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An Analysis of the Influence of Mobile Money on Saving Behavior and Kinship Pressure

EVIDENCE FROM NORTHERN TANZANIA

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Acronyms

Acronym	Definition
CaH	Cash at Home
EUR	EURO
ICT	Information and Communication Technology
IIA	Independence of Irrelevant Alternatives
MM	Mobile Money
MNO	Mobile Network Operator
ROSCAs	Rotating Savings and Credit Associations
RRM	Randomized Response Model
SG	Savings Group
TZS	Tanzanian Schilling

1. Introduction

1.1 Background

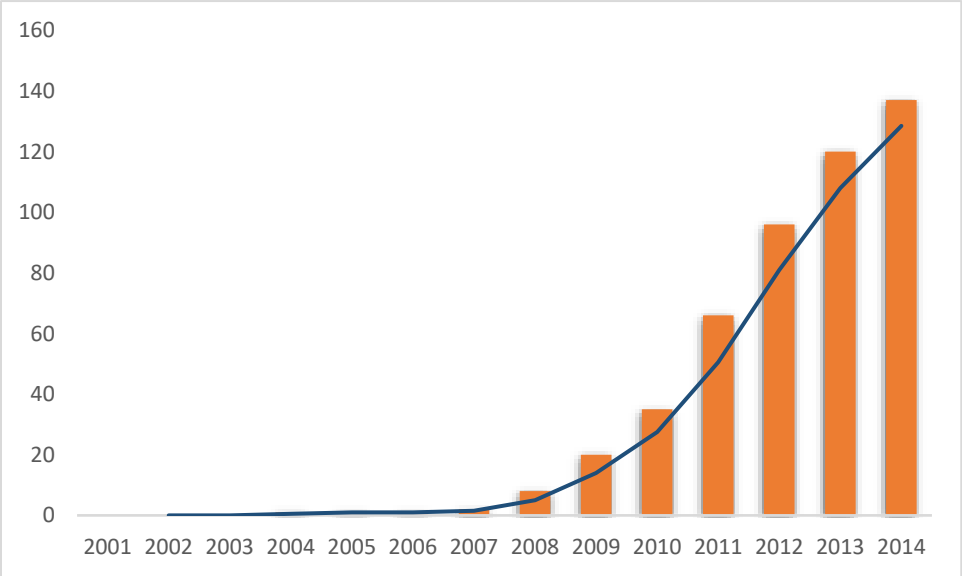
Jeffery Sachs understands the importance of the mobile phone to be the single most transformative tool for development (Must & Ludewig, 2010). Must and Ludewig (2010) expect the number of mobile phone subscriptions to exceed the number of people in the world within the next decade. The usage of information and communication technology (ICT) in some developing countries is more advanced and is even surpassing developed countries with its innovation. Especially in the area of telecommunication many people leapfrog and do not even install a landline but rather make use of mobile phones (Hostettler, Hazboun, & Bolay, 2015) By using mobile phone networks, more households can be reached. Reaching out to 89 countries, mobile network operators (MNOs) are offering 255 services. More than 60% of those services are offered in markets in developing countries.

In Africa the mobile phone is not just seen as a functional tool that makes communication easier. It is rather an essential asset which people see as a major tie to distant family members, an entertainment tool, and with increasing importance a financial tool (Stimolo & Toombs, 2014). This makes the mobile phone a highly valuable tool that has a direct influence on their livelihood (Stimolo & Toombs, 2014). Mobile phones give the opportunity to gather information about markets and services as done in Ghana. Here farmers from Tamale can receive text messages with price information from the capital Accra (Aker & Mbiti, 2010). In Niger, the introduction of mobile phones has seen to influence the price of grain, reducing the price dispersion (Aker, Ksoll, & Lybbert, 2012).

Further, the mobile phone gives users access to different services like mobile money or mobile insurance (Hostettler et al., 2015). By that, mobile phones allow people to protect their income and replace physical cash with electronic money. In case of mobile money services, service providers are offering services that are usually offered by banks. Mobile financial services, as m-Pesa in Kenya and Tanzania, are products that, amongst other, allow people to use their phones to transfer money or store their money on a phone account. The majority of the providers of mobile money services are located in Sub-Saharan Africa (Figure 1) (GSMA, 2014).

Aker & Mbiti (2012) describe that only nine percent of the population in Tanzania have a bank account. While a total adult population of 29.3 million people accounts for 39.4 million mobile subscriptions in Tanzania (GSMA, 2016). This makes the available Mobile Money services, which are targeting people who have no or limited access to formal banking services, benefit the economy (Aker & Mbiti, 2010). Four main MNOs are active in Tanzania since 2008, offering different services (GSMA, 2016). The recent GSMA (2016) report states that by 2015, about one third of all active mobile money users in East Africa were registered in Tanzania. Therefore, this study will focus on Tanzania.

Figure 1 Number of Offered Mobile Money Services in Sub-Saharan Africa



SOURCE: (GSMA, 2014)

1.2 Statement of the Problem

About 2.5 billion people around the world do not have barrier-free access to formal financial services (GSMA, 2014). Karlan et al. (2014) name two main constraints to open a savings or current account with a formal financial institution. First, different fees (e.g. transaction costs, account opening fees, minimum balance requirement and withdrawal fees) that are charged by formal financial institutions. Such fees account for a high proportion of poor people's income and savings, which are already low. Hence, there is a reduced incentive to open an account with a formal financial institution (Karlan et al., 2014).

Secondly, Karlan et al. (2014) name regulatory requirements and trust. Regulatory requirements for financial service providers, such as „know your customer" (KYC) are supposed to increase trust in financial institutions. Often they are rather more addressed to people that are already financially included and therefore do not counteract financial exclusion. (Karlan et al., 2014). A study by Dupas et al. (2013) shows that in Western Kenya people name low trust in banks as a reason to not have a savings account. This supports the findings of Karlan et al. (2014). Further, Karlan et al. (2014) describe the decision to make use of a certain financial provider might be based on reputation but this reputation is built on trust of its customers.

Next to this, only few bank branches are located in remote areas (Aker & Mbiti, 2010; Goss, Mas, Radcliff, & Stark, 2011). Goss et al. (2011) explain, in the poorest country quintile only two bank branches are available for 100.000 people. While in the richest country quintile the penetration accounts for 33 bank branches per 100.00 people. Next to high incurred costs for maintenance and personnel, the low number of customers and small deposit amounts are not profitable enough (Mbiti & Weil, 2011).

Instead, poor people often use informal saving methods like keeping their money at home or engage in informal saving communities as rotating savings and credit associations (ROSCAs). In other informal saving methods people are investing in physical goods like livestock or jewelry (Goss et al., 2011; Karlan et al., 2014; Kusimba, Chaggar, Gross, & Kunyu, 2013). The insufficient access to formal financial services also supports the migration of household members, commonly to urban areas (Jack & Suri, 2014; Kusimba et al., 2013). This is done in order to generate a higher income than on the farm, and to support their families back home (de Brauw, Mueller, & Lee, 2014). Therefore, kinship membership is also important to insure oneself against economic shocks (Aker & Mbiti, 2010).

An advantage of informal saving methods is that people who normally would not have access to financial services, are now able to save (Kendall, 2010). Mas & Mayer (2011) argue that this is an opportunity to stabilize living conditions. On the other hand, the existence of such various methods of saving can explain that none of them is a very good and secure method (Mas, 2010).

Local informal savings like the ROSCAs are conducted within the family or the community at the place of residence (Goss et al., 2011; Kendall, 2010). At periodic meetings, every member of a ROSCA must pay an equal amount into a shared savings pool. Since at each periodic meeting a different member receives the pot money, meetings are held until every member is paid out (Dupas & Robinson, 2013). This means that the saver relies also on other poor people that live in similar circumstances. This leads to the condition, that the whole community is affected in the occurrence of a general shock, like a natural disaster. This in turn means that the savings probably would not be available (Mas, 2010). Other limitations of the engagement in ROSCAs is the default of other members and non-private saving information (Mas, 2010).

Informal saving methods like ROSCAs or financial inflows through remittances of migrated household member create a reliability on one's social network which is correlated to redistribution expectations and pressure among network members (Boltz, Marazyan, & Villar, 2015). De Brauw et al. (2014) argue that it is expected that household members that migrated send money back home but for many it is also a dilemma. On the one hand the family that relies on remittances. On the other hand, to maintain an own life that is not determined by redistribution obligations (de Brauw et al., 2014). Further, traditionally remittances are sent by handing over money to motorists who are going to the region where the family lives. Thus, sender as well as receiver are reliant on trusting people (Kikulwe, Fischer, & Qaim, 2014). Savings in the form of cash at home are exposed to threats like theft or fire (Brune, Giné, Goldberg, & Yang, 2011). While having savings in form of physical goods, the saver does not have his money available when he needs it. The dissaving process is connected to time consuming actions until money in cash is available (Goss et al., 2011). Goss et al. (2011) argue, that savers must travel to markets to sell the good and must take a loss due to travel costs.

Aker et al.(2010), (2011) and Kusimba (2013) claim that Mobile Money services are a reliable tool to manage financial assets and are therefore attractive for people that are living in more rural regions. Mobile Money services have characteristics that can overcome limitations

of informal and formal saving methods (GSMA, 2014; Kusimba et al., 2013; Ky, Rugemintwari, & Sauviat, 2016; Mas, 2010). The GSMA report (2014) explains that such services can be used to store, send and receive remittances in a safe way using digital payments via SMS. Money can be cashed in or out at a local agent. An agent is handling the pay out and cash in of physical money from and to a Mobile Money account. The increasing agent availability, also in rural areas, decreases travelling time and costs to have money available when needed (Jack & Suri, 2014). Hence, this thesis aims to find out the usage of Mobile Money services by cotton farmers in northern Tanzania.

1.3 Research Objective and Questions

The objective of this thesis is to find out the determinants of Mobile Money usage in general and as a preferred savings method by cotton farmers in Shinyanga, Tanzania. Special attention is paid on perceived self-protection against financial claims, the perception of financial requests as a burden, and the occurrence of a shock (natural disaster, theft and illness).

Therefore, the following questions will be answered: (1) What are determinants of Mobile Money usage by cotton farmers in Shinyanga, Tanzania? (2) What are determinants of Mobile Money as a main saving method?

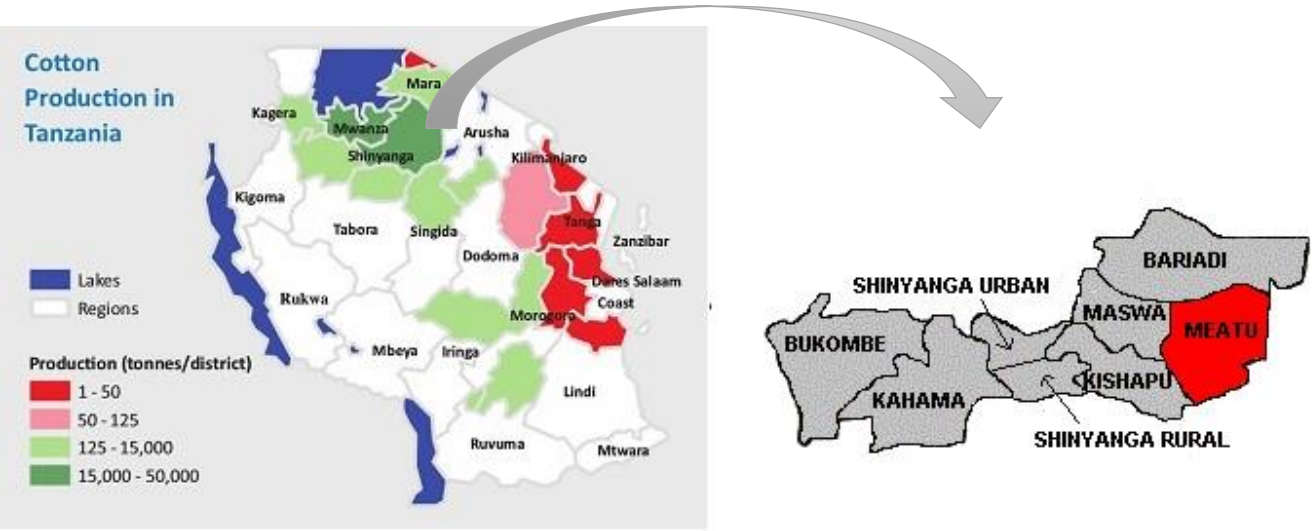
1.4 Context

The data that is used in this thesis was collected during a research for a rural financial service provider called SmartMoney. SmartMoney, a Mobile Money company, is mainly providing financial services in rural areas in Uganda and Tanzania. The initial aim of SmartMoney was to improve transaction methods in agricultural value chain payments. First focusing on the processing industry and the consumer, the role of the producer (farmers) was not considered in the development process. Focusing on different studies regarding financial inclusion it became clear that especially in rural areas in Africa the lack of safe options to store money is prevalent. Therefore, the position of farmers must be considered if an improved payment method is going to be introduced. This changed the aim of SmartMoney to provide a safe possibility to store cash for farmers but that can also hold as a transaction tool for other participants in the agricultural value chain. As a result, a digital payment system that is using telecommunication technology was developed. Using own SIM cards, SmartMoney allows account holders to cash-in, cash-out and transfer money without any transaction cost. Small shop owners are cooperating with SmartMoney to act as agents. An agent is handling the pay out and cash in of physical money from and to a SmartMoney account. Being one of the largest cotton producing regions in Tanzania, Shinyanga (Figure 2) was chosen as a pilot region to introduce SmartMoney.

