection, these measures may reflect the significant problems that households have with food access during the pre-harvest season.

Only 8% of households were categorized as food secure.

Recall that data were collected during the 2008 pre-harvest season (January-March) when little money is typically in circulation and households have to rely primarily on grain stocks. In households with school-aged children, cash needs can be particularly high, as secondary school fees are due at this time as well. Thus, households are typically most vulnerable during this rainy pre-harvest time and may become temporarily food insecure.

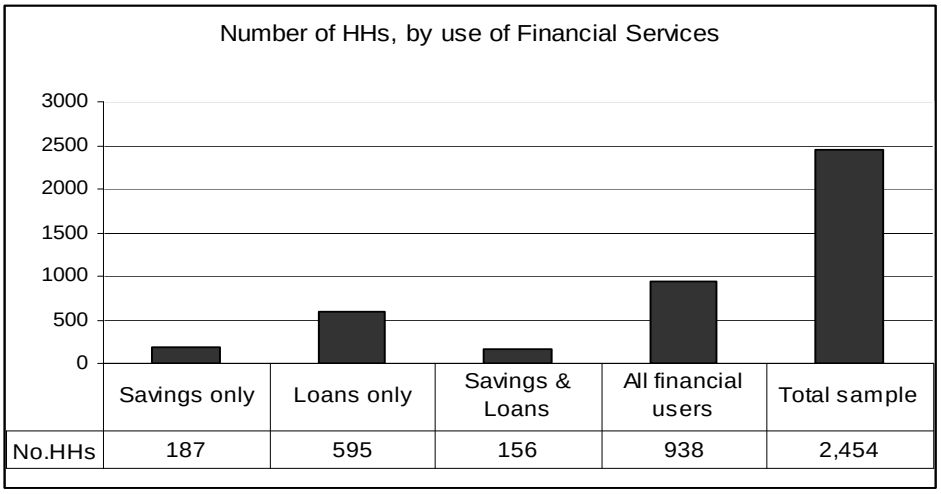
TABLE 5: HOUSEHOLD FOOD INSECURITY ACCESS PREVALENCE (HFIAP) AMONG SAMPLED HOUSEHOLDS (% REPORTING)

HFIAP	Lilongwe	Mchinji	Dedza	Total
Food secure	4%	11%	9%	8%
Mildly food insecure	5%	8%	6%	6%
Moderately food insecure	44%	42%	39%	41%
Severely food insecure	48%	40%	46%	45%

One third of the sampled households used external financial services.[10] Among financial services users, twice as many households report an outstanding loan as those that report using a savings account *(*see Figure 2*)*. Of the 2,459 households sampled for the study, 938 (38%) reported having a savings account and/or an outstanding loan with an external agent. There were 595 households that had an outstanding loan, but no external savings, and 156 borrowing households that also had a savings account, totaling 751 borrower households in the sample (31% of the sample). Of these 751 households, 644 households (86%) reported one loan outstanding, while 107 households (14%) had more than one loan, leading to a total of 866 loans in the sample. Average number of loans per borrowing household was 1.15.

Among financial services users, twice as many households report an outstanding loan as those that report using a savings account.

FIGURE 2: USE OF CREDIT AND DEPOSITS AMONG SAMPLED HOUSEHOLDS



Of the total 866 loans, only 152 (17%) were from formal institutions, while 714 (82%) were informal. Average loan sizes from formal and informal sources were about US$122 and US$14, respectively.

Informal loans were much more common than formal loans. Of the total 866 loans, only 152 (17%) were from formal institutions, while 714 (82%) were informal. The most common lending agent was a borrower's friend or relative. Average loan sizes from formal and informal sources were about US$122 and US$14, respectively. The majority of formal loans were made as group loans. The group loans reported with informal sources were primarily made through rotating savings and credit associations (ROSCAs).

[10] For more details on use of financial services among the sampled households, see "Adelman, Sarah and Geetha Nagarajan (2009). "Who Does Formal Finance Reach in Rural Malawi?" Assessing the Impact of Innovation Grants in Financial Services Project, IRIS Center, College Park, MD.

Use of savings services was limited. Of the total sample of 2,459 households, only 343 households (14% of the sample) reported having at least one savings account. The average deposit balance with formal institutions was about US$140 while the average deposit balance with informal sources was US$29 . These households generally held either only formal accounts or only informal accounts. Very few households (only five of the 343) held both formal and informal accounts. However, 52 of the 343 households have more than one account, leading to a total of 408 accounts in the sample. Savings were held predominantly with formal service providers (84%) such as NBS bank, Standard Chartered, Malawi Savings Bank, National Bank and OIBM, with few informal accounts (14%) held with friends and relatives and ROSCAs. Of these 408 accounts, 107 are group accounts (25% of all savings accounts). Of these 107 accounts, 91 are with formal institutions and 16 are informal group accounts primarily held in ROSCAs.

Only 343 households (14% of the sample) reported having at least one savings account. The average deposit balance with formal institutions was about US$140 while it was US$29 with informal sources. Most of the savings accounts (84%) are with formal institutions.

Remittances were both received and sent (Table 6). There were about 320 households (13% of the sample) that received remittances from friends and family outside the community over a period of a year. About 316 households (13%) sent remittances to other parts of Malawi, primarily to family for paying school fees and medical bills. Most of these households were either remittance receivers or senders.[11] The average remittance amount received and sent was, respectively, about MWK 7,384 (US$50) and MWK 5,769 (US$39). It is interesting to note that almost all the remittance senders and receivers reported experiencing at least one negative shock in the year. Although the study did not collect detailed information on use of remittances, it is possible that remittances could have been requested to manage shocks.

The average remittance amount received and sent was, respectively, about MWK 7,384 (US$50) and MWK 5,769 (US$39).

TABLE 6: FREQUENCY OF REMITTANCES AMONG THE SAMPLED HOUSEHOLDS

Items	Number of Households Reporting	% to total
No remittances received or sent	1,906	78%
Remittance receivers only	260	11%
Remittance senders only	231	9%
Remittance receivers and senders	57	2%

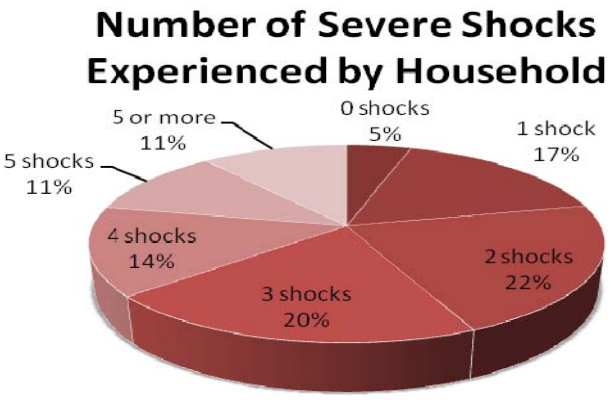
[11] Of the 320 households that reported receiving remittances, about 260 did not send any remittances. Similarly, 231 households that sent remittances did not receive any remittances. Only 57 households both received and sent remittances.

III. SHOCKS EXPERIENCED IN RURAL MALAWI

For this study, we define shocks as uncommon and mostly unexpected events that strike a household without much warning. We consider common and fairly expected events such as births, weddings, school graduations, and events such as funerals, which are only unpredictable in terms of timing, to be life-cycle events and not shocks. Coping mechanisms/devices are measures taken by households to help them survive and to also restore their lives (as best as possible) to pre-shock welfare levels.

Almost all households in the sample (96%) reported experiencing at least one severely welfare-reducing shock in a year (Figure 3). Over a period of 12 months preceding the survey, 2,339 households reported a total of 7,605 shocks affecting their welfare. This is an average of three negative shocks per household in the study year. Most households experienced between one and five severe welfare-decreasing shocks, with a little more than 20% of all households reporting two shocks and another 20% reporting three shocks. Eleven percent experienced six or more severe shocks. Such high shock frequencies within a single year can render a household extremely vulnerable.

Most households experienced between one and five severe welfare-decreasing shocks. Eleven percent experienced six or more severe shocks.



The most commonly reported shock was theft or death of livestock or poultry (Table 7). Among the 2,339 households that reported experiencing some negative shock, about 56% reported loss of livestock or poultry within the 12 months prior to the interview date. The second most common shock was a large rise in the price of food (47%), followed by illness or accident affecting a household member (39%).

