

Social Learning and Community Participation
Key Factors for Financial Literacy among Rice-Farmers in Gisagara,
Rwanda

Jacco Sanderse (5283957)

Department of Social Sciences, Utrecht University

Supervisor: Dr. Weverthon Barbosa Machado

Second reader: Dr. Lucas Drouhot

June 26, 2023

Abstract

This paper aims to contribute to financial well-being and reduce high poverty levels through financial literacy. The paper investigates how social learning and community participation affect financial literacy among rice farmers in Gisagara, Rwanda. This is done by analysing a survey of 83 farmers using multiple regression analysis to examine the hypotheses that social learning and community participation have positive effects on financial literacy, including the examination of an interaction of the independent variables. Although the paper does not find any significant evidence to support these hypotheses, the results and limitations give implications for similar future research. The paper concludes by giving three policy recommendations. The first is focused on financial literacy learning making use of existing community gatherings called Umuganda. The second elaborates current policy's focus on increasing financial long-term planning and the last emphasises the importance of focusing on increasing financial literacy among younger people and females.

Ethical statement

This study is approved by the Ethical Review Board of the Faculty of Social and Behavioural Sciences of Utrecht University. The approval is based on the documents sent by the researchers as requested in the form of the Ethics committee and filed under number 23-0735.

Introduction

Millions of people around the world live in poverty, especially in rural areas where agriculture is the main source of income and employment (Ogutu & Qaim, 2019). Therefore, agriculture can play a crucial role in reducing poverty and promoting economic development, but it requires farmers to have adequate financial literacy (Linh et al., 2019). Financial literacy is the ability to use information and skills to make sound financial decisions (Kiril, 2020). It can help farmers increase their income, savings, and investment, as well as avoid over-indebtedness, exploitation, and financial exclusion (Kiril, 2020; Khan et al., 2022).

However, financial literacy levels vary across countries and regions and may depend on various factors such as people's network, education and learning abilities (Kiril, 2020). The current research focuses on Rwanda. This seems to be an interesting research context due to the role of agriculture, poverty rates and the increasing available financial services. Rwanda is a country where agriculture plays a vital role in the economy and society. Agriculture contributes 24% to GDP and employs approximately 55% of the population (Statista, 2023; World Bank, 2021). Furthermore, Rwanda faces high poverty rates, with 38.2% of its people living below the poverty line in 2017 compared to 9.7% worldwide. The Rwandan government's goal is to eradicate poverty by creating financial inclusion (Finscope 2020). They tend to achieve this goal by providing resources for financial training and increasing financial literacy. The National Agriculture Policy aims to improve farmers' productivity, profitability, and resilience by enhancing their knowledge and skills in financial management, planning, budgeting, saving, borrowing, investing, and risk mitigation (the Republic of Rwanda, 2018). Moreover, the availability and accessibility of financial services in Rwanda also influence the demand and use of financial literacy. There is mobile money coupled with phone numbers, availability of loans and financial cooperatives providing loans with better interest. These initiatives offer opportunities for economic growth and increased financial well-being (Demirgüç-Kunt et al., 2022). For individuals to seize these opportunities, financial literacy is required (Peachey & Roe, 2004). In the past decade, the provision of financial services in the sub-Saharan has seriously increased. Despite the availability, 67% of adults remain unbanked compared to 76% of the global population. This example highlights the importance of increased financial literacy levels.

To map the current levels of financial literacy the first research question to be answered is: "*What are financial literacy levels among Rwandan farmers?*".

In the following paragraph learning mechanisms that could play a role in financial literacy will be analysed. Financial literacy is not only an individual attribute but also a social

phenomenon that can be influenced by the interactions and exchanges among farmers and other actors in their communities. Research in Uganda emphasizes that financial inclusion and education efforts would be more effective if individuals making financial decisions are considered subject to social interaction between peers and suggest that further research should focus on the kind of relationship different communities and social roles have in social learning between peers (Gutter et al., 2010; Okello Candiya Bongomin et al., 2016; Agabalinda & Isoh, 2020).

By researching how people acquire and improve their financial literacy through social interactions, fitting policy recommendations can be done.

Social learning is a key component of learning through social interactions. Social learning refers to the process of learning from others through observation, discussion, or modelling behavior (Bandura & Walters, 1977). It can occur in various contexts and networks, such as peers, governments or NGOs (Van Epp & Garside, 2019). Social learning can influence financial literacy by providing information, feedback, motivation, or examples that shape financial knowledge, behaviours and attitudes. Earlier research showed that social learning is an effective tool for people to learn in general (Bandura 1963), and more specifically financial literacy (Muñoz-Murillo et al., 2020).

Another important factor in predicting financial literacy is community participation. Community participation stems from social capital theory and is defined as a feature of social organization, such as trust, social norms and networks that improve the efficiency of society by facilitating coordinated actions (Putnam et al., 1993). Social capital is often divided into bridging and bonding capital. Bonding capital is defined as structural capital facilitating collective action and cooperation to reach common goals (Arnstein, 1969; Warren et al., 2001), the latter has also been used to define community participation (Grootaert et al., 2004). In the current research, the focus will be put on community participation, leaving bridging social capital out due to the interesting Rwandan context of specific community-focused policy.

In 1993 a genocide took place in Rwanda in which the lives of 800.000 people have been taken and the country's need for physiological and physical, and economic recovery after the gross domestic product (GDP) decreased by 58%.

An important post-genocide recovery policy in place is called Umuganda. Which can be translated as “coming together in common purpose to achieve an outcome”. Umuganda’s goal is to contribute to the socio-economic development of the country by providing infrastructure, environmental protection, social cohesion and citizen participation. Umuganda

is organized every last Saturday of the month and is supervised by a manager or chairperson who oversees the effectiveness and efficiency of community participation. Examples of activities are the building of roads or schools, planting trees or honouring the victims and survivors of the Genocide and the process with possible physiological aftermath (Rwanda Governance Board, 2017). The Rwandan government's focus on community development is likely to have an impact on financial literacy. This becomes evident from social capital theories indicating that strong communities can lead to adherence or coherence of information.

Social learning and community participation are two potential factors that may enhance financial literacy among individuals and groups. Social learning can provide opportunities for acquiring and applying financial knowledge and skills through various forms of social interactions (Bandura, 1963), while community participation can foster trust, norms and networks that facilitate financial decision-making and cooperation (Putnam, 1993). However, the relationship between these factors and financial literacy is not well established and may depend on various contextual and individual variables. Moreover, the interaction effects of social learning and community participation on financial literacy, have not been researched and, potentially have synergistic or antagonistic outcomes. Therefore, research is needed to examine how social learning and community participation influence financial literacy, both separately and jointly in an interaction effect. This leads up to the second research question: *“To what extent can social learning and community participation explain the financial literacy levels of Rwandan rice farmers? And to what extent do social learning and community participation interact in explaining financial literacy?”*.