In Shinyanga, cotton farmers usually sell their harvest to a middleman, who collects the cotton by going from village to village, paying the farmers in cash. In the past people were skeptical to this approach, but no other options were known. One of the reasons people were skeptical to this, was that the farmers had little negotiation power over the price and would have to agree to the offer made by the middleman. Next to this, their lack of price information in other regions benefited the middleman. Another reason is that every farmer took his harvest to the village center to be weighed and paid accordingly, leading to exposure of income to people close by. This could lead to financial expectations by other family members that are living in the same village or even to theft. SmartMoney is tackling those drawbacks by allowing account holders to sell their cotton harvest straight to ginneries. By this the share of the middlemen is cut. Farmers receive a higher income from the ginneries and ginneries do not have to pay a higher price to middlemen. Although the cotton would also be weighed in the village center, the income would be transferred to a SmartMoney account via mobile money transaction. By that their income is less exposed to others. Considering this, SmartMoney is acting as a rural financial service provider.

Research was conducted in three districts in the region of Shinyanga, Tanzania. Namely, Shinyanga rural the districts Meatu and Kishapu were selected (Figure 2). In all three regions, the majority of the labor force is engaged in agriculture and is cultivating cotton. So far SmartMoney is only introduced in the region Shinyanga rural. The other two regions were selected as control areas.

Figure 2 Research Area



1.5 Outline

In the following this thesis will be organized in 5 chapters. The theoretical framework in chapter 2 will be followed by a short description of the context. Subsequently the method of data collection and the methodology for the analysis will be introduced in chapter 4. Chapter 5 represents the results from the quantitative analysis and a discussion of the results and will be followed by the discussion of limitations in chapter 6. Finally, the thesis will be concluded in chapter 7.

2. Theoretical Framework

Within this chapter the concept of saving methods and the perception of social pressure to share money in Sub-Saharan Africa will be introduced. As a basis for the quantitative research in this thesis both concepts will be discussed.

2.1 Savings

People who are living in countries or regions with limited access to formal financial services are more exposed to economic shocks which in turn can endanger their livelihood (Mas, 2010). Therefore, they take actions to share risks through social networks and informal redistribution methods (Boltz et al., 2015). The decision to get engaged in saving mechanisms is often driven by the will to improve one's living conditions or to insure oneself against future shocks like rain outfall, droughts or maybe robbery (Jack & Suri, 2014). Different studies show that people are willing to engage in formal saving methods if they are custom-designed (Brune et al., 2011; Duflo, Esther; Kremer, Michael; Robinson, 2009; Dupas & Robinson, 2013).

A study by Dupas and Robinson (2009) introduced saving opportunities among micro-entrepreneurs in western Kenya. Many of the micro-entrepreneurs owned a bicycle taxi or were merchants at local markets. For the study a village bank eased the barrier of a minimum saving amount to open a saving account. The conditions included that no interest rate was paid out and a withdrawal fee was charged. However, this was well accepted by the study population. 92 percent of the study population accepted the offer and up to 43 percent of the account holders used the account twice or more within a period of 6 months (Dupas & Robinson, 2013).

Duflo, Kremer and Robinson (2013) tested the potential of better saving possibilities for farmers in Kenya. In the harvesting season, randomly selected farmers were offered the possibility to buy vouchers for fertilizer for the next season. This form of converting money into vouchers can be seen as a method of saving, since it represents a stored value. The study shows that over two seasons the usage of fertilizer increased (Duflo, Esther; Kremer, Michael; Robinson, 2009).

A study by Brune, Gine, Goldberg and Yang (2011) gave farmers in Malawi the chance to either open a regular savings account or a commitment savings account. A commitment savings account means that farmers can deposit money on the savings account.

Deposits are following a strict calendar with predetermined dates of payment. To attract farmers no account opening fee was charged. The result shows that farmers who held an account used it to deposit money. Out of 156 people that participated, 47% (74 people) opened one of the two accounts. 41% of all account holders made at least two deposits in the first half year. In other words, this study also shows that poor people are willing to use formal saving channels if they are beneficial in their financial situation.

The studies mentioned above show that people living in rural areas are making use of saving methods if these are tailored to their needs and capabilities. Mobile Money services show characteristics that make them interesting for poor people. They are safe, available in remote areas, and no minimum deposit is required (Kikulwe et al., 2014; Mbiti & Weil, 2011). Also, the fees (e.g. deposit and withdrawal) that are charged by MNOs are low. Branchless banking opportunities (including Mobile Money) are 19% cheaper on average compared to other alternatives (Mckay & Pickens, 2010). For instance, farmers can benefit by storing money in the harvest season, when they are generating most of their income. Remaining savings, after smoothed consumption, can be used in the planting season when money is more scarce (Goss et al., 2011).

Donovan (2012) explains that Mobile Money enhances people's possibility to overcome a negative shock (e.g. natural disaster, theft or illness). Remittances from family members or third parties via Mobile Money unburden the shock compared to remittances via traditional channels (e.g. send money with motorists) (Donovan, 2012; Kikulwe et al., 2014). Jack & Suri (Jack & Suri, 2014) find evidence that Mobile Money remittances are of higher value in the occurrence of a shock. This is because the mobile phone allows to request from a broader social network. Further, the lower transaction costs of Mobile Money services enable households to avoid a loss in consumption although they face a shock (Donovan, 2012). Reduced transaction costs can also help to reduce the frequency of requests for financial support (Jack & Suri, 2014).

2.2 Social Pressure

In the Sub-Saharan-African context, kinship can be seen as an indigenous institution which is a major component of social capital and is acting as a safety net for those who do not have access to formal financial services (di Falco & Bulte, 2011). As aforementioned, kinship membership is important to insure oneself against risks that can threaten one's livelihood. But there is also a downside to kinship membership. In many African countries it is common to be

informally obliged to redistribute earnings (Jakiela & Ozier, 2011). Baland and Guirkinger (2011) explain that it is common for spouses within a household to hide money from each other. While wives are afraid that their husbands will spend the money on alcohol, husbands are afraid to share information about their income with their wives and children, to prevent demands (Baland et al., 2011).

Traditionally, a predominant form to smooth out consumption, or to react to different kinds of shocks, was to ask for financial support of family and kin. The informal nature of such mechanisms is given since they are not regulated or backed by law enforcement (Karlan et al., 2014). Nevertheless, the request for such financial support is a form of risk-sharing within-and across one's network (Jack & Suri, 2014). Different household members can have different income and consumption patterns. Thus, these can lead to request of support or lack of commitment to consumption/savings agreements. Disclosing savings information to family members, leads them expect financial support (Karlan et al., 2014).

Kusimba et al. (2013) describe that frequent requests by family and friends for financial support can put people's needs and obligations in conflict. Evidence from Kenya shows that people choose saving methods that allow them to avoid financial obligations towards family and friends (Baland et al., 2011). Informal saving mechanisms such as ROSCAs, buying livestock, investment in goods or to hide cash at home are common to avoid financial requests (Mas & Mayer, 2011). However, those methods are still exposing the wealth of a household to a certain extend or savings can be found. The recent development of mobile technology can help to enable people to store money in a confidential way (Donovan, 2012; GSMA, 2015). Such services are more allowing an individual to base decisions about money allocation on private saving information (Mas & Morawczynski, 2009).

Thus, the following hypothesis is formulated:

(1) Rural households in Shinyanga, Tanzania use mobile money accounts to save money.

(2) Rural households in Shinyanga, Tanzania are using Mobile Money because they were hit by a Shock (natural disaster, theft, or illness).

(3) Rural households in Shinyanga, Tanzania are using Mobile Money because they perceive financial expectations as a burden.

(4) Rural households in Shinyanga, Tanzania, are using Mobile Money as a method of self-protection from financial expectations.

3. Methods of Data Collection and Evaluation

The data was collected through a survey, in January 2016, in three districts in the region of Shinyanga, Tanzania. In total 39 villages were visited. 14 villages in Shinyaga Rural, 14 villages in Meatu and 11 villages in Kishapu. For further information on the villages, see Appendix 4. The villages in the districts within the research area were randomly picked. The project was introduced to each village chief in the village community center. Due to practical reasons the sample population was selected by the village chief. Each village chief was instructed to pick a random sample of 10 men and 10 women from different households, that are not related to each other. From the village community center, the enumerators joined the village chief or his assistant to go from house to house to check for the availability of respondents. This was repeated until every enumerator had a respondent. Since each enumerator interviewed more than one person, the following interviewees were already picked by the village chief. Each enumerator was informed who he/she should interview afterwards. The interviewees had to be the household head or the spouse. Next to this, to control for biased answers of the interviewees, the enumerators spread over the village to make sure that no other household members were around.

The data was collected through structured interviews. The insufficient knowledge of the educational level of the study population and coverage of mail supports this choice, to name two advantages. Another advantage are higher response rates. The tool for the research was an interview questionnaire and the interviews the method of data collection. The structured interview included 28 sections. Out of these, 7 were used for the quantitative analysis. The relevant sections are listed in Table: 1

Table 1: Relevant Questionnaire Sections

Household demographics
Household income
Savings
Family and financial transfers
Social pressure perception

Further, four informal interviews are used to see if the concept of social pressure to share with kinship is common in Tanzania and how social pressure is perceived. The informal interviews were conducted with officials and the team leader of the research team during the data collection.

3.1 Economic Model

To answer the research questions in this study four models are used. Each model is made up of a set of variables that are listed in Table 2.

Research Question 1:

$$Mobile\ Money\ Usage = \beta_1 + \beta_2 * Gender + \beta_3 * Household\ Size + \beta_4 * Age + \beta_5 * Income + \beta_6 * Shock + \beta_7 * Burden + \beta_8 * Protect + \varepsilon$$

The binary dependent variable shows if one is using Mobile Money or not. The variable $Household\ Size$ shows if an increasing number of household members explains the usage of a Mobile Money account. An increasing number of household members can lead to more financial requests but also to opportunities to receive remittances on the phone. $Income$ can have a direct effect on Mobile Money usage. People with higher income might use Mobile Money to manage their financial assets. The following variables are chosen based on the theoretical framework (Chapter 2). The variable Shock is supposed to show if shocks have a significant influence on Mobile Money usage. Poor people use informal methods to insure themselves against future shocks. The variable burden is included to see if the usage of Mobile Money is significantly related to the perception of financial expectations by family and friends as a burden. The variable Protection from financial expectations is added to see if the decision to protect oneself from financial expectations by family and friends is significantly related with the usage of Mobile Money.

Research Question 2

$$Preferred\ Method\ of\ Saving = \beta_1 + \beta_2 * Gender + \beta_3 * Household\ Size + \beta_4 * Age + \beta_5 * Income + \beta_6 * Shock + \beta_7 * Burden + \beta_8 * Protect + \varepsilon$$

Table 2 Saving Choice Option

Saving Choice Option
Microfinance
Savings Group
Bank
Cash at Home
Livestock
Crops
Mobile Money

The second research question is trying to find determinants of the choice of a mobile money account as main savings method compared to six alternative methods (Table 3). The purpose of this is to get insights to the determinants to prefer a mobile money account over another method of saving. The binary dependent variable shows if one is using Mobile Money or not. The variable $Household\ Size$ shows if an increasing number of household members explains the usage of a Mobile Money account. An increasing number of household members can lead to more financial requests but also to opportunities to receive remittances on the phone. $Income$ can have a direct effect on Mobile Money usage. People with higher income might use Mobile Money to manage their financial assets. The following variables are chosen based on the theoretical framework (Chapter 2). The variable Shock is supposed to show if shocks have a significant influence on Mobile Money usage. Poor people use informal methods to insure themselves against future shocks. The variable burden is included to see if the usage of Mobile Money is significantly related to the perception of financial expectations by family and friends as a burden. The variable Protection from financial expectations is added to see if the decision to protect oneself from financial expectations by family and friends is significantly related with the usage of Mobile Money.