About 56% reported loss of livestock or poultry within the 12 months prior to the interview date. The second most common shock was a large rise in the price of food (47%), followed by illness or accident affecting a household member (39%).

TABLE 7: FREQUENCY OF EACH TYPE OF SHOCK

Shocks	No. Reporting Shocks	% of Total Reporting Shocks
Livestock/poultry died or were stolen	1,382	56%
Large rise in price of food	1,155	47%
Illness or accident of household member	964	39%
Unexpected increase in input prices	841	34%
Large fall in sale prices for crops	715	29%
Crop disease, low crop yields due to drought, flood	639	27%
Business failure	357	15%
Theft	305	12%
End of regular assistance, aid, or remittance	282	11%
Death of household head, income earner or other household member	243	10%
Dwelling damaged, destroyed by fire, flood	127	5%

Shocks	No. Reporting Shocks	% of Total Reporting Shocks
Break-up of the household	77	3%
Loss of salaried employment	39	2%
Communal fights	37	2%
Others	19	1%

All of these shocks clearly had a substantial negative impact on the household's welfare. Most of them were also likely to lower the household's total income and/or consumption for the year, whether due to reductions in self-produced food, decreased purchasing power, or losses in incomes.

Three-fourths of the shocks directly lowered household incomes. About 72% of the total shocks were reported to have directly lowered expected household income. About 85% of households that experienced livestock or poultry losses said these events lowered their expected income, while 67% of those who experienced an illness or accident of a household member said it reduced expected income, and 41% of households experiencing spikes in food prices said that led to income reductions. Note that food price hikes might require a diversion of household resources (e.g. time, money) away from production and income-generation to food-procurement activities.

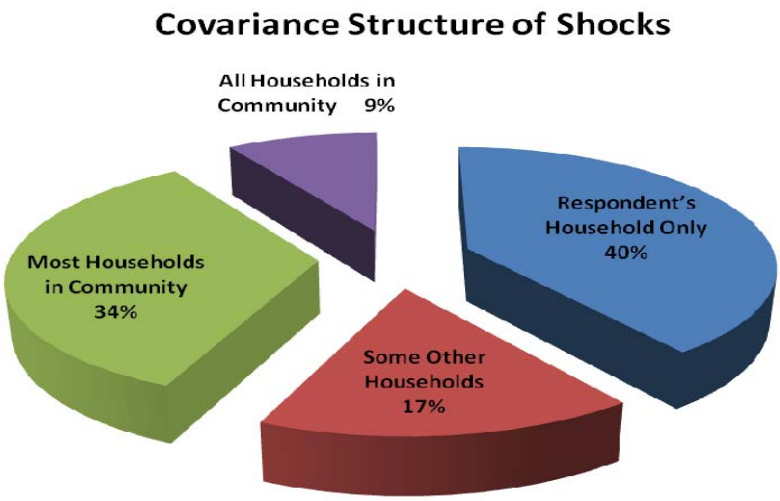
72% of the total shocks were reported to have directly lowered expected household income.

Frequency of death is notable. There were a total of 243 reported deaths in the sample. Four households experienced the death of both a household head, as well as another household member. In total, 239 households (10% of the sample) experienced the death of a household member. This could work out to a death rate of about 96 deaths per 1,000 sampled households. Compared to the national average death rate of 17.6 deaths per 1,000 population (CIA fact sheet, 2009), the death rate among our sampled households appears very high[12].

The more exclusive (*idiosyncratic*) the shocks were to a particular household, the more amenable the household was to cushioning the shocks via within-community coping devices. Such within-community coping measures included reciprocal gift giving among friends and relatives, or the use of informal financial services. However, *aggregate* shocks can simultaneously strike much, or all, of the community at once, leading to high degrees of covariance in shock incidence across households within the area. The greater the covariance (i.e. the more broadly the shock is shared), the higher the likelihood that intra-community mechanisms such as inter-household transfers fail, leaving households to bear the full brunt of the shock with no links to externally-based coping devices.

Most shocks were idiosyncratic, but many shocks also struck at the community level at the same time. Figure 4 indicates the self-reported degree to which the shock experienced by the respondent also hit other households in the area at the same time. The high incidence of self-reported shocks that are purely idiosyncratic (40% of all shocks reported) and mostly idiosyncratic (17% of all shocks reported), along with the low incidence of shocks reported as extremely covariant (9% of all shocks reported), suggests substantial scope for inter-household social- insurance mechanisms within communities. However, the significant number of covariant shocks (34% of the total) also highlights the limitations of intra-community insurance and underscores the need for shock-coping mechanisms linking villagers to coping mechanisms outside their local communities.

[12] Note, however, that it appears low among the total population of 473,500 in the sampled districts of Lilongwe Note, Mchinji and Dedza.



Food price hikes usually affected most of the community, while livestock loss sometimes affected the community and sometimes struck just individual households. Food price increases were largely shared by the entire community. About 55% of households affected by this shock reported that most households in the village were also affected and 19% of households reported their entire village was affected. Livestock loss was fairly evenly divided between the two ends of the spectrum. 46% of households affected by this shock reported that only their household was affected, while 32% reported that most other households in their community were also affected by the shock. Illness or accident of a household member was almost entirely household-specific, with 96% of the households that experienced this shock reporting that they were the only household affected. This suggests that household illness or injuries, and to some extent livestock and poultry loss, can be managed through inter-household transfers. Food price increases, however, due to their predominantly covariant nature and macro effect, and shocks that have cumulative effects, would likely require inter-community transfers.[13]

Our analysis presented in Section II shows that the majority of households reported little use of formal financial services, little salary-based income that is isolated from community-level agro-climatic shocks, and limited remittances from household members working far away. In such a situation, covariant shocks affecting the entire community could leave a greater number of households exposed to the shock because there is not enough help from households within the community, or even from outside the community, to help address them.

The shocks were not highly correlated among one another (Table 8). While multiple shocks may strike a given household, there was no strong evidence that certain types of shocks occurred together within a given year. Table 8 shows the extent to which shocks were correlated with one another by looking at pairs of highly correlated shocks. The second shock in each cell of the table indicates the shock that was found to be most highly correlated with the first shock listed. The two most correlated shocks were an unexpected increase in the price of inputs and a large rise in the price of food. This is not surprising and suggests a common origin in the study area for an unexpected inflation in prices. The next most correlated pair, a large rise in the price of food and a large fall in the sale price of crops, was intriguing. If the prices were from the same time period and if crops produced locally were consumed locally, one would expect that a large rise in food prices would mean that there was a large rise in sale prices received for crops sold. On the other hand, if the prices reported were at different times of the year and food products were transported from other places, then this may reflect significant seasonal variation specific to this location, with low sale prices at harvest time and high food prices in the lean season. The limited correlation

[13] These issues could be better analyzed with panel data and financial diaries.

among the shocks that could lead to a domino effect for a household offers room for developing mechanisms that can better cushion the household from shocks.

TABLE 8: CORRELATIONS AMONG MAJOR SHOCKS *

			Correlation Coefficient
Unexpected increase in input prices;	*and*	Large rise in price of food	0.30
Large fall in sale prices for crops;	*and*	Large rise in price of food	0.23
Illness or accident of household member;	*and*	Large rise in price of food	0.20
Crop disease or crop pests;	*and*	Large fall in sale prices for crops	0.19
Break-up of the household;	*and*	Communal fights	0.19
Lower crop yields due to drought or floods;	*and*	Crop disease or crop pests	0.15
End of regular aid or remittances from outside household;	*and*	Large fall in sale prices for crops	0.14

*The second shock listed is the shock most heavily correlated with the first shock listed in each cell.

Approximately half of all the shocks experienced were of social or economic origin. Nevertheless, a greater number of households were exposed to shocks caused by nature (Table 9). While half the shocks reported were man-made such as thefts, accidents, and fights (and therefore, could be prevented to a large extent), about one-third of shocks were clearly caused by nature in the form of floods, drought, crop disease, crop pests, and fire. However, more households experienced natural than man-made shocks, with as many as 2,187 households experiencing natural shocks compared to 1,547 households that experienced man-made shocks. Shocks experienced by 1,421 households could not be clearly classified as either man-made or natural. For instance, 1,382 households simply reported reductions in livestock, which may be due to theft, wandering off, or death of livestock. The remaining shocks in this ambiguous group consisted of dwelling damage (127), which could have been caused by vandalism or some natural event, such as flood or fire, and "other" (19).