Such research may contribute to the design of more effective and context-specific financial education interventions that leverage the potential of social learning and community participation for rice farmers in Rwanda. Based on the outcomes of the first two research questions the third research question will be answered: *“How can policy increase financial literacy levels in rural areas?”*

The paper is organized as follows. The next section reviews the relevant literature that can explain mechanisms determining financial literacy levels and formulates hypotheses. The third section describes the research methodology and data analyses. The fourth section reports and discusses the results from descriptive and inferential analyses. The fifth section summarizes the main findings, limitations and conclusions. Finally, policy recommendations for improving financial literacy among Rwandan rice farmers are provided.

Theory

The social learning theory and community participation will be used as the main concepts to answer the second question. This chapter will start by describing the relationship between social learning and financial literacy. Secondly, the relationship between community participation and financial literacy will be predicted using social capital theory. Finally, by examining the literature, an expectation will be given for the interaction between social learning and community participation in predicting financial literacy.

Social learning

Social learning is described as a learning process by observing, discussing and modelling behaviour. This implies that farmers who observe, discuss or model financial behaviour are receptive to increased financial literacy.

Observation is deemed an important aspect of acquiring financial literacy for farmers. This involves reading, attending a presentation, or watching a scene (Bandura, 1963). Observation is a cognitive process that requires the mind to process information and evaluate its potential benefits Bandura (1963). For example, this may occur when farmers join a financial literacy workshop offered by an NGO, listening to another farmer's financial experience in making a balance. If this farmer anticipates positive outcomes for applying a method of balancing the budget it is likely to increase financial behaviour. This conveys a positive relationship between observing behaviour and increased financial literacy behaviour.

The second aspect of social learning which is likely to predict financial literacy is discussion. Bandura (1963) asserts that discussion promotes knowledge transfer. This is evident in the case of rice yield enhancement through technology education, where Nakano et al. (2015) reveal that workshops enabled farmers to acquire new skills and that knowledge diffusion occurred among participants and non-participants. Furthermore, they report a significant association between farmer interaction and yield improvement. This implies that farmers with lower financial literacy can learn from those with higher financial literacy. Another important aspect of learning through discussion is found by Lehesvirta (2004), who corroborates the notion of learning through discussion. Through a combination of ethnographic research and literature review, Lehesvirta contends that adults engage in collaborative learning. This supports the idea that farmers can acquire financial literacy knowledge, behavior or attitudes through discussion. The same notion is confirmed for students by Gutter Et al. (2010). They detect more favourable financial behaviours among

students who had social learning opportunities with their peers. This evidence supports the relationship between discussing financial literacy and acquiring improved financial literacy.

Observing and imitating is another significant aspect of social learning which is likely to increase financial literacy. By imitating financial literacy-related behaviour, financial literacy behaviour levels are likely to increase. Bandura (1963) confirms observing and imitating improve learning and refers to this mechanism as modelling. The idea that modelling behaviour is supported by research in Ecuador. The research showed that entrepreneurs who observed more successful entrepreneurs were more likely to have successful businesses after modelling successful behaviour (Engström & McKelvie, 2017). Applied to financial literacy, this can mean that less financially literate farmers learn from more financially literate farmers by observing and imitating their behaviour. For example, a farmer who sees another farmer being very critical when choosing a financial product, the observing farmer might model the behaviour by imitating it when buying a financial product for themselves. This illustrates how modelling can lead to increased financial literacy.

Important conditions for the described social learning mechanisms are motivation and self-efficacy. This means that acquiring improved and new financial literacy knowledge, attitudes and behaviour, depends on the level of motivation and self-efficacy. For example, a farmer who expects to get compliments from fellow farmers when applying knowledge in drawing up a balance sheet that farmer is more motivated to imitate how another farmer draws a balance. This is shown by Bandura (1963) who claims that when a task has pride or a perceived sense of achievement as a consequence, that individual will be motivated to learn through observation, discussion or modelling. Self-efficacy translates into increased learning when the belief that a certain learning objective can be accomplished is present. For example, when a farmer has never made a balance sheet, this might seem like a difficult task which will not be achieved. Therefore they might choose to not start the task, while if the farmer would have believed in their capability, the farmer might have started and accomplished the task. This becomes evident in Bandura's (1963) research on the role of self-efficacy. Bandura shows if tasks are perceived as too difficult a person might choose not to start a task. However, by observing information or by observing behaviour, self-efficacy can be enhanced (Bandura 1963). Third parties like governments, financial institutions and NGOs are likely to improve self-efficacy. By providing opportunities for observation and discussions about information and how to make a balance sheet, farmers might learn more positive financial knowledge and behavior. Literature research focused on social learning among entrepreneurs implies organisations can fulfil a role model for entrepreneurs (Scherer et al., 1989). They

hypothesize that working close to entrepreneurs can enhance a sense of efficacy as they can see others achieving certain goals. This confirms the idea that self-efficacy will lead to increased financial literacy.

The social learning theory of Bandura is supported by research in Kampala, Uganda. This theory states that people learn from observing and imitating others, as well as from discussing and collaborating with them. Agabalinda and Isoh (2020) demonstrate that peers play a crucial role in enhancing financial literacy through social learning. They conclude that financial literacy is necessary for improved financial behaviour and that it is mainly acquired through social learning when financial literacy levels are low. This relationship implies that social learning is a significant predictor of financial literacy in Rwanda because Rwanda has lower financial literacy levels than Uganda (Klapper et al., 2014.). Therefore, it can be assumed that financial literacy and social learning will be high in the current research.

It is expected that Rwandan rice farmers will gain financial literacy by observing provided information and discussing with peers and NGOs and modelling behaviour based on observations. Therefore the first hypothesis is the following:

“Increased social learning activities are related to higher financial literacy levels”

Community participation – social capital theory

The following section will present the investigation of the literature on the relationship between community participation and financial literacy explained by social capital. This will be done by exploring the role of cognitive enhancement and strong ties as mechanisms which are related to social capital.

Social capital theory

An important aspect of social capital influencing financial literacy levels seems to be through strong ties. If communities include high levels of collective action, the strength of their ties is likely to cause a big commitment of community members to achieve the communities goals. When communities identify with acquiring financial knowledge or aim to achieve healthy financial behaviour and attitudes, it is more likely to be achieved. This becomes evident from articles from different worlds parts, focused on the role of social capital in cooperatives and rural area communities (Rivera et al. 2019; Pisani & Micheletti, 2020, Wulhandari et al. 2022). The studies show that collective action positively contributes to long-term initiatives with common objectives.

However, strong ties can also prevent learning effects, depending on the group identity. Increased collective action and strong ties could even be related to low financial literacy levels. When financial literacy is not the goal of a community, it is unlikely that social capital will increase financial literacy levels. On the contrary, it would likely be negatively related. People likely avoid dissent with the communities goals. Therefore, people could choose to avoid the topic of financial literacy. This idea is based on social capital leading to groupthink, which is the tendency to avoid dissent and disagreement in favour of harmony and cohesion, by creating a shared identity and cognitive schema among the network members (Pillai et al., 2017).