3.2 Econometric Model

Model 1,3 and 4 are binary choice models. More specifically logistic regression models. A logit model is preferred since the used data has many 0 observations and too little variation within the non 0 observations (Verbeek, 2008). As described in Verbeek (2008), the dependent, binary, variable in each model is defined as

$$\gamma_i = 1$$

$$\gamma_i = 0$$

Model 2 is a discrete choice model, more specific a multinomial logit model. This model allows to analyze which (single) factor determines a choice over another. To formalize, three assumptions were considered (Verbeek, 2008). The variable of interest, Preferred Method of Saving, contains unordered categories. This means that the preferred method of saving does not have an obvious ordering. Hence, to show how different characteristics, determine the choice of the preferred saving method, a multinomial logit model is preferred over a logistic regression.

Assumption 1

There are M choice alternatives to choose from, $j = 1,2,..M$, assuming that the order is arbitrary.

Assumption 2

The individual i is choosing one utility level, which is given by $U_{ij}, j = 1,2 \dots M$.

If those Assumptions 1 and 2 are met, method j is chosen by individual i in respect to the highest utility, which is $U_{ij} = \max\{U_{i1} \dots U_{iM}\}$. Utility levels are not observed and further assumptions must be made to apply the discrete choice model.

Assumption 3

It is assumed that $U_{ij} = \mu_{ij} + \varepsilon_{ij}$, with μ_{ij} being a non-stochastic function of observables and a small number of unknown parameters, and ε_{ij} the unobservable error term. Within the multinomial logit model, it is assumed that all ε_{ij} 's are independent. Implying that the utility levels are independent, it can lead to difficulties if the alternatives are not distinct (Verbeek, 2008).

The assumption that the utility levels in a multinomial logit model are independent can be tested with an Independence of Irrelevant Alternatives (IIA) test. Long and Freese (2014) are not advising to apply the test because one would not get a reliable result. While some tests accept the null hypothesis, other tests would not. Generally, it is advisable to choose alternatives that are different and not just compensatory (Long & Freese, 2014).

3.3 Intraclass Correlation

Since the respondents of this study are organized in groups (villages), observations can bear a resemblance to each other. (Mansmann, 2012). To see how similar the data is, the intraclass correlation is going to be determined. Clustered standard errors on the village level were used to correct for possible similarities that can be caused by environmental effects for instance.

Table 3: Used Variables

Name	Information	Type
Age	Age of respondent	
Education	Schooling years of respondent	
Household Size	Number of people living household	
Income	Total Household Income	
Number of owned Mobile Phones	Number of owned mobile phones per household	
Bank	1 if having savings with a Bank	Binary
Crops	1 if having savings in the form of Crops	Binary
Financial Expectations are a Burden (Burden)	1 if respondent perceives Financial expectations by family and friends are a burden	Binary
Cash at Home (CaH)	1 if having savings at home in form of cash	Binary
Gender	1 if Female, 0 if Male	Binary
Duty	1 if respondent thinks that helping others financially is a duty in life	Binary
Livestock	1 if having savings in form of Livestock	Binary
Microfinance	1 if having savings on Microfinance account	Binary
Mobile Money (MM)	1 if having savings on Mobile Money account	Binary
Mobile Phone Owner	1 if household possess mobile phone	Binary
Protecting from Financial Expectations (Protect)	1 if respondent is protecting himself from financial expectations by family and friends	Binary
Savings Group (SG)	1 if active member in savings group	Binary
Shock	1 if household was hit by a shock in the last 12 months	Binary

4. Results

The results in this section are based on regressions and the outcome from informal interviews that were conducted during the field research. First the results from the informal interviews will be presented. Subsequently the descriptive statistics of the study population, the results of the regressions and the discussion of these will follow.

4.1 Informal Interviews

Through an interview with the team leader, James Kajuna, the findings of Baland and Gurkinger were supported. He confirmed that the social pressure of sharing income is common in Tanzania. In his opinion no one should not share income information with strangers or kinsmen, since they would expect receiving part of this income through gifts, or could try to rob you.

In contradiction to that, the village executive in Isengwa described that income information are communicated very well. But only among men. They talk about money as prestige. Men compete with the amount of their incomes from harvest sales to beat each other. But it is not common to share income information with their wives.

The statement of a female in rural Shinyanga builds up on this statement. She describes that she has savings that her husband does not know about. She argues that it is normal to hide money, even among spouses, for private consumption.

The district officer of Kishapu explained how spirituality influenced financial expectations are. Especially remittances from family members who moved to another place for work. The family member that moves away does not send remittances in form of gifts, cash or crops back home, neither would the family expect it. Traditional beliefs and witchcraft are deeply grounded in the Sukuma tribe. They believe receiving money can increase jealousy from others, leading to the family receiving curses. Nowadays people use mobile money to receive remittances since this form is less observable by others.

4.2 Intraclass Correlation

The results of the intra class correlation (Appendix 2) do not show significant results that the observations resemble each other.

4.3 Descriptives

Table 4 shows descriptives about the preferred savings method. First, the total number of 474 differs from the total number of respondents (n=957). Only 474 respondents stated that they do have savings. The remaining 483 people stated that they do not have savings of any form. To keep savings in the form of cash at home is preferred by most respondents that have savings (72.15%). The second most preferred method to save are Mobile Money savings. Which account for 19.20%. Followed by Savings with a savings group (11.18%).

Table 4 Descriptives of Preferred Saving Method

Preferred Saving Method	Frequency	Percent
Cash at home	274	72.15
Mobile Money	91	19.20
Savings Group	53	11.18
Crops	24	5.06
Bank	14	2.95
Livestock	17	3.59
Microfinance	1	0.21
Total	474	100

Table 5 shows descriptive statistics of mobile money account holders and active mobile money account users. 275 participants had mobile money accounts. About 39% of them were women. The average mobile money account holder was 41.9 years old, had 7 years of education in school, and lived in a household with 6 people. The average total household income, per annum, is 745,451.6 TZS (≈ 300 EUR). Further, the household possesses one mobile phone. In comparison, among participants without a mobile money account 52.63% are women. On average, they are 43 years old, have 5.69 years of school education and live in a household with 7 people. The average household income is 490,629 TZS (≈ 200 EUR). The average household in this case possesses one mobile phone.

91 participants were actively using their mobile money account to save, where about 40% were female. The average user in this subgroup was 41 years old, had 7.6 years of schooling and lives in a household with 6 people. The average annual household income is 1,197,255 TZS (≈ 485 EUR). Further, the household possesses two mobile phones on average. In comparison, among the respondents that are not using their mobile money account to save, 49.65% were women. On average, a respondent in this subgroup was 43 years old, had 5.89 years of school and lives in a household with 7 people. The average household income is 502631.6 TZS (≈ 200 EUR). The average household in this case possesses one mobile phone on average.

Table 5 Mobile Money Account Holders and Users

	Variable	Holding Mobile Money Account	Not Holding Mobile Money Account	Using Mobile Money as preferred Account to save	Not Using Mobile Money as preferred Account to save
		Mean	Mean	Mean	Mean
	Gender	0.3891	0.5263	0.3956	0.4965
	Age	41.90	43.29	41.27	43.06
	Education	6.94	5.69	7.59	5.89
	Income (in TZS)	745,451.6	490,629	1,197,255	497,295.6
	Household size	6.37	6.72	6.32	6.65
	Number of owned Mobile Phones	1.45	0.91	1.57	1.01
Observations		275	682	91	184

Table 6 shows descriptive statistics of the data. In total 957 respondents were successfully interviewed, whereof 48.7% are female. The average participant was 43 years old, had 6 years of school education, and lived in a household with 7 people. The average household income per years is 563,853.9 Tanzanian Schilling (TZS), which is equivalent to (≈228 Euro (EUR)). Further, 78.26% (749) of all households have a mobile phone, on average, each one mobile phone per household. Further, 75.44% of the study population perceive financial expectations by family and friends as a burden. Also 72.10% of the study population protect themselves from financial expectations by family and friends. Finally, 79.62% of the study population think that helping others financially is a duty in life and 84.01% claim that their household was hit by a shock (natural disaster, theft, illness).

Table 6 Descriptive Results

Variables	Descriptives Mean
Gender	0.487
	(0.0161656)
Age	42.89
	(.4007268)
Education	6.05
	(0.0977015)
Income	563,853.9
	(37007.36)
Household Size	6.62
	(.0951907)
Mobile Phone	0.7826
	(.0133393)
Quantity of Mobile Phones	1.07
	(.0335908)
Financial Expectations are a Burden	0.7544
	(0.0139207)
Protecting from Financial Expectations	0.7210
	(0.0145057)
Helping Financially is a Duty in Life	0.7962
	(0.0130273)
Shock occurred	0.8401
	(0.0118531)
Observations	957

Standard errors in parentheses

4.4 Regressions

4.4.1 Research Question 1: What are determinants of Mobile Money usage by cotton farmers in Shinyanga, Tanzania?

Being a woman decreases the possibility to use Mobile Money by 13.59%. Descriptives (Table 4) show that the average household owns one mobile phone. Hence, it is possible that male household members use the phone more than women. An increase of household income (per year) makes it more likely to use mobile money (Table 7). The average respondent has an annual income of 745,451.6 (in TZS). Nevertheless, the probability which makes it more likely to use Mobile Money if household income per year increases by 1 is very small (0.003%). Although the relation between income and Mobile Money usage is given, the very small coefficient shows a weak relation. An increase in age by 1 decreases the probability to use a Mobile Money account by 0.25%. The knowledge about new technology might be more shared among young people. Also, this relation is rather weak, looking at the small coefficient. A perceived shock, the perception of financial expectation of family and friends as burden and self-protection against financial expectations are not statistical significantly related to Mobile Money usage.

The decision to self- protect oneself from financial requests by family and friends does not have an influence on Mobile Money usage. A possible explanation is that cotton farmers are using other methods to protect themselves from financial expectations. For example, investing in different assets like livestock, jewelry or farming tools. It can also be that the respondents simply do not consider to use their Mobile Money account to hide money. Another possible explanation is that it can be harder to cash in and cash out money from a Mobile Money account. This depends on the availability of a Mobile Money agent in the village of residence.

Further, Mobile Money usage is not influenced by the perception that financial expectations by family and friends are a burden. 75.54% of all respondents (n=957) perceive financial expectations as a burden. However, the usage of Mobile Money is not related to this. Although Mobile Money is also used to send remittances, there is no positive or negative relation to the perception of a burden. A possible explanation can be found in the cultural traditions. Financial expectations are common and financial redistributions among kin are obligatory. Therefore, people might perceive financial expectations as a burden but still follow their traditions. This is supported by the outcome in Table 6. 79.62% of the

respondents think that helping other financially is one of their duties in life. Also, financial redistributions are prestigious to a certain extend. Mainly giving money to support festivities like weddings or funerals is seen prestigious.

Based on the findings in Table 7, the second hypothesis that Rural households in Shinyanga, Tanzania are using Mobile Money because they were hit by a Shock (natural disaster, theft, or illness) does not hold. Hence, the H_0 has to be rejected. Also the H_0 of hypothesis three (Rural households in Shinyanga, Tanzania are using Mobile Money because they perceive financial expectations as a burden) and hypothesis four (Rural households in Shinyanga, Tanzania, are using Mobile Money as a method of self-protection from financial expectations) has to be rejected. No statistical significant relation to Mobile Money usage is shown.

Table 7 Logit Model: Mobile Money Usage Determinants & Marginal Effects

Independent Variable	Logit Model Dependent Variable Mobile Money User	Marginal Effects Dependent Variable Mobile Money User
Gender	-0.679***	-0.1359404***
	(0.148)	(.02869)
Household Size	-0.0487	-0.0098144
	(0.0332)	(.00673)
Age	-0.0126**	-0.0025333**
	(0.00607)	(.00121)
Income	1.86e-07***	3.75e-08***
	(6.59e-08)	(.00000)
Shock occured	0.0789	0.0157185
	(0.207)	(.04075)
Perception of a Burden	0.0310	0.0062223
	(0.161)	(.03214)
Self-Protection	0.0322	0.0064826
	(0.195)	(.03897)
Constant	0.0308	
	(0.419)	
Observations	957	957

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1; clustered at village level

4.4.2 Research Question 2: What determines cotton farmers' choice of Mobile Money over other saving methods?

Table 7 and 8 below show determinants of different saving methods and the related marginal effects. Mobile Money is the base outcome. One can state for the first option Microfinance, being female and an increase household members the likeliness to have savings on a microfinance account, in comparison to a Mobile Money account, is higher. Considering financial expectations as a burden and self-protection against financial expectations makes it more likely to have savings on a microfinance account, in comparison to a Mobile Money account. If total household income per year and the age of the respondent increase by 1, mobile money savings are more likely in comparison. To be hit by a shock, makes it less likely to have savings on a microfinance account, in comparison with a Mobile Money account. There are too few observations for this alternative to estimate the marginal effects that deliver the relevant probabilities. The data is showing that only one person is using a Microfinance account as a preferred method to save. The external reliability of the results is therefore questionable.