2,187 households experiencing natural shocks compared to 1,547 households that experienced man-made shocks.

TABLE 9: ORIGIN OF SHOCK: NATURAL OR MAN-MADE*

Origin of Shock	No. of Shocks	No. of Households Exposed
Natural	2,269	1,833
	(30%)	(75%)
Man-made	3,808	1,547
	(50%)	(63%)
Ambiguous	1,528	1,421
	(20%)	(58%)

*Percentages reported in the first column indicate the proportion of total shocks stemming from the specified origin. Percentages in the second column indicate the proportion of total households in the sample that experienced a shock stemming from the specified source.

IV. SHOCK COPING DEVICES

Coping devices are intended to help households restore their lives to pre-shock welfare levels as much as possible,. While some coping methods may have low impacts on future welfare (such as dissaving from surpluses stored during good times), other methods (such as selling productive assets used in farming) may leave a household considerably more vulnerable.

A little more than half the shocks were responded to with some coping mechanism (Table 10). Of the 7,605 shocks reported within the sample, 4,968 shocks were followed by some response from the household to try to restore its former welfare level.

Of the 7,605 shocks reported within the sample, 4,968 shocks (65%) were followed by some response from the household to try to restore its former welfare level.

A. TYPES OF COPING DEVICES

Table 10 shows the number of times each device was used as a coping mechanism. Note that a given household might report using a certain coping method several times as a primary device if the same method was used in response to different shocks.

The most commonly reported primary coping mechanism was to spend "cash savings." Respondents were asked to list, in order of importance, up to three methods they used to try to regain their pre-shock welfare level. The four most prominent devices accounted for 91% of the primary coping mechanisms used: spent cash savings, worked more, sold animals, and sold more crops.

The four most prominent devices accounted for 91% of the primary coping mechanisms used: spent cash savings, worked more, sold animals, and sold more crops. Among the four, cash savings accounted for 80% of all primary coping devices.

In this study, cash savings refers to any cash stored either at home or in an external account, such as a formal institution, ROSCA, or friend's home. This category accounted for 80% of all primary shock-coping devices. Recall that only 14% of the sampled households reported any savings with external agents, while almost all households reported cash kept at home[14].

TABLE 10: PRIMARY, SECONDARY AND TERTIARY COPING METHODS

Coping Mechanisms	No. of Times Used as Primary Device	No. of Times Used as Secondary Device	No. of Times Used as Tertiary Device	Total
Spent cash savings	3,377	129	2	3,508
Worked longer hours, worked more	199	118	12	329
Sold animals	150	138	2	290
Sold more crops	92	82	8	182
Received help from government	38	23	--	61
Borrowed money from relatives	33	25	--	58
Spiritual effort (prayer, sacrifices, etc.)	28	30	2	60
Started a new business	19	23	3	45
Stopped selling/sold less/didn't sell crops	18	1	--	19
Sold physical assets (tools, furniture, etc)	14	19	2	35
Received unspecified help from relatives	11	10	1	22
Stopped the business	8	2	--	10
Reduced food consumption	7	4	--	11
Sent children to live with relatives	7	2	--	9
Non-working household members started working	6	--	--	6
Went elsewhere to find work	6	5	--	11
Borrowed money from friend	6	4	--	10

[14] In the base line survey, for this query, we did not separate cash kept at home vs. cash kept with external agents. The end line survey will add a separate option for both types of savings.

Coping Mechanisms	No. of Times Used as Primary Device	No. of Times Used as Secondary Device	No. of Times Used as Tertiary Device	Total
Rented out farmland	6	3	1	10
Consumed lower cost, less preferred foods	5	23	1	29
Sold farmland	4	5	--	9
Received help from NGO	4	1	--	5
Received cash help from relatives	3	--	--	3
Received in-kind help from relatives	3	--	--	3
Borrowed money from money lender	3	6	3	12
Removed children from school to work	2	--	--	2
Borrowed in-kind from grocer	1	--	--	1
Borrowed money from unspecified source	1	--	--	1
Borrowed money from bank, MRFC, etc.	1	3	--	4
Received help from religious institution	1	3	--	4
Received unspecified help from friends	1	1	--	2
Reduced non-food expenditure	--	19	10	29
Borrowed money from employer	--	1	--	1
Other	150	37	0	187
Total	4,204	717	47	4,968

Selling livestock and poultry was the most-used secondary coping mechanism. Selling livestock accounted for 19% of secondary shock responses, followed closely by use of "cash savings" (18%), working more (17%), and selling more crops (12%). The four most prevalent secondary coping mechanisms accounted for 65% of all secondary mechanisms used.

The most frequently reported tertiary response was working more hours. Increasing the amount that household members worked accounted for 12 of the tertiary responses (26%), while reducing non-food expenditures accounted for 10 responses (21%), and selling more crops occurred eight times (17%).

Interestingly, a reduction in non-food expenditures was only mentioned as a secondary and tertiary coping tactic. It was only listed as a response for a total of 29 shocks and never as the most important response to the shock. This may indicate that most households are already consuming non-food goods at very low levels and thus have difficulty reducing non-food expenditures in order to adjust to shocks.

Borrowing money, when used as a coping tactic, was almost exclusively from informal sources. While borrowing was listed as a coping device for approximately 80 different shocks, most of these were loans from informal sources. On only four occasions was a formal loan indicated as a coping mechanism.

While borrowing was listed as a coping device for approximately eighty different shocks, most of these were loans from informal sources.

B. SHOCK COPING LEVELS

We classified the coping devices into stress-level categories, based on the devices' probable impact on the household's longer-term income in the future, as well as on the household's capacity for dealing with other future economic stressors. Adapting the classification of Montgomery (1996) to suit the Malawian context, we designated three levels: low-stress, medium-stress, and high-stress.

Low-stress coping mechanisms are typically most effective in helping households address minor unexpected income shortfalls. They consist of short-term actions, involve relatively low values, and are reversible or have little to no lasting negative impact on the household.

Medium-stress coping mechanisms are less reversible. They may also reduce capacity to deal with future shocks and, thereby, lead a household down a road to deeper poverty, especially if an initial economic stress event is closely followed by subsequent shocks. For example, selling more crops than usual, or even selling sooner than planned, may irreversibly decrease the year's food stocks and raise the likelihood of food shortages later the same year. Starting a new business may require capital investments that cannot easily be undone. Borrowing may incur interest costs as well as future obligations.

High-stress coping mechanisms are difficult to reverse, have a negative impact on long-term income potential, and often substantially reduce capacity to deal with future shocks. Use of high-stress mechanisms can easily lead a household into deeper poverty, from which it may not be able to recover. For example, selling assets like farmland or removing children from school reduces long-term earning potential, lowers long-term household welfare, and significantly heightens household vulnerability. A detailed description of how the coping devices of rural Malawi are classified is presented in Table 11.

TABLE 11: CLASSIFICATION OF COPING MECHANISMS

Low-Stress Mechanisms	Medium-Stress Mechanisms	High-Stress Mechanisms
Sent children to live with relatives	Spent cash savings	Sold assets (tools, furniture, etc.)
Worked longer hours, worked more	Sold more crops	Sold farmland
Non-working household members started to work	Started a new business	Long term renting out of farmland
Went elsewhere to find work for more than one month	Borrowed money from relatives	Sold animals
Received help from NGO	Borrowed money from money lender	Removed kids from school to work
Received help from religious institution	Borrowed money from bank, MFRC, etc.	
Received help from government	Borrowed money from friend	
Reduced food consumption	Borrowed money from unspecified source	
Reduced non-food expenditures	Borrowed in-kind from grocer	
Consumed lower-cost, less-preferred food		
Spiritual effort (prayer, sacrifices, etc.)		
Received cash help from relatives		
Received in-kind help from relatives		
Received unspecified help from relatives		
Stopped selling, sold less, didn't sell crop(s)		
Stopped the business		
Received unspecified help from friends		

Source: Adaptation of classification by Montgomery (1996).