Nevertheless, for current research, it assumed that Rwandan farmers with high levels of community participation will be related to having higher financial literacy levels. Whether community participation will have a positive effect on financial literacy thus depends on the goal the community has. If the communities goals are focused on increasing financial literacy this will likely be the outcome. Considering the potential positive effects of financial literacy on the well-being of Rwandan rice farmers (Karakurum- Ozdemir et al., 2019), and the focus of the government on increasing financial literacy as shown in the introduction, it is expected that communities will have a positive attitude towards financial literacy.

Based on the literature about social capital mechanisms in communities concerning learning, the second hypothesis is as follows:

“Increased community participation significantly predicts increased financial literacy”

Interaction Effect of social learning and community participation

Social learning and community participation are likely to reinforce each other in predicting financial literacy through achieving common objectives. When communities are in the process of achieving learning goals, ties become stronger causing a cumulative relation of increasing learning. Applied to learning financial literacy, this means that while achieving financial literacy the communities efforts in social learning will increase even more. This becomes evident in the article of Rivera et al. (2019), which shows collective action tends to contribute to lasting initiatives with shared common objectives that in turn reinforce the sense of belonging of all involved, related to more collective action to achieve goals. This is also supported by Tregear and Cooper (2016). They indicate that cooperatives can shape the values and attitudes of actors toward learning. This supports the idea that social learning of financial literacy in communities leads to increased community participation and social learning. Ultimately, leading to increased financial literacy levels. This conveys that social

learning and community participation can be expected to increase each other's relationship to financial literacy.

Another element likely to increase social learning is motivation. Motivation as a consequence of social capital, enables learning processes to be stimulated. Applied to financial literacy, social learning can be increased by motivation. This relationship is established by Wulandhari et al. (2022) who show that increased social capital within a network can motivate behaviour. This allows social capital to enhance social learning of financial literacy through motivation. This effectively shows that community participation is likely to enhance the relationship between social learning and financial literacy.

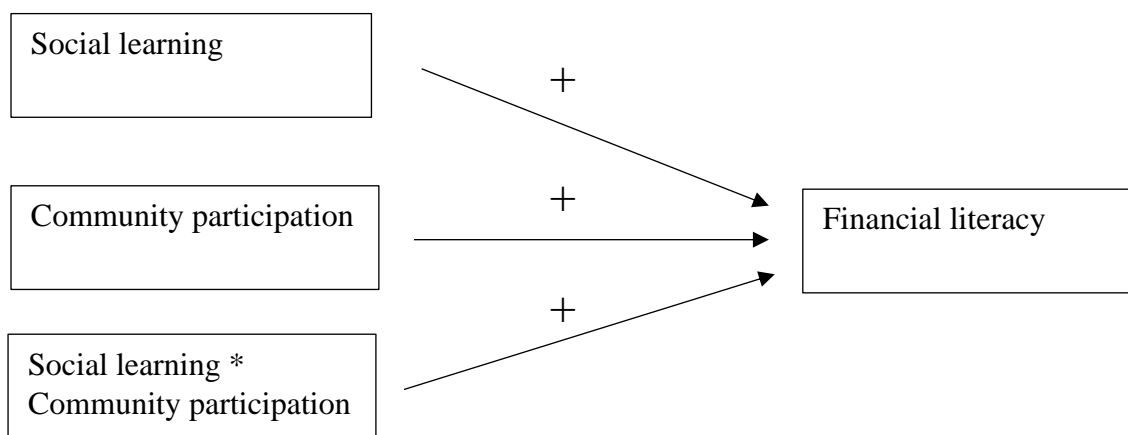
In summary, it has been shown from this review that the relationship between social learning and financial literacy can be enhanced by community participation as well as the other way around. Therefore the third hypothesis goes as follows:

Community participation and social learning increase each other's relationship to financial literacy

An overview of the hypotheses can be found in Figure 1 presenting the model which will be tested.

Figure 1

Statistical model based on hypotheses



Methods

Data collection

The participants of this study are farmers in the Southern Province of Rwanda in the district of Gisagara. A total of 109 farmers have been selected using a non-probability sample. To collect data on short notice four cooperatives in different have been approached within the

Agriterra network to recruit 30 members. The respondent was requested to fill in a paper-based questionnaire, to collect data on financial literacy, social learning, community participation, and control variables. The questionnaire has been developed in English and then translated into Kinyarwanda. To make sure the translation was correct three people have worked on and checked it. After listwise deletion, computing and recoding the variables, 83 respondents remain for the main analysis.

Operationalization

Dependent variable Financial literacy

The dependent variable for this research is financial literacy. Knowledge-, behaviour, and attitude are used to operationalize financial literacy. The operationalization is based on the questionnaire of the Organisation for Economic Co-operation and Development (OECD) (Atkinson & Messy, 2012). Financial knowledge is used to test basic knowledge of key financial concepts and the ability to apply numeracy skills in financial situations. Behaviour shows the positive outcomes of being financially literate. Therefore a wide range of financial behaviours is used, focusing on those enhancing or reducing financial well-being. Attitudes are measured as they are supposed to predict financial behaviour.

The questions relate to aspects including budgeting and money management, short and long-term financial plans and financial product choice. The dependent variable is composed of three variables existing of question scores about knowledge, behaviour and attitude. These have been used separately to answer the first research question describing financial literacy levels more comprehensively. The used questionnaire can be found in Appendix I.

Financial literacy, knowledge

Measuring knowledge was done by questions 7 to 14. Concepts of these questions are simple and compound interest, risk and return, inflation and diversification. Rwandan Francs was used as the currency in the examples instead of dollars to make the question more clear for the respondents. The question about diversification of risk has been changed from stock investments to crop diversification which seemed more relatable for the respondents. For each correct answer respondents got one point. It can be argued that some questions might be more difficult and therefore the one-point score is unfair. However, international experts argue for equal weighting (Atkinson & Messy, 2012). Equal scores also avoid complex statistical approaches that offer more chances for wrong interpretations.

Financial literacy, behaviour

Measuring behaviour is done by questions 15 to 19 and question 23. The question was formulated as statements to be judged by a Likert scale. The statements cover concepts of managing money, including whether they consider carefully whether they can afford something, or whether they typically pay bills on time. The last statement was further clarified by defining bills with examples of inputs for farming, medical insurance and school fees. The other statements regarded, keeping a close watch over their finances and whether they attempt to save and set long-term goals. Finally, question 23 is multiple choice in which respondents indicate how carefully they have chosen financial products, however, due to 50 missings this question has been deleted from the analysis.

Based on the advice of local financial experts two questions of the OECD questionnaire about measuring behaviour were left out. The first question was about the amount of savings and another about borrowing money to meet all financial ends. The question was excluded as it seemed like a too-sensitive topic which would not likely be answered. A question about choosing a bank to loan money has been modified. Originally this was an open question asking about choosing a bank to loan money. Translating the question and answers ought to be heard by the researcher. Therefore, the question was changed to a statement of whether or not they would compare banks to loan money. In the OECD questionnaire, comparing banks to loan money could be rewarded with two points. By adapting the question current research gives a maximum of two points. To be able to compare the scores with OECD, the scores were compensated. The total score was divided by five and multiplied by nine. This solution was applied by following the example of the OECD calculations for countries missing questions (Atkinson & Messy, 2012).