The second alternative, having savings with a savings group, is more likely to be chosen by women. Being a woman increases the probability to be a member of a savings group by 9.6%. Possibly savings groups are more likely to be used as an informal savings form by women since they also have an important social component. Often the saving group members are just family members, friends or a mixture, the periodic meetings serve as a moment in time at which women are among themselves. Another possible factor which leads to the fact that women are not using a mobile money account to save is that women are responsible for the household and keep their savings at home since it is easier to access those when needed. If total household income per year is higher and one is self-protecting against financial requests, it is less likely ($8.93x10^{-7}$ and 12.40%) to have savings with a savings group in comparison with Mobile Money savings. Members of saving groups are often family members or friends. Therefore, people with close ties have good information about the savings of a person and are likely to request for support if needed. Hence, savers prefer methods that are not exposed to others.

Women are less likely to have savings with a bank in comparison with Mobile Money savings, by 2.57%. While a higher income makes it more likely to have savings with a bank compared to Mobile Money with a probability of $8.93x10^{-7}$. Also, self-protection from financial expectations makes it more likely (1.82%) to have savings with a bank, compared to

Mobile Money. If a shock hit the household, it is less likely to have savings with a bank in comparison to Mobile Money savings by 5,28%.

Regarding the alternative to save in the form of cash at home, people that want to self-protect themselves from financial expectations prefer to save in cash at home over mobile money with a probability of 17.46%. While savings in the house can be hidden from the other people, Mobile Money savings could be revealed during the process of cashing money in or cashing it out with a Mobile Money agent in the same village.

An increase in income by 1 makes it less likely to have savings in form of livestock by 0.67% in comparison to Mobile Money savings. If a household has more members, it is more likely to have savings in form of livestock with a probability of 0.42%. It is a traditional method to use livestock as a method of saving. The price for livestock is equal to the saved amount. Livestock can also be used as a form of a support to family and friends. The recipient can sell the livestock to have money available.

It is less likely (8.61%) to have savings in form of crops in comparison to Mobile Money savings, if a shock occurred. Like livestock, also crops are used as a traditional form of remittances to family and friends. After a good harvest crops are dried and a part is stored to be sold in the next season. If a shock occurs, farmers can use the surplus to generate income, for self-consumption or as a form of remittances.

It is hypothesized that cotton farmers that are living in Shinyanga, Tanzania are using Mobile Money accounts to save. Results in Table 4 and 5 show that the H_0 cannot be rejected. However, the number of people that use Mobile Money as a saving method (n=91) but also other methods is low in comparison to the total number of respondents. This affects the reliability of the results.

Table 8 Multinomial Logit: Saving Method Preference Determinants

	Alternative Choice					
Independent Variable	Microfinance	Savings Group	Bank	Cash at Home	Livestock	Crops
Gender	15.89***	1.625***	-1.166*	0.457	0.370	-0.344
	(1.089)	(0.422)	(0.706)	(0.280)	(0.668)	(0.533)
Household Size	0.148	0.0447	0.0647	0.0517	0.221***	0.0567
	(0.186)	(0.0516)	(0.101)	(0.0412)	(0.0660)	(0.0765)
Age	-0.00612	0.0236	0.00150	0.00249	-0.00854	0.0158
	(0.0284)	(0.0156)	(0.0279)	(0.0123)	(0.0259)	(0.0252)
Income	-5.84e-06*	-1.02e-06**	2.34e-07**	-2.04e-07**	-1.03e-06***	-8.13e-07
	(3.20e-06)	(4.17e-07)	(9.74e-08)	(8.29e-08)	(3.94e-07)	(6.11e-07)
Shock occured	-17.72***	-0.258	-2.227***	-0.463	-1.346*	-1.983***
	(1.183)	(0.672)	(0.599)	(0.451)	(0.733)	(0.514)
Perception of a Burden	15.38***	0.598	-0.156	-0.00733	1.077	0.465
	(1.605)	(0.474)	(0.833)	(0.341)	(0.867)	(0.502)
Self-Protection	15.12***	-0.879*	1.778*	0.589*	0.833	-0.116
	(1.278)	(0.531)	(1.022)	(0.328)	(0.862)	(0.496)
Constant	-45.94***	-1.811*	-2.060	0.605	-2.949	-0.605
	(3.050)	(1.006)	(1.725)	(0.792)	(1.890)	(1.251)
Observations	1	53	14	274	17	24

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1; clustered at village level; Mobile Money = Base Outcome(n=91)

Table 9 Marginal Effects after Multinomial Logit: Saving Method Preference Determinants

	Alternative Choices					
Independent Variable	Microfinance	Savings Group	Bank	Cash at Home	Livestock	Crops
Gender	-	.0966071***	-.0256614**	.0336818	-.0007925	-.0248869
	-	(0.02566)	(0.01111)	(.04574)	(0.01343)	(0.01701)
Household Size	-	-.0000399	.0003114	.0042215	.0042583**	.0003914
	-	(0.0032)	(0.00147)	(.00773)	(0.00175)	(0.00238)
Age	-	.0014572	-.0000352	-.0007901	-.000296	.0004122
	-	(0.00096)	(0.00048)	(.00215)	(0.00053)	(0.00074)
Income	-	-5.60e-08**	7.84e-09***	3.41e-08	-1.87e-08**	-1.90e-08
	-	(0.00000)	(0.00000)	(.00000)	(0.00000)	(0.00000)
Shock occured	-	.0190359	-.0528439*	.054048	-.0255883	-.0861274**
	-	(0.0309)	(0.02729)	(.07334)	(0.0246)	(0.03943)
Perception of a Burden	-	.0337916	-.0037522	-.0479952	.0190804	.0122547
	-	(0.01991)	(0.01283)	(.05601)	(0.01164)	(0.01304)
Self-Protection	-	-.1240555*	.0166942*	.1746848***	.0111162	-.0154536
	-	(0.06174)	(0.00885)	(.06017)	(0.01428)	(0.01881)
Observations	1	53	14	274	17	24

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1; clustered at village level; Mobile Money = Base Outcome(n=91)

5. Discussion

This study is suffering from four main limitations. Firstly, the initial sample size (1007) decreased to 957 observations because of research errors that could not be corrected afterwards. This also affected the ratio of male and female interviewees which was equally distributed among men and women which changed. Observations in the sub-group of preferred saving method are low in comparison to the total sample size but most results are on a strong statistical level (1%). Most relevant coefficients are very small which indicates a weak relation between the dependent variable and the explanatory variable. The reliability of the results can suffer from the low number of observations in each preferred saving method group.

Recurring drought over the last two years (2014, 2015) affected the harvest of the farmers in this area tremendously. Hence, 84% of the study population claim that they observe a shock within the last year. Since most farmers in this region live on a subsistence level they had less income than in previous years to smooth their consumption. To maintain their consumption patterns many households used their savings. This affects their total savings but can also have effects on their preferred savings method.

Next, the sample selection by the village chiefs can lead to sample selection bias. Although the village chief followed the requirement to pick 10 women and 10 men that are not related to each other. It is possible that village chiefs picked respondents that are more affluent then other village inhabitants to have a good representation of the village. One should also take in consideration that the village chief chose the respondents based on sympathy and not fully randomly.

Finally, questions if somebody is reacting to social pressure to redistribute money by hiding money can be considered sensitive. 72.10% of the study population claim that they protect themselves from financial expectations. However, the results under 4.4.1 and 4.4.2 depend very much on the reliability of the measure of self-protection against financial expectations.

6. Conclusion

This study adds to the literature of mobile money usage in rural households. It shows the determinants of mobile money usage, determinants to choose Mobile Money savings over other methods and the impacts of social pressure on mobile money usage. The lack of access to formal financial services and the mistrust towards banks is forcing households in rural areas to find own methods to manage their finances. Joining savings groups or keeping money in form of cash at home is are common methods to save. Next to advantages, such methods also have disadvantages. The default of other savings group members or other adverse events (e.g. fire or natural disasters) can put savings in danger. Another disadvantage of social network based savings is fact of shared information. Other community members have information about savings which can lead to financial expectations and the social pressure to share money. Therefore, the usage of innovative digital financial services can reduce the risk to lose savings as well as allow people to save without other people knowing.

Especially Mobile Money services are a practicable alternative to save. Hence, this study was aiming to find out determinants of the use of Mobile Money services and Mobile Money as a preferred saving method by rural households in Shinyanga, Tanzania. A special attention was given to self-protection from financial expectations, the perception of financial requests as a burden and the occurrence of a shock.

To find out the determinants of Mobile Money usage by cotton farmers in Shinyanga, I applied a logit regression. The outcome only shows a positive relation between income as a determinant for Mobile Money usage. This result shows a very small coefficient and is statistical significant on the 10% level. Therefore, I conclude a weak relation between the explanatory variable income and the dependent variable Mobile Money usage. It is of interest that women are less likely to use Mobile Money compared to men. This outcome is significant on a 1% level. Further research about the gender dependency on Mobile Money usage is advisable.

Secondly I wanted to find out determinants of Mobile Money as a main savings method by cotton farmers in Shinyanga, Tanzania. Here I used a multinomial logit model to compare different saving methods and to show which variables make it more or less likely to have Mobile Money as a main savings method. It is shown (Table9) that the preference for Mobile Money savings over other methods is mainly based on income and the occurrence of a shock (significant on a 1% level). Also, self-protection from financial expectations as well as

being female can explain the choice of Mobile Money savings over certain saving methods (significant on a 10% level).

However, informal interviews show that social pressure among kin is known and that people also hide money. Although the number of interviewees is low, this goes along with the findings that most respondents perceive financial expectations as a burden and protect themselves from such. Therefore, further research on the impact of social pressure on money redistribution decisions in general is advisable.

Questions about reactions to and measures to avoid social pressure can be considered sensitive. Hence the application of a one-shot dictator game in combination with a Randomized Response Model (RRM) are advised. Güth, Kliemt and Ockenfels (2003) introduce that the scenario of a dictator game includes two parties. The one-sided treatment includes group A, the dictators, and group B, the recipients. A member of group A cannot become a member of group B and vice versa (Güth et al., 2003). Pairs of two (one from each group) will play one round. In such a round, dictator A has the possibility to reallocate an initial endowment of amount X between him and recipient B (Boltz et al., 2015). The dictator game can be varied and played in two rounds. In one round the dictator and the recipient do not know each other. In another round the instructor can match two people that know each other. This could be done to find differences in redistribution decisions. Generally, dictator A can determine his own payoff and the fairness of the allocation towards recipient B. Such a dictator game will show how much money people are willing to share in an anonymous and in a personalized setting.

The Randomized Response Model (RRM) can be applied to question respondents their behavior. Different studies show that more interviewees admit certain behavior when RRM is used in comparison to interviews that guarantee the anonymity of the interviewee (Clark & Desharnais, 1998). Clark and Desharnais (1998) explain that the basic assumption of an interview is that the respondent answers honestly. However, respondents tend to lie to or refuse to answer sensitive questions. Using a RRM, respondents receive a set of sensitive questions that have dichotomous answer possibilities (Yes or No) (Clark & Desharnais, 1998). Additionally, respondents get a coin. They are obliged to flip the coin before answering each question. If heads is tossed, the question has to be answered honestly. If the outcome is tails, the respondent has to answer with Yes. No matter what he/she would have answered. Using a method developed by Dawes and Moore (1979) one can calculate the share that supposedly answered honestly.

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Appendix

Appendix 1: Transcription of the informal interviews

"The Sukuma are a very special tribe. If somebody leaves, he leaves and is just coming back to his village when he is retired. He starts a life in a new place and stays in touch with his family by telephone. In the past a Sukuma that left the village did not send remittances to his family because a neighbor could call a witch to bring bad to the family if they are better off because of a left child. Nowadays it is changing. People are sending mobile money. It is a common thing but nobody talks about it to not be witched" (Noah, district officer Kishapu)

"You know we have this problem in our country you cannot let others know how much money you have. Your family would expect gifts from you and would even rob you if you keep it at home and they know about it" (James Kajuna).

"I have small savings that I keep from my husband. It is normal to keep a bit a side for private needs. I guess also my husband has savings I do not know about, it is normal" (Female rural Shinyanga).