Tables 12 and 13 below show the frequency with which low-, medium-, and high-stress coping devices were used for primary, secondary or tertiary responses by the sampled households. Medium- and low- stress coping devices were used by the majority of the households (Table 12). Of the 2,339 households that were exposed to at least one negative shock in a year, 1,968 (84%) used some coping device. Of those using coping devices, medium- and low-stress coping devices were used by 1,684 households (86%).

TABLE 12: NUMBER OF HOUSEHOLDS, BY STRESS COPING LEVELS

Items	No. of Households
Any user of high stress coping devices	284
Any user of medium-stress coping devices	501
Any user of low-stress coping devices	1,857
Total number of coping device users	1,968
No coping device users	396
Grand total of households experiencing shocks	2,339

Of the 2,339 households that were exposed to at least one negative shock in a year, 1,968 (84%) used some coping device. Of those using coping devices, medium- and low-stress coping devices were used by 1,684 households (86%).

Note: The numbers do not add up to the total number of device-users since the categories are not exclusive, i.e. a household that uses high-stress devices is also likely to use medium- and maybe low-stress devices and so it will be included in the other two groups. It is not the case that the high-stress device-using households use only high-stress mechanisms; they tend to use all three types.

The largest percentage of shocks was addressed only with medium-stress coping devices (Table 13). While only about 501 households reported using medium-stress mechanisms among the 1,968 households that use any coping device (Table 12), among the 4,968 welfare-decreasing shocks that households responded to through some coping devices, in attempts to restore previous welfare, about 2,412 (49%) could be classified as medium-stress coping mechanisms. Low- and high-stress coping devices were also combined with medium-stress devices.

TABLE 13: NUMBER OF SHOCKS, BY STRESS COPING LEVELS

Stress Levels	No. of Shocks	% to Total
Low only	86	1.8%
Medium only	2,412	49%
High only	25	0.5%
Low + medium	1,280	26%
Low + high	7	0.1%
Medium + high	603	12%
Low + medium + high	510	10%
ALL	4,968	100%

Most of the medium-stress devices involved use of finance, especially cash savings (Table 14). Of the 4,805 shocks that were dealt with using medium-stress devices (either exclusively or in combination with low- or high-stress coping devices), finance constituted about two-thirds of the devices. Use of cash savings (and not loans) accounted for about 43% of the reported coping devices. Use of loans (and not cash savings) accounted for about 6%, while use of both cash savings and loans accounted for 16% of all reported devices used. Recall that cash savings captures money stored in external accounts, as well as cash kept at home.

TABLE 14: NUMBER OF MEDIUM-STRESS COPING DEVICES, BY FINANCIAL DEVICES

Medium Stress Coping Devices	No. of Shocks	% to Total
Cash savings only	2,060	43%
Loans only	298	6%
Savings and loans	755	16%
Other non-financial devices	1,692	35%
TOTAL	4,805	100%

Of the 343 households that experienced shocks and had access to external savings accounts, about 74% used savings as coping devices.

The extent to which households used loans and savings as coping devices could have been affected by their access to external finance. We examined the association between finance as a coping device and access to external finance reported by the households. Access was captured through the history of the

household in terms of deposits held at external locations and loans taken in the past two years from people or institutions outside the household. Results are presented in Tables 15 and 16.

Access to external savings was associated more with use of savings as a coping device, than access to loans was associated with borrowing as a coping device (Tables 15 and 16).[15] Of the 343 households that had access to external savings accounts, about 74% used savings as coping devices. But, of the 757 households that could access loans, only 40% reported using loans as coping devices. Also of interest is that while 43% of those who had access to loans reported using savings as coping devices, only 4% of those that had access to savings used loans as coping devices.

Of the 757 households that experienced shocks and that could access loans, only 40% reported using loans as coping devices.

While 43% of those who had access to loans reported using savings as coping devices, only 4% of those that had access to savings used loans as coping devices.

TABLE 15: ACCESS TO EXTERNAL FINANCE AND USE OF FINANCE AS COPING DEVICE (NUMBER HOUSEHOLDS REPORTING)

Use Coping Devices		Have Access to External Finance	
Used loans	*Used savings*	*External savings*	*External loans*
No	No	76	131
No	Yes	190	322
Yes	No	15	72
Yes	Yes	62	232
	Total	343	757

TABLE 16: ACCESS TO EXTERNAL FINANCE AND USE OF FINANCE AS COPING DEVICE AMONG THOSE EXPERIENCING SHOCKS (% OF HOUSEHOLDS REPORTING)

Items	No. of Households	% of Use to Access
Used savings having access to savings	252 of 343	74%
Used loans having access to loans	304 of 757	40%
Used savings having access to loans	322 of 757	43%
Used loans having access to savings	15 of 343	4%
Did not use loans having access to loans	131 of 757	17%
Did not use savings having access to savings	76 of 343	22%

Sale of animals and poultry was the most commonly used high-stress coping method (Table 17). Among high-stress devices, the sale of animals and poultry was used to address a total of 290 shocks (84% of the high-stress coping mechanisms).[16] This was followed by selling assets (occurring 35 times, representing 10% of the total), renting farmland (occurring nine times, representing 3% of the total), and selling farmland (occurring nine times, representing 3% of the total). Removing children from school in order to work was very rare, occurring only twice.

[15] For this analysis, households that reported outstanding loan balances and that had borrowed in the two years prior to the survey, and households that hold savings accounts currently or have held a savings account in the two years prior to the survey, were considered to be households with access to external loans and savings.

[16] There is a possibility that some households may save in animals and poultry and may sell them as needed (see footnote 19 in the next section). Therefore, sale of animals and poultry could be considered as a medium not a high-stress coping device. However, our survey did not gather enough information on the reasons for holding livestock and poultry to clearly classify the device as a medium-stress mechanism. Our limited qualitative enquiry led us to believe that households generally sold animals and birds that were used in their farming in times of high stress and that such sales can be considered a high-stress device.

TABLE 17: THE HIGH-STRESS COPING DEVICES USED

Coping Devices	No. of Shocks Addressed	% to Total
Sold animals	290	84%
Sold physical assets (tools, furniture, etc)	35	10%
Rented out farmland	10	3%
Sold farmland	9	3%
Removed children from school to work	2	1%
TOTAL	346	100%

Of the 346 recorded sales of assets, farmland, or livestock in response to a severe shock, 82 were sales of productive assets previously used in farming or business. This implies the coping mechanism used to address the shock and restore previous welfare levels could likely reduce long-term income potential for these households.

The average reported value of assets, livestock, or farmland sold in response to a shock was about MWK 5,200 (US$35). The median value of the sales was MWK 3,000 (US$20). Looking at just the assets, livestock, and farmland previously used in farming or other business production, the average value was MWK 7,200 (US$48) and the median still MWK 3,000 (US$20). Among sold assets, farmland, and livestock not previously used in farming or a household business, the average value was MWK 4,600 (US$31), and the median again MWK 3,000 (US$20).

The average reported value of assets, livestock, or farmland sold in response to a shock was about MWK 5,200 (US$35).

V. WHO USES COPING DEVICES?

The above discussion highlights that medium-stress coping devices were used by the majority of the households and that these measures included substantial use of financial devices. Low-stress coping mechanisms often involved use of social networks. High-stress devices included liquidation of assets. Household-related characteristics such as demographics, household composition, and asset levels, along with frequency and severity of the shocks and the effect on the community as a whole, are likely to influence access to, and choice of, coping mechanisms. We examine below the characteristics of high-, medium-, and low-stress coping-mechanism users as much as our data permit (Table 18). In the following analysis, households that used high-stress mechanisms *at least once* (whether as the primary, secondary or tertiary response to a shock) are classified as high-stress users. The rest of the households which used coping devices are classified as medium- and low-stress device users. Accordingly, 284 households were classified as users of high-stress mechanisms, and 1,684 households were classified as users of low- and medium-stress mechanisms.[17]

Households using high-stress coping devices were more food insecure than users of low-stress and medium-stress devices (Table 18). A higher proportion of users of high-stress coping mechanisms (49%) were severely food insecure, compared to the proportion of users of low- and medium-stress mechanisms (45%). Similarly, a lower proportion of high-stress device users (5%) were food secure, compared to the proportion of low- and medium-stress device users (9% of which were food secure). Recall from the previous sections that about 45% of sampled households were severely food insecure, meaning that they have significant problems with food access. Only 8% of households were categorized as food secure.