Financial literacy, Attitudes

Attitudes were measured by scaled attitudinal questions 20, 21 and 22. The score for the attitude questions is calculated by adding the scores to the questions and dividing it by three. This makes the minimum score 1 and the maximum 5.

Financial literacy, the final score

The final dependent variable has a maximum score of 22, achieved when the knowledge score is eight, behaviour is nine and attitudes is five. The combination of the three variables gave a reliability of .431 based on the Kruger test. Combined the minimum financial literacy score is 1 and the maximum is 22.

Social learning:

The social learning score is composed of three dimensions how often respondents, discuss with farmers; questions 24 to 30, discuss with third parties; questions 31 to 37, and observe farmers; questions 38 to 44. Respondents answered statements indicating on a scale from one to five to what extent they discussed or observed behaviour. The statements are based on Gutter and Garrison (2010) and regarded avoiding over expenses, paying bills on time, saving and investing, working with a formal financial institution, and buying crop- and medical insurance. To clarify the statements, original examples of the OECD questionnaire were replaced. For the statement about insurance “buying and maintaining a crop insurance” replaced “Car insurance” to make it more applicable to respondents. A statement about discussing/observing the checking of credit reports was excluded from the analyses as it caused 28 missing answers. This may be explained by not getting credit reports. Although this problem was tried to tackle by asking not applicable. If the missings would be deleted, it is expected to miss a specific group of respondents who do not have a credit report which may bias the research.

The final score is decided on all scales times each other divided by all questions, Cronbach’s alpha >0.9. The minimum score is one and the maximum score is five.

Community participation

Community participation is operationalized as collective action and cooperation similar to earlier research (Jiang et al., 2020). Questions 45, 46 and 47 aim to measure neighbourhood collaborations, the type of activities and how much respondents participated in community participation. Questions 48 to 51 include five statements to which the respondent could answer on a Likert scale starting at 1, very unlikely and ending with 5, very likely. The statements included how much non-participating community members will be criticized and sanctioned, and a statement of how likely it is that the community cooperates in case of a water problem or when a community member suffers from something unfortunate like illness or death of a parent. The questions are inspired by the Worldbank (Grootaert et al., 2004) developed the questionnaire with the aim understanding of the collective capacity of poor rural households. Questions 45, 46 and 47 were excluded from the main analyses due to missings, respectively 29, 27 and 29. This might be caused because it is seen as sensitive information and in the case of several participating in community activities it might be too hard to remember the correct answer. The main analyses added the answer categories of

questions 48 to 51, Cronbach's alpha .836. This led to a minimum score of one and a maximum score of five.

*Moderator social learning*community participation*

To measure an interaction effect, the variables of social learning and community participation have been statistically centred to have comparable scores for interacting.

Control variables

To enhance the internal validity, I control for age, gender, income, education, attitude to risk, and crop diversification. Except for crop diversification, control variables are chosen by the OECD questionnaire, as this research used the same way to measure financial literacy. The goal was to include savings as a control variable, however, it's been left out due to a high number of missings.

Age

It's expected that with increasing age people attain more financial knowledge, and change their attitudes and behaviours based on their knowledge (Atkinson & Messy, 2012). However, changing markets and financial products, like mobile money, can make it hard to adapt to the changes. Retaining and applying financial knowledge might become harder due to cognitive deterioration among the oldest (Atkinson & Messy, 2012). During the data collection was discovered that age was not included in the questionnaire. However, Agriterria has a policy of always noting the age participants they work with. Respondents could indicate if they were below 35 or 35 and older. The question has been included as question 52. The answers were computed to a dummy variable, '0' being below 35 and a score of '1' representing respondents above 35. It is expected that above 35 respondents will have increased financial literacy based on the OECD findings for increased financial literacy levels among older people (Atkinson & Messy, 2012).

Gender

Question 1 is used to measure gender. Atkinson & Messy's (2012) results for measuring financial literacy showed that male respondents often gained higher scores in the overall financial literacy score. Therefore, gender is controlled as a dummy variable, male = 0, female = 1.

Education

Education was measured with question two. Higher education is found to correlate with higher levels of financial literacy (Atkinson & Messy, 2012). Six answer categories are used for finished education, starting with no education, and, ending with postgraduate.

Risk seeking

Question 6 was used to measure risk. Atkinson and Messy (2012) identified risk-seeking, to risk as an important variable in predicting financial literacy. Non-risk-seeking respondents were likely to have higher financial literacy scores. The variable was asked on a Likert scale agreeing completely (1) or completely disagreeing (5) with the statement: “*I am prepared to risk some of my own money when saving or making an investment*”.

Crop diversification

Question 3 measures crop diversification. A study on crop specialization and diversification in developing countries shows a positive correlation between the number of crops cultivated and household income from crops (Pellegrini & Tasciotti, 2014). Higher incomes are related to financial literacy behaviour (Atkinson & Messy, 2012). Crop diversification can also indicate increased financial knowledge. If crop diversification is chosen mindfully, it can be an indicator of reducing risk by growing several crops. Crop diversification was measured by asking what crops farmers grow. There were three answer categories. The first was rice, second maize and third other. The answers were computed into a dummy variable; 0 being rice and 1 being more than rice.

Assumptions and analyses

Before the analyses, the dependent and independent variables have been checked on assumptions of multicollinearity, normal distribution and outliers. The variables have no concerning multicollinearity. Based on a linear regression analysis the VIF is 1.2. Following Alin (2010), this number does not exceed the assumption of multicollinearity. The use of box plots to check for outliers only identified one outlier for the dependent variable. However, this outlier has not been identified as untrue or unreliable, therefore the outlier has been accepted. Both dependent variables are not normally distributed and highly skewed. An attempt using the log-10 technique did not solve this problem. Due to the lack of other data, the variables will be used as continuous variables in the main analyses.

The collected data will be entered into SPSS 28. Descriptive statistics will be used to summarize the data. A multiple regression analysis will be used to test the hypotheses using three models.

Sensitivity analysis

Additional analysis has been done to make 0/1 scores for social learning and community participation. This was done because of the skewed distribution. Zero was given to a score between zero and two, including two. The score one was given to scores from and including three until and including five.

Ethics

This study has been approved by the Ethics Committee FERB social sciences at Utrecht Universit. Informed consent has been obtained from all participants before the data collection. Confidentiality and anonymity of the participants has been assured and the data will be stored under the latest European Union data protocol. The participants did not face any harm or risk as a result of their participation in the study

Results

Table 1 presents the descriptive statistics for the variables used in the analysis. The dummy variables are relative to the reference category. Most of the farmers (67%) were 35 years old or older and only 25% were women. The mean financial literacy score was 16.12 (SD = 2.46) out of a maximum of 22 points. The mean social learning score was 3.80 (SD = 1.30) on a scale from one to five, indicating that they learned from others to some extent. The mean community participation score was 4.42 (SD = 0.82), also on a scale from one to five, implying that they were active in the community. The mean education level was 1.41 (SD = 0.98) on a scale from one to five, equivalent to primary education or lower. The mean risk-seeking score was 1.46 (SD = 1.03) on a scale from one to five, meaning low-risk preference. About 36% of the farmers diversified their crops.