"Income information is shared very well among men. In the evenings they sit together, drink local beer and discuss politics and economic situations. When they talk about money it is prestige. Men compete with the amount of their incomes to beat each other that was more efficient farming and selling. But they do not share that information with their wife's that is not common. Even some of the villagers who live far from the center come here to sell their products and use the income to get drunk or to spend it on other things and return to their wife and kids just with a very little amount" (Richard, Village executive officer Isengwa).

Appendix 2: Intraclass Correlation Results

```
loneway MobileMoney_User Village

                One-way Analysis of Variance for MobileMone~r:

                                                Number of obs =       957
                                                    R-squared =    0.1683

    Source                SS         df      MS            F     Prob > F
------------------------------------------------------------------------
Between Village_Name   32.977653     69      .477937      2.60     0.0000
Within Village_Name    162.99936    887    .18376478
------------------------------------------------------------------------
Total                  195.97701    956    .20499687

         Intraclass       Asy.
         correlation      S.E.       [95% Conf. Interval]
         ---------------------------------------------
            0.10492     0.02731       0.05140     0.15844

         Estimated SD of Village_Name effect     .1467659
         Estimated SD within Village_Name        .4286779
         Est. reliability of a Village_Name mean  0.61550
              (evaluated at n=13.66)

. loneway Gender Village

                  One-way Analysis of Variance for Gender:

                                                Number of obs =       957
                                                    R-squared =    0.0168

    Source                SS         df      MS            F     Prob > F
------------------------------------------------------------------------
Between Village_Name   4.0158247     69    .05820036      0.22     1.0000
Within Village_Name     235.0709    887    .26501793
------------------------------------------------------------------------
Total                  239.08673    956    .25009072

         Intraclass       Asy.
         correlation      S.E.       [95% Conf. Interval]
         ---------------------------------------------
            0.00000*    0.01294       0.00000     0.02537

         Estimated SD of Village_Name effect           .
         Estimated SD within Village_Name        .5147989
         Est. reliability of a Village_Name mean  0.00000*
              (evaluated at n=13.66)

(*) Truncated at zero.
```

```
. loneway Household_Size Village

One-way Analysis of Variance for Household_~e: How many People are Living in th

                                          Number of obs =       957
                                              R-squared =    0.1300

    Source                SS         df      MS            F     Prob > F
------------------------------------------------------------------------
Between Village_Name   1078.0149     69    15.623404      1.92     0.0000
Within Village_Name    7212.0625    887    8.1308483
------------------------------------------------------------------------
Total                  8290.0773    956     8.671629

         Intraclass       Asy.
         correlation      S.E.       [95% Conf. Interval]
         ---------------------------------------------------
            0.06321     0.02199       0.02011     0.10631

         Estimated SD of Village_Name effect      .740695
         Estimated SD within Village_Name        2.851464
         Est. reliability of a Village_Name mean  0.47957
              (evaluated at n=13.66)

. loneway Age Village

                One-way Analysis of Variance for Age: 1.5 Age

                                          Number of obs =       957
                                              R-squared =    0.1043

    Source                SS         df      MS            F     Prob > F
------------------------------------------------------------------------
Between Village_Name   15328.505     69    222.15225      1.50     0.0068
Within Village_Name    131586.66    887    148.35024
------------------------------------------------------------------------
Total                  146915.17    956    153.67695

         Intraclass       Asy.
         correlation      S.E.       [95% Conf. Interval]
         ---------------------------------------------------
            0.03515     0.01811       0.00000     0.07064

         Estimated SD of Village_Name effect     2.324655
         Estimated SD within Village_Name        12.17991
         Est. reliability of a Village_Name mean  0.33221
              (evaluated at n=13.66)

. loneway Total_Household_Income Village

                One-way Analysis of Variance for Total_Hous~e:

                                          Number of obs =       957
                                              R-squared =    0.1149

    Source                SS         df      MS            F     Prob > F
------------------------------------------------------------------------
Between Village_Name   1.439e+14     69    2.086e+12      1.67     0.0008
Within Village_Name    1.109e+15    887    1.250e+12
------------------------------------------------------------------------
Total                  1.253e+15    956    1.311e+12

         Intraclass       Asy.
         correlation      S.E.       [95% Conf. Interval]
         ---------------------------------------------------
            0.04664     0.01973       0.00797     0.08530

         Estimated SD of Village_Name effect       247312
         Estimated SD within Village_Name         1118198
         Est. reliability of a Village_Name mean  0.40049
              (evaluated at n=13.66)
```

```
. loneway Shock Village

                    One-way Analysis of Variance for Shock:

                                                Number of obs =       957
                                                    R-squared =    0.1208

    Source                SS         df      MS            F     Prob > F
------------------------------------------------------------------------
Between Village_Name   15.522859     69    .22496897      1.77     0.0002
Within Village_Name    113.01633    887    .12741412
------------------------------------------------------------------------
Total                  128.53918    956    .13445521

         Intraclass       Asy.
         correlation      S.E.       [95% Conf. Interval]
         ---------------------------------------------------
            0.05309     0.02062       0.01268     0.09350

         Estimated SD of Village_Name effect     .0845179
         Estimated SD within Village_Name        .3569511
         Est. reliability of a Village_Name mean  0.43364
              (evaluated at n=13.66)

. loneway Burden_ Village

   One-way Analysis of Variance for Burden_: Financial expectations by family

                                                Number of obs =       957
                                                    R-squared =    0.0651

    Source                SS         df      MS            F     Prob > F
------------------------------------------------------------------------
Between Village_Name   11.533785     69     .1671563      0.89     0.7156
Within Village_Name    165.75984    887    .18687693
------------------------------------------------------------------------
Total                  177.29363    956    .18545358

         Intraclass       Asy.
         correlation      S.E.       [95% Conf. Interval]
         ---------------------------------------------------
            0.00000*    0.01294       0.00000     0.02537

         Estimated SD of Village_Name effect            .
         Estimated SD within Village_Name        .4322926
         Est. reliability of a Village_Name mean  0.00000*
              (evaluated at n=13.66)

(*) Truncated at zero.

. loneway Protect_ Village

  One-way Analysis of Variance for Protect_: I protect myself from financial

                                                Number of obs =       957
                                                    R-squared =    0.1125

    Source                SS         df      MS            F     Prob > F
------------------------------------------------------------------------
Between Village_Name   21.658276     69    .31388805      1.63     0.0013
Within Village_Name    170.84956    887    .19261506
------------------------------------------------------------------------
Total                  192.50784    956    .20136803

         Intraclass       Asy.
         correlation      S.E.       [95% Conf. Interval]
         ---------------------------------------------------
            0.04407     0.01937       0.00611     0.08203

         Estimated SD of Village_Name effect     .0942338
         Estimated SD within Village_Name        .4388793
         Est. reliability of a Village_Name mean  0.38636
```

```
              (evaluated at n=13.66)

. loneway Mobile_Phone Village

                One-way Analysis of Variance for Mobile_Phone:

                                              Number of obs =       957
                                                  R-squared =    0.1388

    Source                SS         df      MS            F     Prob > F
------------------------------------------------------------------------
Between Village_Name   22.600739     69    .32754695      2.07     0.0000
Within Village_Name    140.19132    887    .15805109
------------------------------------------------------------------------
Total                  162.79206    956    .17028458

         Intraclass       Asy.
         correlation      S.E.       [95% Conf. Interval]
         ---------------------------------------------
            0.07281     0.02326       0.02721     0.11840

         Estimated SD of Village_Name effect     .1114048
         Estimated SD within Village_Name        .3975564
         Est. reliability of a Village_Name mean  0.51747
              (evaluated at n=13.66)

. loneway Quantity_Mobile_Phone Village

                One-way Analysis of Variance for Quantity_M~e:

                                              Number of obs =       957
                                                  R-squared =    0.1027

    Source                SS         df      MS            F     Prob > F
------------------------------------------------------------------------
Between Village_Name   106.06629     69    1.5371926      1.47     0.0091
Within Village_Name    926.24301    887    1.0442424
------------------------------------------------------------------------
Total                  1032.3093    956    1.0798214

         Intraclass       Asy.
         correlation      S.E.       [95% Conf. Interval]
         ---------------------------------------------
            0.03341     0.01786       0.00000     0.06842

         Estimated SD of Village_Name effect     .1899879
         Estimated SD within Village_Name        1.021882
         Est. reliability of a Village_Name mean  0.32068
              (evaluated at n=13.66)

. loneway Helping_Duty_ Village

One-way Analysis of Variance for Helping_Du~_: Helping family and friends finan

                                              Number of obs =       957
                                                  R-squared =    0.1222

    Source                SS         df      MS            F     Prob > F
------------------------------------------------------------------------
Between Village_Name   18.980131     69    .27507437      1.79     0.0001
Within Village_Name    136.28633    887    .15364862
------------------------------------------------------------------------
Total                  155.26646    956    .16241261

         Intraclass       Asy.
         correlation      S.E.       [95% Conf. Interval]
         ---------------------------------------------
            0.05470     0.02084       0.01386     0.09555

         Estimated SD of Village_Name effect     .0942931
         Estimated SD within Village_Name        .3919804
         Est. reliability of a Village_Name mean  0.44143
```

```
              (evaluated at n=13.66)

. loneway Balance_Microfinance Village

One-way Analysis of Variance for Balance_Mi~e: 12.61  Do you have any balance

                                             Number of obs =       957
                                                 R-squared =    0.0753

    Source                SS         df      MS            F     Prob > F
------------------------------------------------------------------------
Between Village_Name   .22504537     69    .00326153      1.05     0.3796
Within Village_Name    2.7655502    887    .00311787
------------------------------------------------------------------------
Total                  2.9905956    956    .00312824

         Intraclass       Asy.
         correlation      S.E.       [95% Conf. Interval]
         ---------------------------------------------------
            0.00336     0.01345       0.00000     0.02972

         Estimated SD of Village_Name effect     .0032433
         Estimated SD within Village_Name        .0558379
         Est. reliability of a Village_Name mean  0.04405
              (evaluated at n=13.66)

. loneway Balance_SavingsGroup Village

One-way Analysis of Variance for Balance_Sa~p: 12.62  Do you have any balance

                                             Number of obs =       957
                                                 R-squared =    0.1897

    Source                SS         df      MS            F     Prob > F
------------------------------------------------------------------------
Between Village_Name   17.134825     69    .24833079      3.01     0.0000
Within Village_Name    73.205823    887    .08253193
------------------------------------------------------------------------
Total                  90.340648    956    .09449859

         Intraclass       Asy.
         correlation      S.E.       [95% Conf. Interval]
         ---------------------------------------------------
            0.12824     0.03003       0.06937     0.18710

         Estimated SD of Village_Name effect     .1101832
         Estimated SD within Village_Name        .2872837
         Est. reliability of a Village_Name mean  0.66765
              (evaluated at n=13.66)

. loneway Balance_Bank Village

One-way Analysis of Variance for Balance_Bank: 12.63  Do you have any balance

                                             Number of obs =       957
                                                 R-squared =    0.0992

    Source                SS         df      MS            F     Prob > F
------------------------------------------------------------------------
Between Village_Name    4.166077     69    .06037793      1.42     0.0171
Within Village_Name    37.810935    887    .04262789
------------------------------------------------------------------------
Total                  41.977011    956    .04390901

         Intraclass       Asy.
         correlation      S.E.       [95% Conf. Interval]
         ---------------------------------------------------
            0.02959     0.01731       0.00000     0.06352

         Estimated SD of Village_Name effect     .0360516
         Estimated SD within Village_Name        .2064652
         Est. reliability of a Village_Name mean  0.29398
```

```
              (evaluated at n=13.66)

. loneway Balance_Cash_at_Home Village

One-way Analysis of Variance for Balance_Ca~e: 12.64 Do you have any balance

                                              Number of obs =       957
                                                  R-squared =    0.1114

    Source                SS         df      MS            F     Prob > F
------------------------------------------------------------------------
Between Village_Name   24.358905     69    .35302761      1.61     0.0016
Within Village_Name    194.26387    887    .21901226
------------------------------------------------------------------------
Total                  218.62278    956    .22868492

         Intraclass       Asy.
         correlation      S.E.       [95% Conf. Interval]
         ---------------------------------------------------
            0.04288     0.01920       0.00525     0.08052

         Estimated SD of Village_Name effect     .0990608
         Estimated SD within Village_Name        .4679875
         Est. reliability of a Village_Name mean  0.37962
              (evaluated at n=13.66)


. loneway Balance_Livestock Village

One-way Analysis of Variance for Balance_Li~k: 12.65  Do you have any balance

                                              Number of obs =       957
                                                  R-squared =    0.0870

    Source                SS         df      MS            F     Prob > F
------------------------------------------------------------------------
Between Village_Name   1.6204327     69    .02348453      1.23     0.1090
Within Village_Name    17.002347    887    .01916837
------------------------------------------------------------------------
Total                   18.62278    956    .01947989

         Intraclass       Asy.
         correlation      S.E.       [95% Conf. Interval]
         ---------------------------------------------------
            0.01622     0.01536       0.00000     0.04633

         Estimated SD of Village_Name effect     .0177776
         Estimated SD within Village_Name        .1384499
         Est. reliability of a Village_Name mean  0.18379
              (evaluated at n=13.66)

. loneway Balance_Crops Village

One-way Analysis of Variance for Balance_Cr~s: 12.66  Do you have any balance

                                              Number of obs =       957
                                                  R-squared =    0.0706

    Source                SS         df      MS            F     Prob > F
------------------------------------------------------------------------
Between Village_Name   1.6529985     69     .0239565      0.98     0.5317
Within Village_Name    21.745121    887    .02451536
------------------------------------------------------------------------
Total                  23.398119    956    .02447502

         Intraclass       Asy.
         correlation      S.E.       [95% Conf. Interval]
         ---------------------------------------------------
            0.00000*    0.01294       0.00000     0.02537

         Estimated SD of Village_Name effect           .
         Estimated SD within Village_Name        .1565738
```

```
         Est. reliability of a Village_Name mean  0.00000*
              (evaluated at n=13.66)

(*) Truncated at zero.

. loneway Balance_MobileMoney Village

One-way Analysis of Variance for Balance_Mo~y: 12.67  Do you have any balance

                                             Number of obs =       957
                                                 R-squared =    0.1187

    Source                SS         df      MS            F     Prob > F
------------------------------------------------------------------------
Between Village_Name   9.7721013     69    .14162466      1.73     0.0003
Within Village_Name    72.574816    887    .08182054
------------------------------------------------------------------------
Total                  82.346917    956    .08613694

         Intraclass       Asy.
         correlation      S.E.       [95% Conf. Interval]
         ---------------------------------------------------
            0.05080     0.02030       0.01101     0.09060

         Estimated SD of Village_Name effect     .0661744
         Estimated SD within Village_Name        .2860429
         Est. reliability of a Village_Name mean  0.42227
              (evaluated at n=13.66)
```

