Resilience in Crisis: Unveiling the Vital Role of Informal Financial Institutions during Crises in the Amhara Region, Ethiopia

[1] Tefera Getachew Dagnachew, [2] B Lilly Grace Eunice

[1] Tefera Getachew Dagnachew: School of Economics, College of Arts & Commerce, Andhra University, Visakhapatnam, Andhra Pradesh 530003, India

[2] Prof, B Lilly Grace Eunice: school of economics Andhra University: College of Arts & Commerce, Andhra University, Visakhapatnam, Andhra Pradesh 530003, India

Corresponding Author: **Tefera Getachew Dagnachew**

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Abstract

Nowadays formal financial institutions have received more recognition and their limitations towards financial exclusion, limited reach in rural areas, and potential exploitation remain prevalent. In another way, informal financial institutions' role in promoting financial inclusion, resilience, and community development is not gaining recognition. In developing countries, the availability of formal financial institutions is limited and in case of cries, they fail to deliver the available service properly. Thus, the aim of this study was to analyse the role of informal financial institutions in the case of crises for resilience. Qualitative and quantitative methods were employed to collect the relevant information. A logit model was employed to analyse the role of IFIs on food security resilience. The result shows that 96.5% of the households participate in IFIs and we found that using HDDS in the area 67% of the households were food insecure during the crises. Participation into IFIs, long stay in the membership, amount of services and income strongly helped them escape food insecurity in case of crises. On the other hand, food displacement and household size are found to reduce food security in case of crises. We conclude that the programmes and policies that target food security in cases of crises or emergencies should provide support to those informal institutions and emphasis should be given to make them strong or integrate with formal ones not to substitute them.

Keywords: *Food security, Resilience, Informal financial institution, Dietary Diversity Score, Logit Mod*

1. Introduction

The role of financial development is undoubtedly crucial for the welfare of society (Demirguc-Kunt & Maksimovic, 2005). In developing countries, financial systems typically operate in two parallel forms: formal and informal financial institutions. Formal financial institutions, including banks, microfinance institutions, and cooperatives, are governed by government regulations and often serve urban populations, whereas informal financial institutions (IFIs) operate outside formal regulatory frameworks, embedded deeply within local communities, offering flexible, accessible, and trust-based financial services (Wiyani & Prihantono, 2016; Taffese & Yohannes, 2024).

Informal financial institutions weave their way through society, operating within formal organizations, informal groups, and even government entities. They are present practically everywhere, catering to specific needs and offering alternative financial solutions. These institutions, whether established for broad or targeted purposes, allow members to contribute regularly and access loans or credit when needed (Sambe et al., 2013). In order to mitigate the negative effects of formal financial institutions on people's socio-economic well-being, individuals and groups have developed informal financial institutions.

IFIs in Ethiopia, particularly in rural and conflict-affected regions, play an essential role in meeting the financial needs of households. Among the most common types of IFIs are Equb, Iddir, SACCOs, and Debo. Equb is a rotating savings and credit association where members contribute a fixed amount at regular intervals and the lump sum is given to one member in rotation. This system is widely used for large purchases or emergencies. Iddir, initially formed as funeral societies, has evolved into a broader community-based support network that now provides informal insurance services and emergency financial assistance during health shocks, displacement, or food shortages. SACCOs (Savings and Credit Cooperatives) are member-owned institutions that mobilize community savings and provide small loans. They often bridge the gap between formal and informal finance, operating under some regulatory frameworks while retaining the accessibility and flexibility characteristic of informal systems. Debo is a traditional labour-sharing arrangement, where community members support each other during peak agricultural seasons or crises, often involving financial or material exchanges embedded in these practices.

A lot of research has been conducted on the role and effect of financial institutions in both developed and developing economies. However, most of it focuses on formal financial institutions, and the role of informal financial institutions has received less attention in recent literature. In most developing countries, the informal financial sector is larger than the formal financial sector in terms of outreach since they are accessible to most socio-

economic groups (Demirguc-Kunt et al., 2017). There is a rapid and growing demand for informal savings and credit facilities, given the large number of people moving into the informal real sector. High proportions of rural credit and savings are still managed informally. To varying degrees, informal financial services are characterized by easy access, flexibility in loan use, rapid processing, and flexibility in interest rates and collateral requirements (Aryeetey, 2008).