TABLE 18: HOUSEHOLD CHARACTERISTICS OF HIGH-, MEDIUM- AND LOW- STRESS COPING DEVICES

Items	High-Stress Device Users (n=284)	Low- and Medium-Stress Device Users (n=1,673)
Food security		
Severely food insecure (% reporting)	49%	45%
Food secure (% reporting)	5%	9%
Assets and income		
Cell phone ownership (% reporting)	11%	14%
Home ownership (% reporting)	98%	93%
Main occupation		
Farming (% reporting)	87%	80%
Household business (% reporting)	3%	6%
Salaried employment (% reporting)	6%	9%
Wage labor (% reporting)	3%	4%
Household demographics		

[17] We combined low- and medium-stress mechanism user households in the analysis since many households used the two categories together to provide a first glimpse of the characteristics of high-stress users versus other types of device users. It was also challenging to separate the households that exclusively used only one medium- or low-stress coping mechanism due to the combination of devices in these categories. If results are intriguing, we could attempt separate estimates for high, low and medium devices after the end line data are gathered in 2010.

Items	High-Stress Device Users (n=284)	Low- and Medium-Stress Device Users (n=1,673)
Households with one or more people working in salaried positions (% reporting)	11%	15%
Average family size (number)	5.75	5.12
Average number of children (number)	3.14	2.79
Average number of Chichewa writers (number)	2.45	2.08
Average number of English writers (numbers)	0.97	0.79
Households having at least one person who can write English (% reporting)	50%	45%
Use of financial services and social capital		
Outstanding informal loans (% reporting)	31%	25%
Outstanding formal loans (% reporting)	9.2%	11.5%
Can turn to family for help if an unfortunate event occurs (% reporting)	67%	73%

High-stress mechanism users held more land and houses than medium- and low-stress device users. Surprisingly, households using high-stress devices have about 10% more agricultural land on average (2.76 acres, compared to 2.54 acres among the low- and medium-stress users). While 98% of high-stress device users reported owning their home, 93% of low- and medium-stress device users owned their homes. If home ownership were considered a sign of wealth and access to better resources, this finding may be puzzling, since high-stress mechanisms have negative impacts on future income. We would expect to see households with sufficient resources avoid, if possible, use of high-stress devices if such assets could generate more income or could be used as collateral to secure loans. It may be, however, that most or all residents of rural areas own their homes and that renters tend to live in more urban areas and have better access to off-farm labor. In this case, home ownership may actually be a sign of having fewer income resources. Also, households with more assets, compared to those with fewer assets, are more able to liquidate those assets to cope with shocks.

Cell phone ownership among households using high-stress coping devices was only slightly lower than that of users of low-stress and medium-stress devices. About 11% of high-stress device-using households had a cell phone, while 14% of low- and medium-stress device users had a cell phone. Having a cell phone may itself improve a household's capacity to deal with shocks by providing better access to coping resources external to both the household and the community.

Households using high-stress devices received more cash and food aid from external sources, such as governments and churches, than households using low- and medium-stress devices.

Households using high-stress devices received more cash and food aid from external sources, such as governments and churches, than households using low- and medium- stress devices. High-stress device- using households received, on average, MWK 3,400 (US$23), compared to MWK 2,700 (US$18) received by low- and medium-stress device-using households. This difference represents a 25% increase in average aid income received by high-stress device-using households.

Farming was the primary occupation among high-stress coping-device users. A greater proportion of high-stress device users (87%) described farming as the household head's main occupation, compared to the heads of low- and medium-stress device users (80%). Slightly fewer high-stress device-using households reported the main occupation of their household heads as a household business

(3%), salaried employment (6%), or wage labor (3%), compared to heads of households using low- and medium-stress devices (for which the respective percentages were 6%, 9%, and 4%). In addition, only 11% of high-stress mechanism households had one or more people working in salaried positions, compared to 15% of low- and medium-stress mechanism households, suggesting that stable income, especially when not affected by community wide shocks, could be associated with lower use of high-stress coping devices.

Household size was larger among high-stress device users. High-stress device households have an average of 5.75 household members and a median of six household members. Households using low- and medium-stress devices reported an average of 5.12 members, and a median of five household members. Also, high-stress device users had more children than other stress-device users. High-stress device-using households had an average of 3.14 children, while medium- and low- stress device using households had an average of 2.79 children. These differences in household size indicators were statistically significant, suggesting that household size, especially number of dependents, could play a significant role in the use of coping devices.

High-stress device-using households had more literate household members than other households. High-stress device-using households had an average of 2.45 Chichewa writers and 0.97 English writers. Low-and medium-stress device-using households had 2.08 Chichewa writers and 0.79 English-writers. This difference may be partly due to the fact that households using high-stress devices are larger. However, high-stress device-using households were also more likely to have at least one person who was literate in English. While 50% of high-stress device-using households have at least one person who can write in English, only 46% of low- and medium-stress device-using households had one person who could write in English. The slightly higher literacy rates among high-stress device-using households might reflect that some of the high-stress device users could have been using high-stress devices such as asset depletion in order to invest in education. They may have preferred to accumulate savings in physical assets that could easily be liquidated to address potential income shocks.[18] Data presented in Table 16 shows that about 95% of high-stress device users sold animals and farm land to cope with shocks.

A greater percentage (31%) of high-stress device using households had current outstanding informal loans than medium- and low-stress device users (25%).

High-stress device users were less connected with social networks.

A greater percentage (31%) of high-stress device-using households had current outstanding informal loans than medium- and low-stress device users (25%). This may reflect that some high-stress device-using households had recourse to high-stress mechanisms because they had already exhausted their informal borrowing options. But, this may also indicate that high-stress device-using households were simply utilizing a broader array of coping mechanisms (perhaps because they were forced to resort both to more types, as well as more stressful mechanisms, than medium- and low-stress users). Note that a smaller number of high- stress coping-device users reported an outstanding loan with *formal* lenders (9.2%) than low- and medium-stress coping device users (11.5%).

High-stress device users were less connected with social networks. If family members are a superior support type, then low- and medium-stress device users had slightly better social networks. Among high-stress device users, only 67% of households said they could turn to family for help if something unfortunate happened, while 73% of low- and medium- device users said they could turn to family.[19]

In order to understand the joint probability of a household using a high-stress coping device over low- and medium-stress coping devices, conditional on the

[18] One of our respondents, when asked if she had any savings with a bank or informal sources for rainy days, mentioned she has a mobile bank with four legs: her goat.

[19] Previous research shows that under some circumstances better-off families are outside the community social networks. If the high-stress users are better off and have assets, then they may not have family to depend on (they have stayed out of those social networks to protect their assets). Also, well-off families may not turn to poorer relatives for help. An early warning sign for famine (or other crises) in communities is when better-off families run out of resources to help others.

household experiencing a shock, we estimated a binomial probit model.[20] Results presented in Table 19 show the estimated change in probability for a household using a high-stress device associated with changes in each determinant, compared to low- and medium-stress coping devices.

TABLE 19: PROBABILITY OF USING HIGH-STRESS COPING DEVICES (BASE=MEDIUM/ LOW STRESS DEVICES): PROBIT ESTIMATES: MARGINAL EFFECTS (ELASTICITIES)

Determinants	Marginal Coefficient	Z Statistic
Number of shocks	0.031	7.72***
Household size	0.017	4.45***
Formal savings (dummy)	-0.012	-0.47
Formal loans (dummy)	-0.005	-0.01
Informal savings (dummy)	0.057	1.01
Informal loans (dummy)	0.010	0.61
Severely food insecure (dummy)	-0.005	-0.30
Salaried member (dummy)	-0.003	-0.09
Farming (dummy)	0.047	1.98**
Number of social networks	-0.007	-0.21
LR Chi-Square	95.28***	

*** and ** represent statistical significance at 1% and 5% levels, respectively.

The results above indicate that the number of shocks the household experienced, family size, and farming as an occupation, appeared to significantly affect the probability of a household using a high-stress mechanism compared to low- and medium-stress coping devices.

The number of shocks had the most statistically significant impact on whether a household used a high-stress device. Each additional shock experienced by the average household was associated with a 3% increase in the probability of using a high-stress device. The more shocks a household experienced, the more likely it was to use at least one high-stress coping device to deal with the shock.