Table 1. Descriptive statistics for analyses variables

	N	Min	Max	Mean	S.D.
Financial literacy	83	8.13	20.33	16.1237	2.45500
Social learning	83	1.00	5.00	3.7999	1.30078
Community participation	83	1.00	5.00	4.4247	0.81594
AgeD 35 or above	83	0.00	1.00	0.6747	
Gender, female	83	0.00	1.00	0.2530	
Education	83	1.00	5.00	1.4096	0.97576
Risk seeking	83	1.00	5.00	1.4578	1.02768
Crop diversification	83	0.00	1.00	0.3614	

Additional descriptives, including all respondents, have been used to compare with a research of the OECD (Atkinson & Messy, 2012). This data is expected to be comparable as the making of the financial literacy score was similar to the OECD except for some language use and then deciding on the behavior score. The descriptives show that the sample has a relatively high level of financial literacy compared to other countries. Financial literacy is composed of knowledge, behaviour and attitudes. The sample has a mean financial literacy score of $M = 16.12$, $SD = 2.46$, which is higher than the OECD average range of 12.4 to 15.1. The sample also has a good understanding of basic financial concepts and principles, as indicated by the mean knowledge score of $M = 5.23$, $SD = 1.14$, which is higher than the OECD average range of 4.6 to 6.1. The sample has a high degree of positive financial

behaviours, such as budgeting, saving, investing and borrowing responsibly, as shown by the mean behaviour score of $M = 7.41$, $SD = 1.78$, which is higher than the OECD average range of 4.5 to 6.1. The sample has a less favourable attitude towards saving and planning for the future, as shown by the mean attitude score of $M = 2.74$, $SD = 0.97$, which is lower than the OECD average range of 2.3 to 3.7.

The descriptives also show some differences in financial literacy and its components by gender and age group. Females have a higher mean attitude score than males ($FM = 3.31$, $SD = 0.97$ vs $M = 2.61$, $SD = 0.94$), but lower mean knowledge and behaviour scores ($FM = 5.04$, $SD = 1.10$ vs $M = 5.31$, $SD = 1.07$ and $FM = 7.23$, $SD = 2.45$ vs $M = 7.34$, $SD = 1.57$, respectively). Younger respondents (below 35 years old) have a higher mean behaviour score than older respondents ($>35 = 7.55$, $SD = 1.61$ vs $>35 = 7.34$, $SD = 1.83$), but lower mean knowledge and attitude scores ($>35 = 5.12$, $SD = 5.29$ vs $<35 = 5.24$, $SD = 1.10$)

Table 2. Regression analyses predicting financial literacy

	Model 1		Model 2		Model 3	
	B	SE	B	SE	B	SE
Constant	13.305** *	1.464	13.146***	1.664	10.961***	1.968
<i>Independent variables</i>						
Social learning	.358	.232	.214	.252	.294	.251
Community participation	.330	.370	.385	.379	.747	.414
<i>Interaction</i>						
Social learning * Community participation					.446	.224
<i>Control Variables</i>						
Gender Female			.204	.624	.014	.619
Age above 35			.157	.587	.189	.576
Education			.244	.287	.238	.281
Risk seeking			-.217	.276	-.084	.279
Crop diversification			.762	.565	.472	.573
R ²	.068		.107		.152	
F	2.910		1.285		1.661	

Note: First the coefficient (B) is shown, and second the Standard Error. $P < 0,05$; * $p < .01$; ** $p < 0.001$; ***

Table 2 shows how social learning, community participation, and their interaction affect financial literacy. Financial literacy is composed of knowledge, behaviour and attitudes. The table presents three regression models. Model 1 has only the independent variables, model 2 adds the control variables, and Model 3 adds the interaction term. The coefficients show how much financial literacy changes when the predictor variable increases by one unit while keeping all other variables constant. The independent variables are continuous variables that measure the level of social learning and community participation on a scale from one to five. Both social learning and community participation have positive coefficients in all models, meaning that higher levels of social learning and community participation are associated with higher levels of financial literacy. However, they are not significant, meaning that this

association is not statistically different from zero. Furthermore, in model 3, the interaction term between social learning and community participation is not significant at the 0.05 level, with a p-value of 0.051. The control variables do not significantly affect financial literacy in any of the models. The R-squared values show that the models explain a small part of the variation in financial literacy, with model 3 having the highest value of 0.152. The F-statistics show that the models are not statistically significant at the 0.05 level, implying that they do not fit the data well.

Table A1 shows a sensitivity analysis using dummy variables for the independent variables instead of continuous variables. The dummy variables take the value of 1 if the farmer has high social learning or high community participation, and 0 otherwise. The reference category is low social learning and low community participation. The results are similar to those in Table 2: except for social learning in the first model, none of the independent variables or the interaction term is significant in any of the models. The control variables also do not have significant effects on financial literacy. The R-squared values are low in all models, indicating poor model fit. The F-statistics are not statistically significant at the 0.05 level in any of the models.

Conclusion

This study examined how community participation and social learning influenced financial literacy among Rwandan rice farmers, and how these two factors interacted. Financial literacy consists of knowledge, behaviour and attitudes that can improve livelihoods and financial well-being. The study analyzed survey data from 83 farmers using multiple regression. The results indicated that none of the relationships were significant statistically, but the coefficients were positive, indicating a possible link between higher levels of community participation, social learning and financial literacy. However, the data were skewed and violated some of the regression assumptions, so the results should be treated with caution.

Possible reasons for the insignificant effects and the skewed data for social learning and community participation are cultural differences, a lack of measuring cognition, and negative effects of social capital and homogeneous data. A discrepancy in culture between the researcher and the respondents may have caused respondents to have chosen extreme or socially desirable answers instead of expressing their true opinions. This can be a result of culture (Kemmelmeier, 2016). Kemmelmeier argued that different cultures have different response styles, which can result in fence-sitting. Therefore, future studies should consider the sample's cultural context, and when needed consider alternative methods to capture answers wanted on a scale.

The differentiation in cognitive abilities of respondents may have influenced the relationship between social learning of financial literacy. The current questions measure how much they discussed and observed. However, Bandura (1963) stresses the importance of cognitive ability to enhance social learning. Future research may therefore include questions that test the cognitive ability to avoid similar scores that do not reflect the actual amount of social learning that occurred.

A lack of diverse answers causing skewness for the independent variables may have been caused by question formulations and a homogeneous sample. The questions of financial literacy asked about how often farmers discuss financial topics.