The current setup of formal lending institutions makes it difficult for them to support rural development, especially when it comes to small farmers needing credit. This challenge often stems from limited information about borrowers' backgrounds and their ability to repay. To manage risk, banks demand substantial collateral, which excludes most small farmers who typically lack assets acceptable to financial institutions (Sagrario & Ray, 1997; Ghosh & Ray, 1996). Informal financial institutions remain a powerful force in both rural and urban areas, serving as a crucial source of credit for many borrowers. Interestingly, formal and informal systems target different borrower groups and use distinct strategies to manage potential challenges. While formal lenders rely on collateral and standardized rules, informal intermediaries often embed loans in other activities such as labor provision or product sales (Ghosh & Ray, 1996).

In previous literature, there are two contradicting views regarding the effect of informal financial institutions on food security. On one hand, scholars support the positive effect of IFIs; for example, IFIs provide savings options and microloans, enabling households to build buffers before crises and access resources to cope with disruptions (Dercon & Christiaensen, 2011). IFIs offer risk-sharing mechanisms like group insurance, spreading risk and providing financial support during crises, protecting against food insecurity (Gine & Yang, 2007). Microloans can help individuals invest in small businesses or agricultural activities, generating income and ensuring access to food, thereby fostering resilience (Fafchamps & Lund, 2003; Khandker, 2005). On the other hand, IFIs may have negative effects on households; borrowing can lead to debt traps, where income is primarily used for repayments, limiting resources for essential needs and potentially worsening vulnerability (Chowdhury & Yasmin, 2014). Some IFIs might engage in unfair practices like high interest rates or hidden fees, exacerbating financial struggles and jeopardizing resilience (Banerjee & Duflo, 2011).

In Ethiopia, where formal financial institutions are limited, unequally distributed, and often constrained by regulations and political instability, informal financial institutions (IFIs) play a crucial role in serving the financial needs of a predominantly rural population (Demirguc-Kunt et al., 2017; World Bank, 2018, 2022). Formal financial institutions often face bureaucratic hurdles and complex regulations, further limiting their reach and flexibility. Additionally, political instability can disrupt their operations

and lead to reduced confidence among potential users (Abebe & Lemma, 2019). For instance, in Ethiopia's Amhara region—affected by civil war and currently under a state of emergency—many households rely on IFIs to access food, finance medical emergencies, or recover from shocks (Ayele & Nigatu, 2023; Yohannes et al., 2024). Their localized, trust-based nature makes them particularly effective in contexts of political instability and limited institutional capacity.

The area under study was in a two-year war and after that, due to the political situation, is under a state of emergency. In this scenario, we seek to assess the role of informal financial institutions for food resilience. This study aims to fill a critical gap in the literature by examining the impact of informal financial institutions (IFIs) on household food security resilience in contexts where formal institutions are dysfunctional or inaccessible due to political instability. We challenge the predominant narrative that advocates for transforming IFIs into formal institutions and instead shed light on their potential to enhance food security under challenging circumstances.

Moreover, the findings aim to contribute to a broader understanding of how IFIs function not just as financial tools but as community-based institutions capable of stabilizing household welfare in the face of systemic shocks. Rather than advocating for the wholesale formalization of IFIs, the study highlights their existing strengths and explores pathways for integrating them with formal financial systems in a way that preserves their flexibility while expanding their reach and long-term sustainability (Yohannes et al., 2024; World Bank, 2023).

2. Objective of the study

- To assess the household's extent of participation in the informal financial institutions in case of crises
- To analyse the role of informal financial institutions on household's food security in case of crises

The remainder of the study is organized as follows: the study methodology is presented in Section 3, where the research framework and data collection techniques are reviewed; and the research findings and results are presented in Section 4. The study is concluded under section 5 by stressing its primary contribution to the subject of resilience, as well as its practical implications.

3. Research Methodology

3.1. Study Area

The study is conducted in Dessie zuria woreda, South Wollo Zone Amhara region, Ethiopia. The area is located at a distance of 400 km from the capital city Addis Ababa and the main activities in Dessie Zuria district revolve

around agriculture and informal trade, mainly small-scale business. The financial inclusion rate in the area is very low for instance in the rural area of south wollo zone only about 20% are financially included in the informal financial institution (Dagnachew, & Mawugatie, 2022). In the area there are four common informal financial institutions like Eddir, Iqquib, SACCO, and Debo.