Larger family size and farming were also associated with use of high- compared to medium- and low-stress coping devices. Each increase in family size increased the probability of using high-stress devices by about 1.7%. Farming as an occupation resulted in a 4.7% increase in the likelihood of using high-stress mechanisms.

Access to finance and the number of social networks were not statistically significant in affecting the likelihood of a household using high- rather than low- and medium-stress devices. However, it is of interest to note that access to formal savings or formal loans appeared to reduce the likelihood of using high-stress mechanisms, while access to informal loans or savings were positively associated with use of high-stress mechanisms. The number of networks appeared to be negatively associated with the use of high-stress devices, suggesting that social networks facilitate the household's use of lower-stress mechanisms.

The results imply that households exposed to a larger number of shocks, that have a larger household size and engage in farming, are more likely to use high- rather than low- or medium-stress coping mechanisms. However, households with better access to formal finance and social networks would more likely use low- or medium-stress coping mechanisms than high-stress coping devices that may result in a reduction of household welfare in the long run.

Households exposed to a larger number of shocks, with a larger household size, engaged in farming, are more likely to use high- compared to low- or medium-stress coping mechanisms.

Households with better access to formal finance and social networks are more likely to use low- or medium-stress coping mechanisms than high-stress coping devices.

[20] A probit regression model is a type of multiple regression model where the dependent variable is discrete/categorical. The distribution of the dependent variable is a cumulative normal curve. See Maddala, G.S. (1983) for more details.

VI. WHO ARE THE NONUSERS OF COPING DEVICES?

About 17% of households exposed to shocks did not use any mechanism to cope with the shock, which may indicate extreme vulnerability. Among the 2,339 households that experienced one or more severe negative shocks, about 396 households (17%) reported not using any coping mechanism to try to restore previous welfare. Of these, 173 (45%) experienced one shock, 123 (32%) experienced two shocks, 47 (12%) experienced three shocks, and 41 (11%) experienced four or more shocks. While it could be that the shocks experienced by these households were not severe enough to merit a response, the question was asked so as to elicit shocks with a severe negative effect on the household's welfare. Thus, it is more likely that this significant absence of shock responses indicates lack of access to coping mechanisms and, consequently, a high degree of vulnerability among these households. Table 20 indicates the types of shocks for households that reported doing nothing to cope with the shock. These shocks were indeed similar to those experienced by households that reported some response to cope with the shock.

About 17% of households exposed to shocks did not use any mechanism to cope with the shock.

TABLE 20: SHOCKS EXPERIENCED BY NON-RESPONDING HOUSEHOLDS

Shocks	Frequency	% of Total
Livestock died or were stolen	260	35%
Crop disease or crop pests	89	12%
Lower crop yields due to drought or flood	67	9%
Large fall in sale prices for crops	65	9%
Large rise in price for food	58	8%
Unexpected increase in input prices	53	7%
Theft	44	6%
Business failure	38	5%
Illness or accident of household member	23	3%
End of regular assistance, aid, or remittance	12	1.6%
Dwelling damaged, destroyed by fire, flood	9	1.2%
Death of household head or other household member	7	0.9%
Break-up of the household	6	0.8%
Communal fights	2	0.3%
Loss of salaried employment	1	0.1%
Other	11	1.5%
TOTAL	745	100%

We examined the characteristics of nonusers of any device to cope with the shock. Results are presented in Table 21.

Non-device users had slightly worse food security scores than households using at least one coping device to address shocks.

Non-device users had slightly worse food security scores than households using at least one coping device to address shocks. While 8% of households using coping devices were food secure, 5% of non-device using households were food secure. And, while 46% of households using devices were moderately food secure, 40% of non-device using households were moderately food-secure.

The median value of total assets owned by non-device users was MWK 35,000 (US$236) while it was MWK 40,500 (US$273) among device users.

Non-device users owned fewer assets. About 10% of non-device users had cell phones while 14% of coping device users had cell phones. Also, the median value of total assets owned by non-device users was MWK 35, 000 (US$236) while it was MWK 40, 500 (US$273) among device users.

TABLE 21: CHARACTERISTICS OF NON-RESPONDERS

Characteristics	Non-Device Users	Device Users
Food secure	5%	8%
Moderately food secure	40%	46%
Cell phone ownership	10%	14%
Average km out from mobile bank call point	8.3	7.97
Average family size	4.8	5.2
Average number of children	2.58	2.84
At least one HH member who can read Chichewa	84%	87%
At least one HH member who can write Chichewa	82%	86%
At least one HH member who can read English	45%	49%
At least one HH member who can write English	40%	46%
Average Chichewa readers	2	2.2
Average Chichewa writers	1.88	2.13
Average English readers	0.78	0.9
Average English writers	0.67	0.82
Have current outstanding loan balances	27%	32%
Have current informal loan balances	23%	26%
Average number of current informal loans	0.25	0.31
Have no one to help	12%	7%
Perceive that family will help them if needed	64%	73%
Average number of support networks	1.4	1.7

Non-device users appeared to have marginally smaller families. Among non-device users, the average family size was 4.8 members, compared to 5.2 members among device users. They also reported 0.26 fewer children on average than device-using households. Non-device using households had an average of 2.58 children, while device-using households had an average of 2.84 children.

Non-device users appeared slightly less literate in both Chichewa and English. There was a smaller percentage of non-device users (82%) with at least one household member who could write Chichewa, compared to 86% among device-using households. In addition, only 40% of non-device users could write English, while 46% among device -using households could.

While 32% of device-using households had outstanding loan balances, 27% of non-device users had outstanding loans.

Non-device users were less likely to have outstanding loans. While 32% of device-using households had outstanding loan balances, 27% of non-device users had outstanding loans. This appears driven mostly by a higher incidence of current informal loans among device users (26% of device users have informal loan balances, compared to 23% of non-device users). In addition, the average number of outstanding informal loans among device users was 0.31 and among non-device users was about 0.25. This may indicate more constrained borrowing capability by households that did not use coping devices compared to those that did. This could have important implications for improving household welfare for the most vulnerable by expanding access to credit.

Non-device users appeared to have weaker social capital. While 7% of device-using households reported having no one to help, 12% (almost twice the proportion) of the households not using any coping device reported not having anyone they could turn to for help in the event of a shock. In addition, non-device users are less likely to believe family would help them. 64% of non-device

users said family would help them if needed, compared to 73% of coping device users. Non-device users also reported an average of 1.4 different types of support networks (family, friends, church, etc.), compared to an average of 1.7 types of supporters by device-using households.

TABLE 22: PROBABILITY OF USING A COPING DEVICE (BASE = NO DEVICE USED) PROBIT ESTIMATES: MARGINAL EFFECTS (ELASTICITIES)

	Marginal Coefficient	Z Statistic
Number of shocks	0.056	13.9***
Household size (number)	0.005	1.58*
Formal savings (dummy)	0.002	0.08
Formal loans (dummy)	0.021	0.76
Informal savings (dummy)	-0.066	-1.53*
Informal loans (dummy)	-0.003	-0.21
Severely food insecure (dummy)	-0.001	-0.65
Salaried member (dummy)	-0.003	-0.11
Farming (dummy)	-0.022	-1.03
Number of Social networks	0.059	2.05**
LR Chi-Square	210.76***	

***, **, and * represent statistical significance at 1% levels, 5% levels, and 10% levels, respectively.

In order to understand the joint probability of a household using any coping device over none, conditional on the household experiencing a shock, we estimated a binomial probit model. Results presented in Table 22 show the estimated change in probability for a device-using household, associated with changes in each determinant, compared to non-device users.

The number of shocks the household experienced had the most statistically significant impact on whether a household chose to use a coping device. Each additional shock experienced by the average household was associated with a 5.6% increase in the probability of using a coping device to handle shocks. The more shocks a household experienced, the more likely it was to use at least one coping device to deal with some shocks.

Each additional shock experienced by the average household was associated with a 5.6% increase in the probability of using a coping device to handle shocks.

The likelihood of using coping devices increased by 5.9% for the households that were able to turn to social networks for help in the event of a shock.

The number of supporters appeared to be important. If the household was able to turn to social networks for help in the event of a shock, then the likelihood of using coping devices increased by 5.9%. Additionally, an increase in household size by one unit was associated with a 0.5% increase in the likelihood of using coping devices.