However, cooperative meetings include financial topics which are likely to have caused homogeneous answers in the current research. This indicates that for future research it could be beneficial to address the questions in personal settings of discussion. Community participation answers might have been homogeneous because many respondents are from the same community. This could have led to reduced variability and sensitivity of the data. A lack of financial literacy goals within the community might be another cause of the insignificant relationship between community participation and financial literacy. As described in the

literature review, a lack of goals can prevent learning a certain topic (Pillai et al., 2017), creating no increased financial literacy.

This study found that the respondents had a higher financial literacy level than the OECD average, as assessed by the OECD framework. They demonstrated favourable behaviour and the ability to apply and restate financial knowledge. However, the total score might deviate due to a slightly different composition of the behaviour score compared to the OECD composition. Moreover, the respondents had a lower attitude score than the OECD average, indicating their low motivation to save and plan for the future. This could impair their long-term financial well-being. Additionally, the results showed some variations in financial literacy and its components by gender and age group. Females had a higher attitude score than males, but lower knowledge and behaviour scores. Younger respondents had a higher behaviour score than older respondents, but lower knowledge and attitude scores. These results imply that financial education and policy interventions should consider the specific needs and preferences of different groups.

The study has important implications for policymakers and practitioners who aim to enhance financial literacy and reduce poverty among rural populations in Rwanda and other developing countries. The study suggests that community participation and social learning may have positive effects on financial literacy, which may in turn improve financial behaviours and attitudes. Therefore, interventions that encourage community engagement and social interaction among farmers may help increase their financial capabilities and outcomes. However, future research should take note of the implications current research has addressed concerning the methodological challenges. Future research should design research that is tailored to the specific context, investigate these issues more thoroughly and design interventions that are tailored to the specific needs and contexts of the target groups. By doing so, future research can contribute to more effective and sustainable solutions for poverty reduction and financial well-being.

Policy recommendations

Based on this study, three policy recommendations are deducted. Whilst this study did not confirm the relation of social learning, community participation and its interaction with financial literacy, the literature findings, descriptives and positive coefficients do substantiate the expectations. Therefore, the first policy recommendation is regarding the use of Umuganda for enhancing financial literacy.

Umuganda is one of the traditional tools of mutual help rooted in Rwandan culture that has the potential to contribute to the financial literacy of the community. Current policies support the idea of aiming at communities to increase financial literacy, however, they do not explicitly mention Umuganda to increase financial literacy, (Consumer Empowerment and Market Conduct, 2015; Republic of Rwanda, 2018; Finscope, 2020,). Therefore, using Umuganda for financial literacy learning seems like a small policy step with high potential. For example, this could be done by using current policies such as a workshop, training or online game about financial knowledge, behavior and attitudes. This is likely to increase financial literacy as communities become aware of its goal and influence each other's financial knowledge and behavior through social learning (Bandura, 1963). Moreover, when the communities see financial literacy as a goal, they are likely to work together towards this goal because it will become inherent to the group norms and values (Rivera et al. 2019; Pisani & Micheletti, 2020, Wulhandari et al. 2022).

The second policy recommendation is focused on improving financial attitudes. The descriptive results indicated that financial attitudes scores are low compared to the OECD. The literature emphasises the role of socialization agents to shape financial attitudes (Gutter et al. 2010). This idea fits the current policy, which already focuses on the use of peer learning and the use of example farms for increasing financial literacy (Consumer Empowerment and Market Conduct, 2015; Republic of Rwanda, 2018). By increasing the focus on long-term financial planning through the socialization agents, financial attitudes are likely positively be shaped. Socialization agents could also be selected on whether they have positive financial attitudes. The socialization agents could then be an example to be modelled or could provide information that can be observed and discussed.

The last policy recommendation emphasises a policy focus on gender and age. Although Rwanda has many policies in place with a special focus on increasing financial literacy among youth and women (Consumer Empowerment and Market Conduct, 2015; Republic of Rwanda, 2018; Finscope, 2020), the current results and research in Rwanda indicate the importance of gender and age focus when increasing financial literacy (Abbott and Malunda, 2014; Moïse and Hongyi, 2017).

References

- Agabalinda, C., & Isoh, A. V. N. (2020). Moderating effects of social learning on the usage of formal financial services in Kampala, Uganda. *Journal of Economics and International Finance*, 12(3), 120–129. <https://doi.org/10.5897/JEIF2020.1043>
- Alin, A. (2010). Multicollinearity: Multicollinearity. *Wiley Interdisciplinary Reviews: Computational Statistics*, 2(3), 370–374. <https://doi.org/10.1002/wics.84>
- Arnstein, S. R. (1969). A Ladder Of Citizen Participation. *Journal of the American Institute of Planners*, 35(4), 216–224. <https://doi.org/10.1080/01944366908977225>
- Atkinson, A., & Messy, F. (2012). *Measuring Financial Literacy: Results of the OECD / International Network on Financial Education (INFE) Pilot Study* (OECD Working Papers on Finance, Insurance and Private Pensions Vol. 15). OECD. <https://doi.org/10.1787/5k9csfs90fr4-en>
- Bandura, A. (1978). Self-efficacy: Toward a unifying theory of behavioral change. *Advances in Behaviour Research and Therapy*, 1(4), 139–161. [https://doi.org/10.1016/0146-6402\(78\)90002-4](https://doi.org/10.1016/0146-6402(78)90002-4)
- Bandura, A., & Walters, R. H. (1963). *Social learning and personality development*. New York.
- Consumer Empowerment and Market Conduct (2015). *National Financial Education Strategies Toolkit* https://www.afi-global.org/wp-content/uploads/2021/07/NFES_toolkit_22082022.pdf
- Demirgüç-Kunt, A., Klapper, L., Singer, D., & Ansar, S. (2022). *The Global Findex Database 2021: Financial Inclusion, Digital Payments, and Resilience in the Age of COVID-19*. The World Bank. <https://doi.org/10.1596/978-1-4648-1897-4>
- Engström, P., & McKelvie, A. (2017). Financial literacy, role models, and micro-enterprise performance in the informal economy. *International Small Business Journal*, 35(7), 855–875. <https://doi.org/10.1177/0266242617717159>
- Finscope (2020). *Financial inclusion Rwanda* <https://afr.rw/downloads/finscope-survey-2020-report/>