Appendix 3: List of Villages in Research Area

Shinyanga Rural	**Meatu**	**Kishapu**
Isela	Mwakaluba	Mpumbula
Nduguti	Inonelwa	Sekeididi
Nyashimbi	Mwandu-Iti	Butuyu
Shabuluba	Kisesa	Mwaweja
Ihalu	Mbalagane	Bulekela
Buchana	Mwabusalu	Mwangongo
Manyada	Itinje	Bunambiyu
Singita	Mwabuma	Malwilo
Nzagaluba	Mwamishali	Mwakipoya
Idingo	Sakasaka	Seseko
Ishinabula	Bulyashi	Ngofila
Nyida	Malwilo Mn	
Jomu	Mwagayi	
Kituli	Mwashata	

Appendix 4: Used Questionnaire

AECF Evaluation – Baseline survey 2016

Tanzania TZAW SmartMoney

Section 0: Interview information

0.1 To be completed by Interviewer

Please complete before the Interview

0.11	_____ *Interviewer name*	└─┴─┘ *Interviewer ID*
0.12	Date: └─┴─┘ / └─┴─┘ / 2015 (dd/mm)	
0.13	Region:	Code: └─┴─┘
0.14	District:	Code: └─┴─┘
0.15	Village:	Code: └─┴─┘
0.16	Household code: └─┴─┴─┘	

Introduction to household members:

"My name is_____. We are here to collect information about the farming activities in _____ district, for a study of a university in The Netherlands. Your household was selected to be part of this survey. I would like to speak to you (and your spouse/partner)."

"The researchers will keep your responses confidential. Your full name will never be used anywhere to ensure confidentiality."

"You are not obliged to answer questions if you do not want to and you are free to stop the interview at all times."

"We hope that the research will benefit farmers in _____ district."

"You will not receive any direct benefit if you join this study, your participation is voluntary."

"Do you have any questions for me? You may ask questions about this study at any time.

"The survey will take approximately 1 hour. Are you willing to participate?"

Signature of Interviewer:

0.2. To be completed by Team leader:

0.21	_____ *Team leader name*	└─┴─┘ *Team leader ID*

Remarks:

I confirm that the questionnaire is fully and correctly completed.

Date: └─┴─┘ / └─┴─┘ / 2015 (dd/mm)

Signature of team leader:

0.3. To be completed by Data Entry

I confirm that the data is correctly entered and checked.

Date of entry: └─┴─┘ / └─┴─┘ / 2015 (dd/mm)

_____ *Name of data entry operator*	└─┴─┘ *Data entry ID*

	_____ *Name of controller*	⌊__⌋__⌋ *Controller ID*
	Signature of data entry operator: *Signature of controller:*	

0.17	Who is the respondent?	1	Male household head	
		2	Female household head	
		3	Spouse (female)	
		4	Other, specify _____	
0.18	Is the interviewee willing to participate?	Yes	No	If no, why not?
		1	2	
0.19	Interview language			

Space for remarks:

SECTION 1 – HOUSEHOLD DEMOGRAPHICS

1.1	What is the number of persons living in your household? [ ] *Please list below by first name. Start with the head of the HH, then the spouse and complete the table for any other member.* *A household is defined as a group of people <u>currently</u> eating from the same pot "under the same roof" (or in same compound if the HH has 2 structures)*								
	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	1.10
HH Member Code	Name	Sex 1=male 2=female	Literate? 1=yes 2=no	Age in completed years	Relation to Head SEE CODES	Current schooling status (2015/2016) SEE CODES	Major income activity SEE CODES	Years of education completed	Status SEE CODES
01									
02									
03									
04									
05									
06									
07									
08									
09									
10									
11									
12									

CODES

1.6	1.7	1.8	1.10
1=Head 2=Spouse 3=Child 4=Other, specify:	1=Attend kindergarten 2=Attend primary school 3=Attend secondary school 4=Attend university 5=Attend vocational or other training program 6=Currently not attending any type of school/training	1=Farming (own farm) 2=Trading activities 3=Off-farm employment 4=Formal employment 5=Other, specify	1=Village chairman 2=Elder 3=Youth leader 4=Women's leader 5=Religious leader 6=Tribal leader 7=Other, specify: _____ 99=Not applicable

SECTION 2 – HOUSING

2.1	Do you or your household own or rent this dwelling/building?	1	Own ► Move to 2.3
		2	Don't own but live for free ► Move to 2.3
		3	Rent
2.2	How much do you pay per month for rent?	TSH	
2.3	What is the major construction material of the outside walls? OBSERVE IF YOU ARE AT THE PARTICIPANTS HOUSE	1	Earth / mud
		2	Mud bricks / blocks
		3	Cement / Concrete
		4	Other, specify _____
2.4	What is the major material of the roof?	1	Straw / thatch
		2	Zinc / metal sheet
		3	Plastic sheet (tarpaulin)
		4	Other, specify _____
2.5	What is the major material of the floor?	1	Earth/stones
		2	Wood
		3	Cement
		4	Tiles
		5	Other, specify _____

SECTION 3 – ASSETS						
3.1		Do you own [ASSETS]? 1. YES 2. NO ► MOVE TO NEXT LINE	How many?	When did you get it? ENTER YEAR	How much did you spend? AMOUNT (TSH)	If you sold the [ASSETS] now, how much could you earn? AMOUNT (TSH)
3.1.1	Chairs	⌊__⌋	⌊__⌋			
3.1.2	Mattress	⌊__⌋	⌊__⌋			
3.1.3	Couch	⌊__⌋	⌊__⌋			
3.1.4	Coal pot	⌊__⌋	⌊__⌋			
3.1.5	Generator	⌊__⌋	⌊__⌋			
3.1.6	Solar cell	⌊__⌋	⌊__⌋			
3.1.7	Radio / Tape	⌊__⌋	⌊__⌋			
3.1.8	TV	⌊__⌋	⌊__⌋			
3.1.9	Cell phone	⌊__⌋	⌊__⌋			
3.1.10	Sewing machine	⌊__⌋	⌊__⌋			
3.1.11	Mosquito net	⌊__⌋				

			⌊__⌋			
3.1.12	Hoe / Ax	⌊__⌋	⌊__⌋			
3.1.13	Shovel / Spade	⌊__⌋	⌊__⌋			
3.1.14	Bicycle	⌊__⌋	⌊__⌋			
3.1.15	Motorbike	⌊__⌋	⌊__⌋			
3.1.16	Car	⌊__⌋	⌊__⌋			
3.1.17	Cart	⌊__⌋	⌊__⌋			
3.1.18	Plough	⌊__⌋	⌊__⌋			
3.1.19	Wheelbarrow	⌊__⌋	⌊__⌋			
3.1.20	Tractor	⌊__⌋	⌊__⌋			
3.1.21	Irrigation device	⌊__⌋	⌊__⌋			

SECTION 4 – FIELD ROSTER							
				RENTED IN	RENTED OUT		
Field ID	4.1	4.2	4.3	4.4	4.5	4.6	4.7

	Field Description	What is the area of [FIELD] in ha?	Does your household hold a certificate for this [FIELD]? 1=Yes 2=No	Have you rented this [FIELD]: 1=Yes 2=No ► Q3.5 How much did you pay the owner for the use of [FIELD] last 12 months? ESTIMATE VALUE OF IN-KIND RECEIPTS to TSH.		During last 12 months, was this [FIELD] rented out? INCLUDES LAND GIVEN OUT FOR MONEY OR FREE 1=Yes 2=No ► Q3.7	How much was received from renting out these fields on this [FIELD] last 12 months? ESTIMATE VALUE OF IN-KIND RECEIPTS to TSH.	IF you were to rent out this [FIELD] today for 12 months, how much could you rent it for?	
				CASH	IN KIND			CASH	IN KIND
1									
2									
3									
4									
5									
6									

	In general, how would you assess the quality of the land that was cultivated by your household, last farming season?		
4.8.1	Fertility	⌊__⌋	1=Good 2=Not good, not poor 3=Poor
4.8.2	Erosion	⌊__⌋	1=No erosion 2=Light erosion 3=Heavy erosion

4.8.3	Slope	⌊__⌋	1=mostly flat 2=gentle slope 3=very steep

SECTION 4 – FIELD ROSTER (CONT'D)									
Field ID	Field description COPY FROM PREVIOUS ROSTER	4.9 During last Farming season, what was the status of this [FIELD]? 1=Purestand 2=Mixed crop 3=Pasture 4=Fallow 5=Forest 6=Land prepared for upcoming season 7=Other (specify)	4.10 Is [FIELD] irrigated? 1=Yes 2=No ► Q3.12	4.11 Source of irrigation 1=ponds 2=irrigation dams 3=pump/wells 4=other, specify	4.12 Is manure used on this [FIELD] ? 1=Yes 2=No	4.13 Are chemical-fertilizer or other chemicals used on this [FIELD]? 1=Yes 2=No ► NEXT SECTION	4.14 Spent on chemical-fertilizer & chemicals ESTIMATE VALUE OF IN-KIND RECEIPTS to TSH CASH	IN KIND	4.15 Where did you buy these inputs? WALKING MINUTES
1									
2									
3									
4									
5									
6									

SECTION 5 – FIELD ROSTER: LABOR								
For last Farming season, please list for me the <u>total number of days</u> household members and other laborers worked on this [FIELD] for activities such as land preparation, planting, ridging, weeding, fertilizing and harvesting.								
FIELD ID	Field description COPY FROM PREVIOUS ROSTER	5.1 HOUSEHOLD MEMBERS / EXCHANGE LABOR (FREE OF CHARGE) 1. # ADULTS >15 YRS	2. # DAYS	3. # CHILDREN ≤15 YRS	4. # DAYS	5.2 HIRED LABOR 1. # PEOPLE (MEN / WOMEN / CHILDREN)	2. # DAYS (TOTAL)	3. TOTAL WAGE TSH

SECTION 6 – FIELD ROSTER: CROPS						
Field ID	6.1	6.2	6.3	6.4	6.5	6.6
	Crop code SEE CODES IN ANNEX	How much of the field was planted with [CROP]? ESTIMATE %	Did you take prevention measures to prevent crop damage? (pesticides, herbicides, fungicides) 1=yes 2=no ► Q6	Approximately, how much did you spend on any of these prevention measures? TSH	Was [CROP] damaged on this field? 1=yes 2=no ► SECTION D4	What percentage of the crop on this field was damaged? ESTIMATE %