Access to informal savings accounts was significantly associated with the likelihood of not using coping devices. Increased access to informal savings accounts by one unit was associated with a 6.6% reduction in use of a coping device.

Increased access to informal savings accounts by one unit was associated with a 6.6% reduction in the likelihood of using a coping device.

Access to formal loans or savings accounts was positively associated with the use of coping devices.

While not statistically significant, access to formal loans or savings accounts was positively associated with the use of coping devices. The result was especially noticeable for formal loans that could increase the use of coping devices by 2.1%.

The results above indicate that the probability of households resorting to shock-coping devices goes up with an increase in the number of shocks, the availability of wider or better social networks, larger families, and access to formal finance, and reduces with access to informal finance.

VII. LIFE-CYCLE EVENTS

Another important dimension of risk and vulnerability to worse household welfare outcomes stems from life-cycle events. Recall that, for this study, we considered common and fairly expected events to be life-cycle events rather than shocks, including events such as births, weddings, school graduations, and those such as funerals that are only unpredictable in their timing,. These life-cycle events are often more predictable than shocks (which are uncommon and mostly unexpected events that strike a household without much prior warning) that we discussed above. Therefore, households frequently can plan for life-cycle events in advance. Nevertheless, they still involve a substantial element of unpredictability and can turn into a shock if the household is unprepared, requiring high recovery costs that can strain a household's resources.

Three-fourths of the sample (1,948 households) reported some life-cycle event occurring during the one-year period prior to the survey date (Table 23). There were a total of 2,945 life cycle events reported in the sample. The average number of life-cycle events, per household that experienced an event, was 1.5. Almost half of the sample experienced just one event, about one-quarter of the households experienced two events, and 7% had three or more events.

The average number of life-cycle events per household that reported experiencing an event was 1.5.

TABLE 23: NUMBER OF LIFE-CYCLE EVENTS EXPERIENCED BY HOUSEHOLDS

Number of Life-Cycle Events	Number of Households	% of Total Sample
0	511	21%
1	1,176	48%
2	585	24%
3	154	6%
4	28	1%
5	5	0%

Payment of school fees accounted for the majority of life-cycle events *(Table 24)*. About 1,542 households reported paying for primary school fees, 287 households for secondary school, and 19 households for post-secondary fees. This finding could indicate that investments in education are anticipated to build human capital. The next most common life-cycle event was the birth of a child, with 411 households (17% of all households in the sample) experiencing a birth within the last year. There were 314 households (13%) reporting funeral expenditures (which could include funerals of non-household relatives), 233 (10%) reporting weddings within the household, and 139 (6%) reporting the adoption or fostering of a child. The adoption finding may be a result of unexpected deaths or illnesses of relatives with dependents.

About 95% of the life-cycle events required that households use some of their cash savings to pay for related expenses.

TABLE 24: NUMBER OF HOUSEHOLDS REPORTING LIFE CYCLE EVENTS, BY TYPE OF EVENTS*

Life-Cycle Event	No. of Households
Paid education fees	1,613
Paid primary school fees (incl. uniform	1,542
Paid secondary school fees	287
Paid post-secondary school fees	19
Birth	411
Funerals	314
Wedding within the household	233
Adoption/fostering a new child	139

About 95% of the life-cycle events required that households use some of their cash savings to pay for related expenses (Table 25). The median amount spent on all expenses was MWK 800 (US$5.35)[21]. The most expensive events involved paying for education and ranged from US$3 to US$66. To provide context on the use of savings to pay for such events, recall that only 343 households (14%) in our sample reported having at least one savings account with an external agent at the time of our survey. These accounts were held predominantly with formal service providers (84%), while some few informal savings accounts (14%) were held with friends and relatives and ROSCAs. The average deposit balance with formal institutions, at the time of our survey, was about US$140, while it was US$29 with informal sources. Nonetheless, almost all households reported holding some cash at home. It is also possible that some households might have held larger amounts prior to the survey period and depleted or drew down their savings to cope with the hungry season, shocks, and life-cycle events.

About 95% of the life-cycle events required that households use some of their cash savings to pay for related expenses.

TABLE 25: LIFE EVENT EXPENSES MET FROM CASH SAVINGS

Life-Cycle Events	Median Savings Used		No. of Events
	(MWK)	US$	
Paid post-secondary school fees	10,000	$66	19
Paid secondary school fees	3,750	$24	276
Wedding within the household	2,000	$13	225
Funeral rites	2,000	$13	295
Birth	1,000	$6	391
Adoption/fostering a new child	1,000	$6	79
Paid primary school fees	450	$3	1499
TOTAL	800	$5	2784

Assets were also sold to pay for life-cycle events (Table 26). About 200 events (experienced by 175 households) required the sale of assets to help cover the event's cost. The median value of assets sold was MWK 2,000 (US$13). The greatest proportion of asset sales (66 events) came from the cost of primary school fees. The highest-valued asset sales came from costs associated with secondary school fees (median of MWK 4,000/US$27), followed by funeral rites and weddings (median of MWK 2,000/US$13 for each). Of the 200 reported asset sales, 48 (24%) included productive assets previously used either in farming or a household business. A little more than half of these productive asset sales were for education expenses (14 for primary school fees and 11 for secondary school fees). Of the remaining productive-asset sales, nine were related to funeral expenses, eight to weddings, four to births, and two to adoptions.

The highest-valued asset sales came from costs associated with secondary school fees (MWK 4,000 / US$27), followed by funeral rites and weddings (MWK 2,000 / US$13).

Households with savings may not sell their assets to pay for life cycle events but those with loans may deplete their assets to pay for such events.

Asset sales were reported by households that did not hold any savings accounts with external agents, formal or informal. However, about 30% of these households reported an outstanding loan with an informal source. This could imply that households with savings may not sell their assets to pay for life-cycle events, but those with loans may deplete their assets to pay for such events.

[21] The variation in amounts spent was too high to summarize with simple averages. Therefore, we present information on the median amounts spent on the events. The median statistic provides information for the sample household that lies at the middle of the total sample. Note that at most half the households will have values less than the *median* and half, at most, will have values greater than the median.

TABLE 26: LIFE EVENT EXPENSES MET FROM ASSET DEPLETION

Life-Cycle Events	All Assets		Productive Assets	
	Median Value of Assets Sold (MWK)	*Number Events*	*Median Value of Assets Sold (MWK)*	*Number events*
Paid primary school fee	950	66	1,521	14
Paid secondary school fee	4,000	34	6,815	11
Funeral rites	3,000	35	4,217	9
Wedding within the family	3,000	31	3,710	8
Birth	2,000	32	2,522	4
Adoption/fostering child	1,500	2	1,500	2
TOTAL	2,000	200	3392	48

VIII. SUMMARY AND IMPLICATIONS OF THE STUDY

This study, based on a quantitative survey of 2,459 rural households in Central Malawi, conducted from February to April of 2008, documented the shocks experienced by households of various poverty levels and the coping devices used to survive and try to restore their households to a pre-shock welfare level. The study examined the characteristics of high-, medium-, and low-stress coping device users and the determinants of the use of coping devices to understand the roles played by external finance and social networks.

For this study, shocks are defined as uncommon and mostly unexpected events that strike a household. Common and fairly expected events, such as births, weddings, school graduations, and events such as funerals that are only unpredictable in terms of timing, are considered to be life-cycle events, not shocks. Coping mechanisms/devices are measures taken by households to help them survive and to restore their lives to pre-shock welfare levels (as much as possible).

A. MAJOR FINDINGS OF THE STUDY

Shocks were very common in the sample. Almost all households in the sample (96%) reported experiencing at least one severely welfare- reducing shock in a year. Over a period of 12 months preceding the survey, 2,339 households reported a total of 7,605 shocks that affected their welfare. This is an average of three negative shocks per household in the study year. Most households experienced between one and five severe welfare-decreasing shocks, with a little more than 20% of all households reporting two shocks and another 20% reporting three shocks.

The most commonly reported shock was the theft or death of livestock and poultry. About 56% reported loss of livestock or poultry within the 12 months prior to the interview date. The second most common shock was a large rise in the price of food (47%), followed by illness or accident affecting a household member (39%).