- Grootaert, C., Narayan, D., Jones, V. N., & Woolcock, M. (2004). *Measuring Social Capital: An Integrated Questionnaire*. The World Bank. <https://doi.org/10.1596/0-8213-5661-5>
- Gutter, M. S., Garrison, S., & Copur, Z. (2010). Social Learning Opportunities and the Financial Behaviors of College Students. *Family and Consumer Sciences Research Journal*, 38(4), 387–404. <https://doi.org/10.1111/j.1552-3934.2010.00034.x>
- Jiang, N., Wu, B., Lu, N., & Dong, T. (2020). Neighborhood-based social capital and cognitive function among older adults in five low- and middle-income countries: Evidence from the World Health Organization Study on global AGEing and adult health. *International Journal of Geriatric Psychiatry*, 35(4), 365–375. <https://doi.org/10.1002/gps.5239>
- Karakurum-Ozdemir, K., Kokkizil, M., & Uysal, G. (2019). Financial Literacy in Developing Countries. *Social Indicators Research*, 143(1), 325–353. <https://doi.org/10.1007/s11205-018-1952-x>
- Kemmelmeier, M. (2016). Cultural differences in survey responding: Issues and insights in the study of response biases. *International Journal of Psychology*, 51(6), 439–444. <https://doi.org/10.1002/ijop.12386>
- Khan, F., Siddiqui, M. A., & Imtiaz, S. (2022). Role of financial literacy in achieving financial inclusion: A review, synthesis and research agenda. *Cogent Business & Management*, 9(1), 2034236. <https://doi.org/10.1080/23311975.2022.2034236>
- Kiril, K. (2020). *OECD/INFE 2020 International Survey of Adult Financial Literacy*.
- Klapper, L., Lusardi, A., & van Oudheusden, P. (2014). *Financial Literacy Around the World*.
- Lehesvirta, T. (2004). Learning processes in a work organization: From individual to collective and/or vice versa? *Journal of Workplace Learning*, 16(1/2), 92–100. <https://doi.org/10.1108/13665620410521558>

- Linh, T. N., Long, H. T., Chi, L. V., Tam, L. T., & Lebailly, P. (2019). Access to Rural Credit Markets in Developing Countries, the Case of Vietnam: A Literature Review. *Sustainability*, *11*(5), Article 5. <https://doi.org/10.3390/su11051468>
- Muñoz-Murillo, M., Álvarez-Franco, P. B., & Restrepo-Tobón, D. A. (2020). The role of cognitive abilities on financial literacy: New experimental evidence. *Journal of Behavioral and Experimental Economics*, *84*, 101482. <https://doi.org/10.1016/j.socec.2019.101482>
- Nakano, Y., Tsusaka, T. W., Aida, T., & Pedde, V. O. (2015). The impact of training on technology adoption and productivity of rice farming in Tanzania: Is farmer-to-farmer extension effective. *JICA-RI working paper*, *90*.
- Ogutu, S. O., & Qaim, M. (2019). Commercialization of the small farm sector and multidimensional poverty. *World Development*, *114*, 281–293. <https://doi.org/10.1016/j.worlddev.2018.10.012>
- Okello Candiya Bongomin, G., Ntayi, J. M., Munene, J. C., & Nkote Nabeta, I. (2016). Social capital: Mediator of financial literacy and financial inclusion in rural Uganda. *Review of International Business and Strategy*, *26*(2), 291–312. <https://doi.org/10.1108/RIBS-06-2014-0072>
- Pellegrini, L., & Tasciotti, L. (2014). Crop diversification, dietary diversity and agricultural income: Empirical evidence from eight developing countries. *Canadian Journal of Development Studies / Revue Canadienne d'études Du Développement*, *35*(2), 211–227. <https://doi.org/10.1080/02255189.2014.898580>
- Pillai, K. G., Hodgkinson, G. P., Kalyanaram, G., & Nair, S. R. (2017). The Negative Effects of Social Capital in Organizations: A Review and Extension. *International Journal of Management Reviews*, *19*(1), 97–124. <https://doi.org/10.1111/ijmr.12085>

- Pisani, E., & Micheletti, S. (2020). Social capital and rural development research in Chile. A qualitative review and quantitative analysis based on academic articles. *Journal of Rural Studies*, 80, 101–122. <https://doi.org/10.1016/j.jrurstud.2020.08.002>
- Putnam, R. D. (1993). What makes democracy work? *National Civic Review*, 82(2), 101–107. <https://doi.org/10.1002/ncr.4100820204>
- Republic of Rwanda, (2018). *National Agriculture Policy* https://www.minagri.gov.rw/fileadmin/user_upload/Minagri/Publications/Policies_and_strategies/National_Agriculture_Policy_-_2018___Approved_by_Cabinet.pdf
- Rivera, M., Knickel, K., María Díaz-Puente, J., & Afonso, A. (2019). The Role of Social Capital in Agricultural and Rural Development: Lessons Learnt from Case Studies in Seven Countries: The Role of Social Capital in Agricultural and Rural Development. *Sociologia Ruralis*, 59(1), 66–91. <https://doi.org/10.1111/soru.12218>
- Rwanda Governance Board. (2017). *Impact Assessment of Umuganda*. [Impact_Assessment_of_Umuganda_2007-2016.pdf](https://www.rgb.gov.rw/Portals/0/Impact_Assessment_of_Umuganda_2007-2016.pdf) (rgb.rw)
- Scherer, R. F., Adams, J. S., & Wiebe, F. A. (1989). Developing Entrepreneurial Behaviours: A Social Learning Theory Perspective. *Journal of Organizational Change Management*, 2(3), 16–27. <https://doi.org/10.1108/EUM0000000001186>
- Statista. (2023). *Rwanda—Share of economic sectors in the gross domestic product 2011-2021*. Statista. <https://www.statista.com/statistics/452199/share-of-economic-sectors-in-the-gdp-in-rwanda/>
- Tregear, A., & Cooper, S. (2016). Embeddedness, social capital and learning in rural areas: The case of producer cooperatives. *Journal of Rural Studies*, 44, 101–110. <https://doi.org/10.1016/j.jrurstud.2016.01.011>

- Van Epp, M., & Garside, B. (2019). Towards an evidence base on the value of social learning-oriented approaches in the context of climate change and food security. *Environmental Policy and Governance*, 29(2), 118–131. <https://doi.org/10.1002/eet.1835>
- Warren, M. R., Thompson, J. P., & Saegert, S. (2001). *The Role of Social Capital in Combating Poverty*.
- World Bank. (2021, January). *World Bank Open Data*. World Bank Open Data.
<https://data.worldbank.org>
- Wulandhari, N. B. I., Gölgeci, I., Mishra, N., Sivarajah, U., & Gupta, S. (2022). Exploring the role of social capital mechanisms in cooperative resilience. *Journal of Business Research*, 143, 375–386. <https://doi.org/10.1016/j.jbusres.2022.01.026>

Appendix I Questionnaire

Questionnaire: *“Learning by discussing; the moderating effects of community participation on the relationship between social learning and financial literacy”*

Research data

The next few questions are meant to collect general data

1. What is your gender
 - a. Female **0**
 - b. Male **1**
 - c. I'd rather not share **9**
2. What is your highest level of finished education?
 - a. No education **0**
 - b. Primary education **1**
 - c. Junior secondary education **2**
 - d. General Certificate of Secondary Education **3**
 - e. Undergraduate **4**
 - f. Postgraduate **5**

The next question regards your farm business:

3. Which of the following crops do you grow?
 - a. Maize **0**
 - b. Rice **1**
 - c. Different, such: **2**

4. How much was the yield in kg in the past season?

5. How much money in RWF did you save from last season?
 - a. 0-100.000 **0**
 - b. 100.000 – 500.000 **1**
 - c. 500.000 – 1.000.000 **2**
 - d. 1.000.000 or more **3**

The next question is regarding risk taking.