SECTION M1 – SEEDS ROSTER

Field ID	Crop ID	1	2		3	4		5
		Seed type 1= traditional 2= improved	How much of the [SEED] was purchased or purchased on credit last Farming season? RECORD TOTAL QUANTITY, REGARDLESS OF SOURCE.		What was the value of all of the [SEED] that you purchased or purchased on credit last Farming season?	How much of the [SEED] was borrowed, given for free or left-over last Farming season? RECORD TOTAL QUANTITY, REGARDLESS OF SOURCE.		What was the value of all of the [SEED] that was borrowed, given for free, or left over last Farming season?
COPY FROM SECTION 6			KG	GRAM	TSH	KG	GRAM	TSH

** If seed was bought on credit:*

6a.	When will you have to pay back the credit?			MM / YY
6b.	How much will you have to pay back?			In percentage (%) of the credited amount

SECTION 7 – CROP HARVEST ROSTER: 2014/2015 FARMING SEASON										
Field ID	Crop code	7.1 How much did you produce last Farming season?	7.2 How much of this production is (will be) used for seed reproduction?	7.3 How much of this production is (will be) consumed by your own household?	7.4 How many months will the stock *from own production* last for consumption by your own household?	7.5 How much of this production is (will be) given away?	7.6 How much of this production got lost (e.g. during storage)?	7.7 How much of this production is sold?	7.8 Revenue from sales	7.9 Who controls the output of this crop?
COPY FROM SECTION M1			KILOGRAMS	KILOGRAMS	MONTHS	KILOGRAMS	KILOGRAMS	KILOGRAMS	TSH	1=head 2=spouse 3=other (specify)

SECTION 8 – ESTIMATED HOUSEHOLD INCOME			
	Please estimate the total amount of income your household earned from [INCOME SOURCE] for last 12 months.		
	[INCOME SOURCE]	Amount earned TSH	Who controls the income from [THIS SOURCE]? 1=hh head 2=spouse 3=other (specify)
8.1	Off-farm activities (farm activities on other holders' farm etc.)		
8.2	Non-farm activities (e.g. handicraft, carpenter, charcoal etc.)		
8.3	Remittances (from migrated family) and gifts		
8.4	Cash for work program / Productive safety net		
8.5	Formal employment		
8.6	Other income sources, specify: _____		

SECTION 9: LIVESTOCK											
		9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	9.10
		How many [LIVESTOCK] do you or your household members own?	What is the amount of [LIVESTOCK] acquired during the last 12 months?	Value of [LIVESTOCK] acquired	What is the amount of [LIVESTOCK] sold during the last 12 months?	What was the total value of sales of [LIVESTOCK] in the last 12 months?	Did you hire any labor to help you with the [LIVESTOCK] in the past 12 months? 1=Yes 2=No ► Q8	What was the total cost of this labor for [LIVESTOCK] in the past 12 months?	Did you incur any other expenses such as fodder, vaccination / medicine / veterinary services for your [LIVESTOCK] in the past 12 months? 1=Yes 2=No ► NEXT LIVESTOCK	What was the total value of these additional expenses for [LIVESTOCK] in the past 12 months?	Who controls the income from [LIVE-STOCK] sales? 1=hh head 2=spouse 3=other (specify)
Code	Livestock			TSH / IN KIND RECEIPTS				TSH			
1	Cattle										
2	Sheep										
3	Goats										
4	Horses										
5	Donkeys										

6	Mules											
7	Chickens											
8	Beehives											

SECTION 10: LIVESTOCK BY-PRODUCTS									
		10.1	10.2			10.3	10.4	10.5	10.6
Code	By-product	In the last 12 months, did you produce any [BY-PRODUCT] from your livestock? 1=Yes 2=No ► NEXT BY-PRODUCT	What proportion of livestock and livestock products have you used for… HH CONSUMPTION % SALE % OTHER %			In the last 12 months, did you use any input (labor, transport, etc) in the production of by-products? 1=Yes 2=No ► Q5	How much was the total cost of inputs used? TSH	Please estimate the *total* value of the by-products (both sale and consumption) TSH	Who controls the income from [BY-PRODUCT]? 1=hh head 2=spouse 3=other (specify)
1	Milk								
2	Butter								
3	Cheese								
4	Meat								
5	Eggs								
6	Honey								

7	Wax								
8	Wool								
9	Skin								
10	Manure								
11	Others: _____								

SECTION 11 – HOUSEHOLD EXPENDITURES AND CONSUMPTION (1/3)														
Food ID	11.1 Over the past month (30 days), did you or others in your household consume any [ITEM]? INCLUDE FOOD BOTH EATEN COMMUNALLY IN THE HOUSEHOLD AND THAT EATEN SEPARATELY BY INDIVIDUAL HOUSEHOLD MEMBERS 1=Yes 2=No ► SKIP TO NEXT LINE		11.2 How much in total did your household consume in the past month?		11.3 How much came from purchases? IF NONE PUT 0		11.4 How much did you pay for the purchase?	11.5 How much came from own production? IF NONE PUT 0		11.6 How much came from gifts and other sources? IF NONE PUT 0		11.7 In the past 24 hours, did you or others in your household consume any [ITEM]? 1=Yes 2=No
			QTY	UNIT 1=Gram 2=Kg 3=Liter 4=Piece	QTY	UNIT 1=Gram 2=Kg 3=Liter 4=Piece	TSH	QTY	UNIT 1=Gram 2=Kg 3=Liter 4=Piece	QTY	UNIT 1=Gram 2=Kg 3=Liter 4=Piece	
Cereals (by month)												
1	Rice											
2	Maize											
3	Millet and sorghum											
4	Wheat, barley grain and other cereals											
5	Bread											
6	Buns, cakes, biscuits											
7	Spaghetti, macaroni											
Pulses (by month)												
8	Peas, beans, lentils, and other											

	pulses											
Oil seeds (by month)												
9	Seeds (any type)											
10	Groundnuts											
11	Coconuts											
12	Cashewnuts, almonds and other nuts											

SECTION 11– HOUSEHOLD EXPENDITURES AND CONSUMPTION (2/3)

Food ID	11.1		11.2		11.3		11.4	11.5		11.6		11.7
	Over the past week (7 days), did you or others in your household consume any [ITEM]? INCLUDE FOOD BOTH EATEN COMMUNALLY IN THE HOUSEHOLD AND THAT EATEN SEPARATELY BY INDIVIDUAL HOUSEHOLD MEMBERS 1=Yes 2=No ► SKIP TO NEXT LINE		How much in total did your household consume in the past week?		How much came from purchases? IF NONE RECORD 0.		How much did you pay for the purchase?	How much came from own production? IF NONE RECORD 0.		How much came from gifts and other sources? IF NONE RECORD 0.		In the past 24 hours, did you or others in your household consume any [ITEM]? 1=Yes 2=No
			QTY	UNIT 1=gram 2=kg 3=liter 4=piece	QTY	UNIT 1=gram 2=kg 3=liter 4=piece	TSH	QTY	UNIT 1=gram 2=kg 3=liter 4=piece	QTY	UNIT 1=gram 2=kg 3=liter 4=piece	
Vegetables & fruits (by week)												
13	Onions, tomatoes, carrots, green pepper											
14	Greens (spinach, cabbage and others)											
15	Canned, dried, wild vegetables											
16	Ripe bananas											
17	Citrus fruits (orange, lemons, etc)											
18	Mango's, avocado's, other fruits											
19	Sugarcane											
Root crops (by week)												
20	Sweet potato											

21	Irish potato											
22	Cassava											
23	Yam											
24	Cooking banana / plantains											

SECTION 11– HOUSEHOLD EXPENDITURES AND CONSUMPTION (3/3)

Food ID	11.1		11.2		11.3		11.4	11.5		11.6		11.7
	Over the past week (7 days), did you or others in your household consume any [ITEM]? INCLUDE FOOD BOTH EATEN COMMUNALLY IN THE HOUSEHOLD AND THAT EATEN SEPARATELY BY INDIVIDUAL HOUSEHOLD MEMBERS 1=Yes 2=No ► SKIP TO NEXT LINE		How much in total did your household consume in the past week?		How much came from purchases? IF NONE RECORD 0.		How much did you pay for the purchase?	How much came from own production? IF NONE RECORD 0.		How much came from gifts and other sources? IF NONE RECORD 0.		In the past 24 hours, did you or others in your household consume any [ITEM]? 1=Yes 2=No
			QTY	UNIT 1=gram 2=kg 3=liter 4=piece	QTY	UNIT 1=gram 2=kg 3=liter 4=piece	TSH	QTY	UNIT 1=gram 2=kg 3=liter 4=piece	QTY	UNIT 1=gram 2=kg 3=liter 4=piece	
Others (by week)												
25	Meat											
26	Fish											
27	Milk											
28	Yoghurt											
29	Butter											
30	Cheese											
31	Eggs											
32	Cooking oil											
33	Honey, syrup, jam											
34	Sugar											
35	Salt											

36	Sweets											
Beverages (by week)												
37	Coffee and cocoa											
38	Tea											
39	Soft drinks											
40	Beer											
41	Wine and spirits											

SECTION 12 – SAVINGS								
		1. Micro-finance institute	2. Savings group / circle	3. Bank	4. Cash at home	5. Buying livestock	6. Crops in storage	7. Mobile money account
12.1	Have you or your household had any kinds of the following savings ? 1 = Yes, 2 = No Always NO? GO TO 11.8							
12.2	Which household member holds the account? Use codes below							
11.3	What is the main source of this saving? Use codes below							
12.4	How often have you deposited in the last 6 months? (TSH)							
12.5	How often have you withdrawn or credited in the last 6 months? (TSH)							
12.6	Do you have any balance now? 1=yes, 2=no							
12.7	What amount do you have saved as of today? (TSH)							

Codes 12.2 Which household member holds the account?		Codes 12.3 What is the source of this saving?	
1=Head	8=Orphan taken care of	1=Save up small amounts for a long time	6=Profits from business
2=Spouse	9=Other relative	2=From selling land	7=From selling agricultural products
3=Child	10=Foster child (no orphan)	3=From selling livestock	8=From salary or wages

4=Parent 5=Sibling 6=Grand-child 7=Grand-parent	11= Son/ daughter in law 12=No relation 13= Other specify)_____	4=From selling other assets 5=From inheritance	9=Other (specify)_____

12.8	In your opinion, what are the three most important reasons that you save? Rank them starting with the most important (READ THE OPTIONS BELOW)			
	1. Most important reason to save: ⌊__⌋	2. Second most important reason to save: ⌊__⌋	3. Third most important reason to save: ⌊__⌋	
	1=To pay for children's education expenses 2=To (re)build house 3=To buy farm equipment or farm inputs (e.g. fertilizer) 4=To buy livestock		5=To buy assets (e.g. radio, TV, mobile phone, furniture) 6=To provide for old age 7=Celebrations (marriages, funerals, birth, etc.) 8=Other (specify)_____	

SECTION M2– MOBILE MONEY													
		1	2	3	4	5	6	7	8	9	10		
	Provider	Do you know about this service? 1=yes; 2=no If no, move to next line.	How many people in your village do you know who use this service?	Are you registered for this service? 1=yes; 2=no If no, move to next line.	Since when are you registered?	Did you ever use this service? 1=yes; 2=no	# times used last month	Total amount transferred last month	Total amount received last month	Balance on mobile money account now	For what types of transactions do you use service? In order of importance See codes below		
			NUMBER		Month/Year			TSH	TSH	TSH	Main	Second	Third
1	M-Pesa												
2	Tigo Pesa												
3	Airtel money												
4	SmartMoney												
	Codes Q8 – TRANSACTIONS : 1= Receiving remittances, 2=Sending remittances, 3= Receiving payments from cotton ginnery 4= Paying for small consumption items, 5= Paying school fees, 6= Paying other bills, 7= Other, specify												

11	Have you seen any promotion for Mobile Money in the last six months?	1= Yes, 2=No ► Go to Q14			
12	From which company did you see promotion? [RANK FROM MOST SEEN TO LEAST SEEN]	1=M-pesa 2=Tigo Pesa 3=Airtel money 4=SmartMoney	1st	2nd	3rd
13	What kind of promotion did you see? [RANK FROM MOST SEEN TO LEAST SEEN]	1= Radio 2=Promotional event (market, football game) 3=Church or mosque 4=Friends or family 5=Farmer group or coffee company 6=Visited SmartMoney office 7=Other, specify	1st	2nd	3rd

SECTION 13 – LONG-TERM EXPENDITURES

In the past 6 months, how much money have you spent on each of the following items or services? *(both cash and on credit)*

		TSH			TSH
13.1	Education: school fee, uniform, copy books		13.7	Taxes, fines	
13.2	Medical expenses, health care		13.8	Construction, house repair	
13.3	Clothing, shoes (except for school uniform)		13.9	Repayment of debts	
13.4	Celebration, social event, funeral, wedding		13.10	Savings	
13.5	Airtime		13.11	Other, _____	
13.6	Charging phone		13.12	Other, _____	