Three-fourths of the shocks directly lowered household incomes. Most shocks were idiosyncratic, affecting only individual households, but many shocks also affected the community. Food price hikes were the only major shock that affected most of the community, while livestock and poultry loss affected only one-third of the community.

Two thirds (4,968) of the reported 7,605 shocks were followed by some coping response by the household to try to restore its former welfare level. The four most prominent responses accounted for 91% of the primary coping mechanisms used: spent cash savings, worked more, sold animals, and sold more crops.

Medium-stress coping devices such as savings and loans were used by the majority of the households. Use of cash savings accounted for 80% of all four primary coping devices. These savings were held with external agents and/or at home. While borrowing was listed as a coping device for approximately 80 different shocks, most of these were loans from informal sources. Of the 343 households that experienced shocks and had access to external savings accounts, about 74% used savings as coping devices. Of the 757 households that experienced shocks and that could access loans, only 40% reported using loans as coping devices. While 43% of those who had access to loans reported using savings as coping devices, only 4% of those that had access to savings used loans as coping devices.

High-stress coping devices, such as the sale of assets, were also reported in the sample. The average reported value of assets, livestock, or farmland sold in response to a shock was about MWK 5,200 (US$35). Households that used such high-stress coping devices, compared to households using low- and medium-stress devices, owned slightly higher levels of assets in land and houses, but also received more cash and food aid from external sources, such as governments and churches. A greater percentage (31%) of such households had current outstanding informal loans than medium- and low-stress device users (25%). They were also less connected with social networks. It is likely that households exposed to a larger number of shocks, had a larger household size, and engaged in farming, used high- compared to low- or medium-stress coping mechanisms.

Households with better access to formal finance and social networks were more likely to use low- or medium-stress coping mechanisms than high-stress coping devices that could result in a reduction of household welfare in the long run.

Non-coping device users had slightly worse food-security scores and owned slightly lower levels of assets than households using at least one coping device to address shocks. While 32% of device-using households had outstanding loan balances, 27% of non-device users had outstanding loans. They also appeared to have weaker social capital. Increased access to informal savings accounts was associated with a reduction in the likelihood of using a coping device. But access to formal loans or savings accounts was positively associated with the use of coping devices.

Life-cycle events such as births, weddings, schooling, and funerals were common. Three-fourths of the sample reported some life-cycle event occurring during the one-year period prior to the survey date. There was a total of 2,945 life cycle events reported in the sample, averaging 1.5 events per household. About 95% of the life-cycle events required that households use some of their cash savings to pay for related expenses. The highest-valued asset sales came from costs associated with secondary school fees (MWK 4,000/US$27), followed by funeral rites and weddings (MWK 2,000/US$13). Households with savings may not sell their assets to pay for life cycle events but those with loans may deplete their assets to pay for such events.

B. CAN ACCESS TO FORMAL FINANCE HELP HOUSEHOLDS COPE WITH SHOCKS?

The above findings show that most of the sample's households exposed to shocks used medium-stress coping devices. These included use of finance, especially savings, including savings kept at home and/or with external agents.

Access to savings, defined as savings accounts held by the household with external agents currently and/or in the two years prior to the survey, was associated more with the use of savings as a coping device than with access to loans. Access to loans, defined as loans outstanding for the household with external agents currently and/or taken in the two years prior to the survey, was used less as a coping device. Borrowing money, if used as a coping tactic, was almost exclusively from informal sources.

The results also show that with increased access to formal finance and social networks, the probability of households using high-stress coping devices declined.

Also, increased access to informal savings accounts was associated with a reduction in the likelihood of using a coping device. While not statistically significant, access to formal loans or savings accounts was positively associated with the use of at least one coping device.

It is notable that about 95% of the life-cycle events required that households use some of their cash savings kept at home or with external agents, mostly formal, to pay for related expenses. Interestingly, asset sales to pay for expenses were only reported by households that did not hold any savings accounts with external agents, formal or informal, although about 30% of these households had an outstanding loan with an informal source.

The study results provide some initial indication that with increased access to formal finance, especially savings services, the use of coping devices to deal with shocks could be increased and irreversible asset depletion, which may lead to reduced household welfare in the long run, could be averted. Also of note is that significant expenses are incurred to pay for education and funerals. These expenses are currently met through cash savings kept at home or with external agents.

C. WHAT ROLE FOR OIBM?

OIBM is a savings-led formal institution that is increasing its presence in the study area using the mobile bank that stops at six trading centers. The majority of formal institutions that mobilize deposits are located in only two of these trading centers, thus offering more market space for OIBM. The savings kept at home could potentially be mobilized by OIBM with appropriate savings products. There is considerable scope for developing short-term commitment savings to meet life-cycle events. OIBM could also develop products that could help save for education. Funeral insurance introduced by OIBM in September 2008 could help with meeting expenses incurred by such events.

Indeed, further inquiry is required to clearly assess the potential of formal finance to help households in rural Malawi better cope with shocks. Additional data from the same households, collected in another year, will help address the issues. Also, a companion study that captures the cash flows of 200 rural households that are users and nonusers of OIBM finance, using financial diaries, will help address the role of formal finance, especially products provided by OIBM.

REFERENCES

Adelman, Sarah and Geetha Nagarajan (2009), "Who Does Formal Finance Reach in Rural Malawi?", College Park, MD: IRIS Center, Assessing the Impact of Innovation Grants in Financial Services Project

Collins, Daryl, Jonathan Morduch, Stuart Rutherford and Orlanda Ruthven. (2009), "Portfolios of the Poor", New Jersey: Princeton University.

Coates, Swindale and Bilinsky. (2007), "Household Food Insecurity Access Scale (HFIAS) for Measurement of Household Food Access: Indicator", Guide Version 3.

Diagne and Zeller (2001), "Access to Credit and Its Impact on Welfare in Malawi", Research Report 116, International Food Policy Research Institute, Washington, D.C.

Ferguson, Michael (2008), "Financial Landscape Baseline: Service Innovations of Pro Mujer Peru", Washington, DC: Microfinance Opportunities, Assessing the Impact of Innovation Grants in Financial Services Project.

Maddala, G.S. (1983), "Limited-Dependent and Qualitative Variables in Economics". New York: Cambridge University Press.

Montgomery, Richard. (1996) "Disciplining or Protecting the Poor? Avoiding the Social Costs of Peer Pressure in Solidarity Group Micro-Credit Schemes." Sustainable Banking with the Poor, Occasional Paper No. 11. Washington, DC: The World Bank.

McGuinness, Elizabeth (2008), "Malawi's Financial Landscape", Washington, DC: Microfinance Opportunities, Assessing the Impact of Innovation Grants in Financial Services Project.

Rutherford, Stuart. (2000), "The Poor and Their Money", New Delhi: Oxford University.

Sebstad, Jennefer and Monique Cohen, (2001). "Microfinance, Risk Management and Poverty", Washington DC: CGAP, the World Bank.

USAID Poverty Assessment Tools (2009). 15 June 2009. www.povertytools.org.

ANNEXES

ANNEX A – PREVIOUS STUDIES UNDER THE PROJECT

Adelman, Sarah and Geetha Nagarajan (2009). "Who Does Formal Finance Reach in Rural Malawi?". College Park, MD: IRIS Center, Assessing the Impact of Innovation Grants in Financial Services Project.

Cohen, Zoe and Geetha Nagarajan (2009), "Market Segmentation and Outreach to the Poor: Results from Client Welfare Assessment Survey in Peru", College Park, MD: IRIS Center, Assessing the Impact of Innovation Grants in Financial Services Project.

Ferguson, Michael (2008), "Financial Landscape Baseline: Service Innovations of Pro Mujer Peru", Washington, DC: Microfinance Opportunities, Assessing the Impact of Innovation Grants in Financial Services Project.

Ferguson, Michael (2009) "An Appetite for Credit: A Study of Product Innovation in Pro Mujer Peru." Washington, DC: Microfinance Opportunities, Assessing the Impact of Innovation Grants in Financial Services Project

McGuinness, Elizabeth (2008). "Malawi's Financial Landscape", Washington, DC: Microfinance Opportunities, Assessing the Impact of Innovation Grants in Financial Services Project.

Meagher, Patrick (2009). "Constant Gardening: A Study of Malawi's Enabling Environment for Microfinance". College Park, MD: IRIS Center, Assessing the Impact of Innovation Grants in Financial Services Project.