6. To what extent do you agree with the following statement:
“I am prepared to risk some of my own money when saving or making an investment”

Completely agree	1.	2	3	4	5.	Completely disagree
------------------	----	---	---	---	----	---------------------

The next questions are about financial literacy.

7. Imagine that five brothers are given a gift of 10.000 rwf. If the brothers have to share the money equally how much does each one get?

8. Now imagine that the brothers have to wait for one year to get their share of the X. In one year's time will they be able to buy:

- | | |
|-----------------------------------|----------|
| a. More | 0 |
| b. The same amount | 1 |
| c. Less than they could buy today | 2 |

9. You lend 1000rwf to a friend one evening and he gives you 1100rwf back the next day. How much interest has he paid on this loan?

10. Suppose you put 10.000rwf into a savings account with a guaranteed interest rate of 2% per year. You don't make any further payments into this account and you don't withdraw any money. How much would be in the account at the end of the first year, once the interest payment is made?

11. And how much would be in the account at the end of five years? Would it be:

- | | |
|--|----------|
| a. More then 11.000 rwf | 0 |
| b. Exactly 11.000 rwf | 1 |
| c. Less than 11.000 rwf | 2 |
| d. It is impossible to tell from the given information | 3 |

12. An investment with a high return is likely to be high risk

- | | |
|---------------|----------|
| a. True | 0 |
| b. False | 1 |
| c. Don't know | 2 |

	Fully disagree	Disagree	Don't disagree/agree	Agree	Fully agree
13. High inflation means that the cost of living is increasing rapidly	1	2	3	4	5
14. It is usually possible to reduce the risk of investing by growing a wide range of crops	1	2	3	4	5

15. I have actively saved the past 12 months	1	2	3	4	5
16. Before I buy something I carefully consider whether I can afford it	1	2	3	4	5
17. I pay my inputs, medical insurance and school fees on time	1	2	3	4	5
18. I keep a close personal watch on my bank transactions	1	2	3	4	5
19. I set long term financial goals and strive to achieve them	1	2	3	4	5
20. I find it more satisfying to spend money than to save it for the long term	1	2	3	4	5
21. I tend to live for today and let tomorrow take care of itself	1	2	3	4	5
22. Money is there to be spent	1	2	3	4	5

The next question is about making informed decision. Please describe as accurate as possible how you choose the following:

23. Choosing a bank to loan money
- a. I did not compare banks **0**
 - b. I compared interest rates and loan-conditions of banks **1**
 - c. Refuse to say **9**

The next questions are regarding topics during conversations or discussions with other farmers. On a scale from 1-5, 1 being never and 5 being very often, how frequently have you discussed the following in the past 5 years? Circle the number you think applies.

	Never	Almost never	Sometimes	Somewhat often	Very often
24. managing expenses and avoiding more than my monthly income	1	2	3	4	5
25. paying bills on time (Insurance, crop inputs, school fees)	1	2	3	4	5
26. saving and investing	1	2	3	4	5
27. working with a formal financial institution	1	2	3	4	5
28. buying and maintaining a crop insurance	1	2	3	4	5
29. buying and maintaining a medical insurance	1	2	3	4	5

	Never	Almost never	Sometimes	Somewhat often	Very often	Not applicable
30. checking credit report	1	2	3	4	5	0

The next questions are regarding topics during conversations, discussions or workshops with third parties. On a scale from 1-5, 1 being never and 5 being very often, how frequently have you discussed the following in the past 5 years? Circle the number you think applies.

Note: Third parties like: Local government, NGO's or financial institutions

	Never	Almost never	Sometimes	Somewhat often	Very often
31. managing expenses and avoiding more than my monthly income	1	2	3	4	5
32. paying bills on time (Insurance, crop inputs, school fees)	1	2	3	4	5
33. saving and investing	1	2	3	4	5
34. working with a formal financial institution	1	2	3	4	5
35. buying and maintaining a crop insurance	1	2	3	4	5
36. buying and maintaining a medical insurance	1	2	3	4	5

	Never	Almost never	Sometimes	Somewhat often	Very often	Not applicable
37. checking credit report	1	2	3	4	5	0

The next questions are about observing behaviour of other farmers. How frequently have you observed other farmers following behaviour in the past 5 years? Circle the number you think applies.

	Never	Almost never	Sometimes	Somewhat often	Very often
38. managing expenses and avoiding more than my monthly income	1	2	3	4	5
39. paying bills on time (Insurance, crop inputs, school fees)	1	2	3	4	5
40. saving and investing	1	2	3	4	5
41. working with a formal financial institution	1	2	3	4	5
42. buying and maintaining a crop insurance	1	2	3	4	5
43. buying and maintaining a medical insurance	1	2	3	4	5

	Never	Almost never	Sometimes	Somewhat often	Very often	Not applicable
44. checking credit report	1	2	3	4	5	0

The following questions are regarding community participation.

45. In the past 12 months, have you worked with others in your village/neighborhood to do something for the benefit of the community?

- a. No **0**
- b. Yes **1**
- c. Refuse to say **9**

46. Of those activities, please imply if they were mainly voluntary, mandatory or equal?

- a. Mandatory **0**
- b. Equal **1**
- c. Voluntary **2**
- d. Refuse to say **9**

47. All together, how many days in the past 12 months did you or anyone else in your household participate in community activities?

Please indicate on a scale from 1-5 how likely the following statements are:

	1 very unlikely	2 Unlikely	3 Not likely/unlikely	4 likely	5 Very likely
48. How likely is it that people who do not participate in	1	2	3	4	5

community activities will be criticized?					
49. How likely is it that people who do not participate in community activities will be sanctioned? Think of sanctions like denied help from neighbors.	1	2	3	4	5
50. If there was a water supply problem in this community, how likely is it that people will cooperate to try to solve the problem?	1	2	3	4	5
51. Suppose something unfortunate happened to someone in the village/neighborhood, such as a serious illness, or the death of a parent. How likely is it that some people in the community would get together to help them?	1	2	3	4	5

52. Please state your age by choosing >35 if you are younger than 35 or chose 35> if you are 35 or older.

Age	>35	35<

Thank you very much for your participation!

Appendix 2 Sensitivity analysis

Table A1. Regression analyses predicting financial literacy

	Model 1		Model 2		Model 3	
	B	SE	B	SE	B	SE
Constant	15.924** *	.953	15.613***	1.157	15.261***	1.279
<i>Independent variables</i>						
Social learning	1.245*	.616	0.933	0.674	1.005	0.686
Community participation	-.781	.979	-0.764	1.031	-0.421	1.159
<i>Interaction</i>						
Social learning * Community participation					1.355	2.060
<i>Control Variables</i>						
Gender Female			0.046	0.638	-0.016	0.647
Age above 35			0.133	0.588	0.109	0.591
Education			0.278	0.292	0.261	0.294
Risk seeking			-0.175	0.284	-0.154	0.287
Crop diversification			0.795	0.565	0.725	0.577
R ²	.050		.092		.098	
F	2.113		1.091		1.002	