3.2. Research Design

The study used both qualitative and quantitative research design to answer the basic research questions. The combined qualitative interviews and surveys can provide deeper insights into experiences and perceptions alongside quantitative data on resilience outcomes.

3.3. Data type, source and methods of collection

The study mainly used a primary data set to answer the basic research questions. The basic data set was collected from rural and urban households, community leaders and NGO reports. The primary data were collected by using well-structured questionnaires, focused group discussion and interviews. The structured questionnaire consists of households' socio-economic characteristics, food consumption diversity and membership to informal financial institutions. The questionnaires were translated to the local language and it was pretested for clarity and appropriateness to the local community. Five FGD was administered to understand the basic contribution of IFIs and challenges and in each FGDs combination of IFIs representatives, local community leaders and some ordinary household heads were incorporated.

3.4. Sampling techniques and sample size determination

To analyze the effect of IFI participation on household resilience in the case of crises, probability sampling techniques are generally preferred to ensure the representativeness and generalizability of our findings. The data was collected from both rural and urban areas of Dessie zuria woreda, south Wollo zone, Amhara region. Regarding sample size determination the study used Cochran formula and this is because the formula is appropriate when the population is infinite and it's also best when the sampling method is random sampling (Cochran, 1977), and (Levy & Lemeshow, 2008). Due to the absence of recent census data in Ethiopia we used the infinite population formula. Households were selected using stratified random sampling to ensure representativeness and reduce the potential for self-selection bias.

The Cochran sample size formula is stated as follows:

$$n = \frac{z^2 * p(1-p)}{e^2} = \frac{1.96^2 * 0.5(1-0.5)}{0.05^2} = 384$$

Where:

Where N is the required sample size; z^2 is a value corresponding to your significance level (and is called the "standard normal deviation"). Z = 1.96 (rounded to 2) for 5 percent significance levels; p is the rough value you provided for your estimated percentage (proportion); e is the precision you wish to achieve.

3.5. Methods of Data Analysis

The study used both descriptive and econometrics analysis. Descriptive analysis of quantitative data revealed IFIs participation rates, loan sizes, repayment rates, and their correlations with food security and a measure of resilience. To analyse the effect on food resilience Logistic regression (Binary Logit) was employed.

3.5.1. Model Specification

This study's primary objective is the role of IFIs on food security in case of emergencies. The binary logistic regression model is expressed as follows in light of the model's covariates, including IFI participation, types of IFIs used, duration of participation, amount of services received, income, education, household size, location, Age, gender, Social network size and strength, displaced, and the error term:

The model is specified as follows:

$$P = E\left(Y = \frac{1}{x}\right) = \frac{1}{1} + \varepsilon(-\beta + \beta 2xyi) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 1$$

This can be further simplified as

$$P = \frac{1}{1+e^z} = \frac{e^z}{1+e^z} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 2$$

Where, $z_i = f(\beta_i + \beta_2 x_i)$

The likelihood that a household is food secured, given the vector of the observable qualities, can be represented as P (Food secured= 1/X).

The logistic function is given as $G(z) = \frac{e^2}{1+e^2} = P(food\ secured = \frac{1}{x})$

Following this, for easy of interpretation we used the logistic regressions marginal effect. The marginal effect can be represented as follows given the logit model:

$$\frac{\gamma E\left(\frac{Y}{X_i}\right)}{\gamma X_i} = \frac{e^{\beta_0+\beta_1 * x_i}}{1+e^{\beta_0+\beta_1 * x_i}}\left(1 - \frac{e^{\beta_0+\beta_1 * x_i}}{1+e^{\beta_0+\beta_1 * x_i}}\right) = \frac{e^{\beta_0+\beta_1 * X_i \beta_1}}{\left(1+e^{\beta_0+\beta_1 * x_i}\right)^2} \quad \ldots\ldots\ldots\ldots\ldots\ldots 3$$