SECTION M3 – ORGANIZATIONAL PARTICIPATION

1	How many groups are you a member of?		
2	In the last 12 months, have you been an active member of any of the following types of groups in your community? *(N.B. Active means that the member spends time on the organization / interacts with its members)* CIRCLE ALL THAT APPLY	1 = farmers group	6 = youth group
		2 = traders / prof. association	7 = religious group
		3 = credit/funeral association	8 = political organization
		4 = women's group	9 = sports group
		5 = community group	10 = other: specify _____
		99 = None	
3	Total number of meetings per month		

SECTION M4 - TRUST							
1	In general, how much do you think people can be trusted?		Not at all	A little bit	A bit	Pretty much	Very much
	How much do you trust…						
2	Your neighbors?		1	2	3	4	5
3	Community leaders?		1	2	3	4	5
4	Strangers?	If there are no strangers circle: 99	1	2	3	4	5
5	If_____ *(see categories)* would offer you to sell to some of your produce at the market would you accept this offer?	Own family member: Yes / No		Neighbor: Yes / No			
6	In case the person agreed to pay you some of the revenue in advance, which part would _____ *(see categories)* have to pay you in advance for you to accept the offer? → SEE CODES BELOW	Own family member: ⌊___⌋		Neighbor: ⌊___⌋			
*CODES6: 0= Nothing; 1= Almost nothing; 2= Less than half; 3= Half ; 4= More than half; 5= Almost all; 6= All							

SECTION M5 - FAMILY AND FINANCIAL TRANSFERS						
	1.		2a.	2b.	3a.	3b.
	Please list the number of family members living in your village, outside your own household, by relationship type:		In the past month, have you been requested for giving a financial transfer to some of these persons? 1=yes; 2=no	If yes, how much did you give? RECORD "0" IF YOU DID NOT GIVE A TRANSFER	In the past month, have you asked for receiving a financial transfer from some of these persons? 1=yes; 2=no	If yes, how much did you receive? RECORD "0" IF YOU DID NOT RECEIVE A TRANSFER
	Relationship	Count #				
A	Parents					
B	Children					
C	Grandchildren					
D	Foster-children					
E	Siblings					
F	Cousins / Aunts / Uncles					
G	Other relatives					

SECTION 14 – FOOD SECURITY										
14.1.	14.2								14.3	
In the past 7 days, did you worry that your household would not have enough food? 1=yes; 2=no	In the past 7 days, how many days have you or someone in your household had to: IF NO DAYS, RECORD ZERO.								How many meals, including breakfast are taken on average per day in your household?	
	A Rely on less preferred foods?	B Limit the variety of foods eaten?	C Limit portion size at mealtimes?	D Reduce number of meals eaten in a day?	E Restrict consumption by adults for small children to eat?	F Borrow food, or rely on help from a friend or relative?	G Have no food of any kind in your household?	H Go a whole day and night without eating anything?	A. Adults (5 yrs and above)	B. Children (6-59 months)
	DAYS	DAYS	DAYS	DAYS	DAYS	DAYS	DAYS	DAYS	NUMBER	NUMBER

14.4	14.5			14.6	14.7												14.8		
Do all household members eat roughly the same diet? 1=yes ► Q6 2=no	Who in the household usually eats a more diverse variety of foods, a less diverse variety of foods? 1=more diverse; 2=less diverse			In the last 12 months, have you been faced with a situation when you did not have enough food to feed the household? 1=yes 2=no ►SECTION H	In which months of the last 12 months did you experience this incident? MARK X IN EACH COLUMN WHEN INCIDENT APPLIES ADJUST CALENDER TO TIME OF SURVEY												What was the cause of this situation? LIST UP TO 3 IN ORDER OF IMPORTANCE; USE CODES ON THE BOTTOM.		
					2015											2014			
	A MEN	B WOMEN	C CHILDREN (6-59		NOV	OCT	SEP	AUG	JUL	JUN	MAY	APR	MAR	FEB	JAN	DEC	A 1ST	B 2ND	C 3RD

			MONTHS)																

Codes for 14.8a, 14.8b & 14.8c	5=Food in the market was very expensive
1=Inadequate household stocks due to drought/poor rains	6=Not able to reach the market due to high transportation costs
2=Inadequate household food stocks due to crop pest damage	7=No food in the market
3=Inadequate household food stocks due to small land size	8=Floods/water logging/hailstorm
4=Inadequate household food stocks due to lack of farm inputs	9=Other, specify: _____

SECTION 15: SHOCKS AND COPING (1/2)													
				Answer these questions for the 3 most significant shocks only:									
		15.1	15.2	15.3					15.4			15.5	
	SHOCK	During the last 12 months, was your household affected negatively by [SHOCK]? 1=Yes 2=No ► NEXT SHOCK	Rank the three most significant shocks you experienced 1=Most severe 2=Second most severe 3=Third most severe	As a result of this [SHOCK], did your […] … READ RESPONSES FOR EACH COLUMN 1=Increase 2=Decrease 3=Did not change					What did your household do in response to this [SHOCK] to try to regain your former welfare level? LIST UP TO 3 ANSWERS BY ORDER OF IMPORTANCE. IF MORE THAN ONE EVENT, ASK ABOUT THE MOST RECENT INCIDENT. USE CODES BELOW.			During the last 12 months, how many times did [SHOCK] occur?
CODE				Income	Assets	Food production	Food stocks	Food purchase	1st	2nd	3rd		
1	Price fall of food items												
2	Price raise of food items												
3	Loss of non-farm jobs of HH member												
4	Drought												
5	Flood / landslides / heavy rains preventing work												
6	Other crop damage												
7	Death of HH member												
8	Illness of HH member												

Codes: Coping strategy		
1=Relied on own savings	7=Adult household members who were previously not	14=Sold crop stock

2=Received unconditional help from relatives/friends 3=Participated in cash or food for work program 4=Received unconditional help from ngo/religious institution (food or cash) 5=Changed eating patterns (relied on less preferred food, reduced the number of meals per day, hh members skipped days of eating, etc.) 6=Employed household members / Took on more employment	working had to find work 8=Household members migrated 9=Reduced expenditures on health and/or education 10=Obtained credit 11=Sold agricultural assets 12=Sold durable assets 13=Sold land/building	15=Sold livestock 16=Intensify fishing 17=Sent children to live elsewhere 18=Engaged in spiritual efforts prayer, sacrifices, diviner consultations 19=Did not do anything 20=Other (specify)

SECTION 15: SHOCKS AND COPING (2/2)													
				Answer these questions for the 3 most significant shocks only:									
		15.1	15.2	15.3					15.4			15.5	
CODE	SHOCK	During the last 12 months, was your household affected negatively by [SHOCK]? 1=Yes 2=No ► NEXT SHOCK	Rank the three most significant shocks you experienced 1=Most severe 2=Second most severe 3=Third most severe	As a result of this [SHOCK], did your […] … READ RESPONSES FOR EACH COLUMN 1=Increase 2=Decrease 3=Did not change					What did your household do in response to this [SHOCK] to try to regain your former welfare level? LIST UP TO 3 ANSWERS BY ORDER OF IMPORTANCE. IF MORE THAN ONE EVENT, ASK ABOUT THE MOST RECENT INCIDENT. USE CODES BELOW.			During the last 12 months, how many times did [SHOCK] occur?
				Income	Assets	Food production	Food stocks	Food purchase	1st	2nd	3rd		
9	Increase in price of inputs (seed, fertilizer)												
10	Great loss / death of livestock												
11	Fire												
12	Theft / robbery and other violence												
13	Involuntary loss of house/land												
14	Displacement (due to government development projects)												

15	Other (specify)											

Codes: Coping strategy

1=Relied on own savings 2=Received unconditional help from relatives/friends 3=Participated in cash or food for work program 4=Received unconditional help from ngo/religious institution (food or cash) 5=Changed eating patterns (relied on less preferred food, reduced the number of meals per day, hh members skipped days of eating, etc.) 6=Employed household members / Took on more employment	7=Adult household members who were previously not working had to find work 8=Household members migrated 9=Reduced expenditures on health and/or education 10=Obtained credit 11=Sold agricultural assets 12=Sold durable assets 13=Sold land/building	14=Sold crop stock 15=Sold livestock 16=Intensify fishing 17=Sent children to live elsewhere 18=Engaged in spiritual efforts prayer, sacrifices, diviner consultations 19=Did not do anything 20=Other (specify)

SECTION 16 - CONCLUSION

Thank you very much for participating.

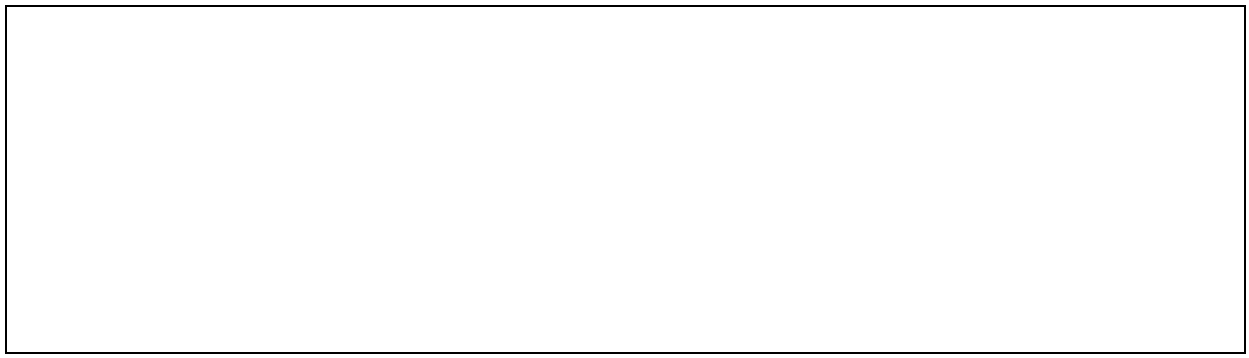
The results of this questionnaire will help us to better understand the situation in your villages, in order to advice NGOs and policy makers about policies that could lead to further improvements in this region.

Do you have any questions for me before I leave? *Take the time to answer any questions.*

Section 17 - Observations of the enumerator. Do not read the following questions. Simply record your impressions!

A	Ending time	_ _ : _ _ (hh:mm)	
B	How would you judge the respondent's understanding of the questions during the survey?	1	Displayed no problems
		2	Displayed a little difficulty
		3	Displayed moderate difficulty
		4	Displayed serious problems
C	How did the thought process of the respondent appear to you during the survey?	1	Logical and sensible
		2	Somewhat Unclear
		3	Unclear, insensible
		4	Totally disoriented
D	Remarks about respondent / spouse (e.g. physical disabilities, mental disease)		

Space for additional remarks



ANNEX: Crop Codes

Crop Codes (Cereals/tubers/roots):
11 Maize
12 Paddy
13 Sorghum
14 Bulrush Millet
15 Finger Millet
16 Wheat
17 Barley
22 Sweet Potatos
23 Irish potatos
24 Yams
25 Cocoyams
26 Onions
27 Ginger

Legumes Oil & fruit:
31 Beans
32 Cowpeas
33 Green gram
35 Chick peas
36 Bambara nuts
37 Field peas
41 Sunflower
42 Simsim
43 Groundnut
47 Soyabeans
48 Caster seed

Cash Crop Codes:
50 Cotton
51 Tobacco
53 Pyrethrum
62 Jute
19 Seaweed

Vegetable Codes:
86 Cabbage
87 Tomatoes
88 Spinach
89 Carrot
90 Chillies
91 Amaranths
92 Pumpkins
93 Cucumber
94 Egg Plant
95 Water Mellon
96 Cauliflower
100 Okra
101 Fiwi

Permanent Crops:
70 Passion Fruit
71 Banana
72 Avocado
73 Mango
74 Papaw
76 Orange
77 Grapefruit
78 Grapes
79 Mandarin
80 Guava
81 Plums
82 Apples
83 Pears
84 Peaches
85 Lime/lemon
68 Pomelo
69 Jack fruit
97 Durian
98 Bilimbi
99 Rambutan
67 Bread fruit
38 Malay apple
39 Star fruit

Permanent (Cash crops)
53 Sisal
54 Coffee
55 Tea
56 Cocoa
57 Rubber
58 Wattle
59 Kapok
60 Sugar Cane
61 Cardamom
63 Tamarin
64 Cinamon
65 Nutmeg
66 Clove
18 Black Pepper
34 Pigeon pea
21 Cassava
75 Pineapple
44 Palm Oil
45 Coconut
46 Cashewnut
998 OTHER