3.6. Measuring food security

In order to measure food security in the area we used a household level measure of food security. From different types of household level food security measures, we employed Dietary Diversity Score (DDS) method and this is because DDS is common measure of food securities in the-torn areas since it requires minimal data collection infrastructure, making it feasible even in challenging environments (Kennedy, et.al, 2011). It also captures variety in food groups, suggesting a broader nutrient intake and it can readily detect shifts in dietary patterns during periods of instability (Yari, et.al, 2022), and (Habte, & Krawinkel, 2016). The Dietary Diversity Score (DDS) is a tool used to assess the variety of food groups consumed by an individual or household over a specific period (usually 24 hours or 7 days). It's often used as a proxy indicator of dietary quality and potential nutrient adequacy. Different food groups provide different nutrients and it increases the likelihood of getting sufficient nutrients. DDS assigns weights to each food group consumed, with higher score indicating greater diversity (Kakwangire, et.al, 2021). From different scoring methods we use household dietary diversity score (HDDS). According to HDDS, 6 groups considered minimum acceptable diversity, 7-9 groups indicate moderate diversity and 10-12 groups indicate high diversity (Kennedy, et.al, 2011). In this study we asked about their 7 days consumption. Table 1 shows food groups used to create HDDS. While HDDS is a common and practical indicator, it does not capture aspects like food availability and stability, which are also crucial for a comprehensive understanding of food security.

3.7. Diagnostic test

We performed pre-estimation checks to ensure the model's accuracy. We looked for multicollinearity (similar variables) using VIF and contingency coefficient tests, and checked for hetero scedasticity (unequal error variance) with the Breusch-Pagan test. A binary logistic regression model analyses how multiple factors (predictors) influence a yes/no (binary) outcome. To ensure the model's accuracy, researchers performed various tests, the most common being the Hosmer-Lemeshow test. This test compares the actual distribution of people across different categories based on the predictors with what the model predicts, basically checking if the model aligns with reality (Fagerland & Hosmer, 2012). Table 3 shows the diagnostic results. Variance Inflation Factor (VIF) tests indicated no problematic multicollinearity among the predictor variables.

The outcome of the diagnostic test revealed no issues with heteroscedasticity or multicollinearity, and the goodness of fit test revealed the model to be sound.

4. Discussion and Conclusion

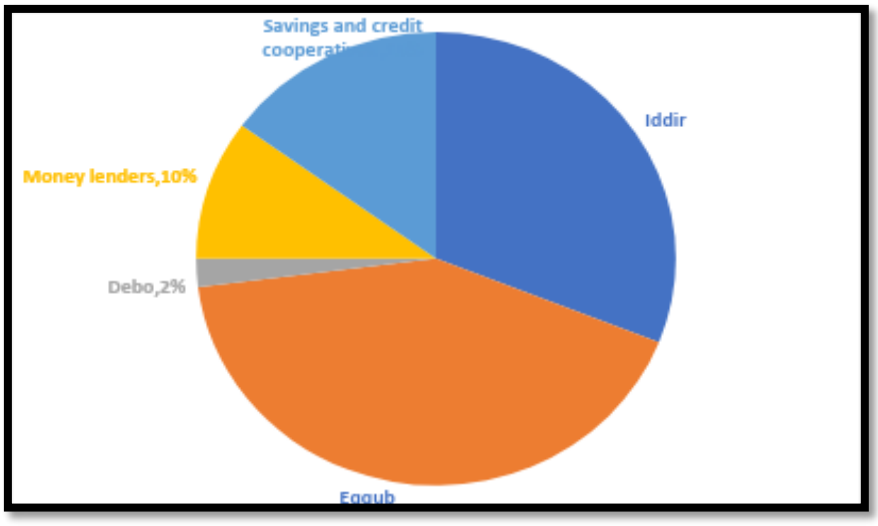
This section of the study summarizes the main empirical findings. In this section we covered both the descriptive and inferential analysis with relevant discussions. In the first part the study presented the descriptive analysis regarding the extent of informal financial institutions, level of food security and on food security and the second part of the analysis we discussed the effect of IFIs on food security resilience in case of crises. Due to the political instability and the war in the area we are forced to collect 83% of the sample population which is 316 and it's sufficient to analyse the objectives considering the existing situations.

4.1. Types of informal financial institutions and their share in the area

In Ethiopia specifically in the Amhara region there are five common types of informal financial institutions which are practised by the rural and urban households. And in this study, we tried to analyse the household's level of participation. Other IFI forms may exist and merit exploration in future studies to enrich understanding of financial behavior under crisis.

According to Figure 1, the two informal financial institutions Eqqub and Iddir hold dominant positions with73% combined usage, highlighting their deep roots and community reliance. Saccos gained 15% share, likely attracting users seeking broader services and formal structures. The prevalence of money lenders is small relative to the above three and it constitutes 10% from the sample; their usage is mostly specific to urgent needs or limited access to other options, warranting caution due to potential risks. The other category which is called Debo constitute the smallest portion 2%, suggesting their high-interest model might be less preferred.

Figure 1: Type and Shares of financial institutions in the area



Source; Own computation from survey result, 2025

4.2. Barriers to access

The result in table 4 shows that over half of households (52%) faced no barriers in accessing IFIs during emergencies, a significant portion still encountered obstacles. Affordability and high fees (29%) represent the most significant barrier. Emergencies often strain household finances, making high interest rates and fees associated with some IFIs prohibitive. Bureaucratic procedures and cumbersome documentation requirements can exclude households, particularly those facing displacement or lacking formal identification. 6% of the household's lack trust which concerns about transparency, potential exploitation, or unfair practices within some IFIs can deter usage.

4.3. Reasons for use

The study also analysed the primary reasons why households seek financial services from IFIs during emergencies.

As shown in table 5, the study revealed that households predominantly rely on IFIs during economic crises for meeting basic needs (64.5%), followed by rebuilding assets (23%) and investing in recovery (3.5%). This shows that in the case of emergencies IFIs play crucial roles. Emergencies disrupt income, infrastructure, and create immediate needs for food, shelter, and healthcare. With limited access to formal safety nets or insufficient coverage, households turn to IFIs to bridge the gap and ensure survival. IFIs provide smaller loans or quick access to funds, crucial for immediate needs (Feleke, A., 2018). Investing in the recovery constitutes the smallest portion and this may be because in the case of emergencies, fulfilling immediate needs takes precedence over long-term investments as it is supported by (Rahmato, D., 2009), the size and types of loans offered by some IFIs might not be suitable for larger investments.

4.4. Descriptive analysis for continuous variables

The result table 6 above indicates that the mean value of 11.5 years, indicating a relatively long-term engagement with the service and the standard deviation of 3.5 years, suggesting some variation in participation length and a minimum value of 0.5 indicates that there are some recent participants and 36 years, highlighting long-term commitment from some individuals. This long average participation signifies trust and potential benefits derived from the service. Regarding the amount of services received (Loan and Savings), a mean of 4,638.5 Ethiopian Birr, showcased moderate utilization of available services and a standard deviation of 22.4, indicating significant variation in amounts used. The minimum Birr is 250, suggesting accessibility for smaller needs and the maximum is 300,000 Birr, highlighting larger investments or accumulated savings. Regarding the monthly income of the respondents the mean was 2,517.6 Birr, providing

context for the service's target audience and the high standard deviation suggests income variation within the group. The minimum birr 500, indicating potential inclusion of low-income individuals and the maximum birr 10,500, revealed participation from higher-income earners as well. The household size also indicates that the services are available for all. Regarding the age categories of households, the minimum of 16 years indicates inclusion of young adults starting households and the maximum is 76 years, demonstrating broader reach across adult age groups.

According to table 7, nearly everyone (96.5%) uses informal financial institutions (IFIs), primarily community-based groups (70.3%). This highlights the crucial role IFIs play in financial inclusion, especially for rural areas (57.6%). The sample has varied education levels, with a significant portion being illiterate (30.2%). Regarding the sex male household heads constitute (87.4%) from the total population. Social network size and strength variable indicates that 50.1% have strong followed by 39.2% moderate. 90.2% of the households are original settlers while the remaining 9.8% were displaced households. Further analysis revealed that displacement duration and severity influenced households' participation in and benefits from IFIs.

The result in table 8, indicates that using the HDDS in the study from a sample of 310 households we found that, more than half of (67%) of households are classified as food insecure, having an HDDS score of below 6. This indicates a significant concern regarding dietary diversity and potential nutrient deficiencies in a large portion of the population. 26% of households fall under the "minimum acceptable" category with an HDDS score of 6. While this suggests some diversity, it might not guarantee adequate nutrient intake for all household members. Only a small percentage (5%) of households have "moderate acceptable" or "high" HDDS scores, indicating limited access to a wider variety of food groups for a significant portion of the population.

Econometrics Analysis

In order to analyse the effect of informal financial institutions (IFIs) on the household's food security in the case of crises we employed a binary logistic regression analysis. The regression results are shown in table 9.

The logistic regression model revealed that participation in the informal financial institution has a positive and significant effect on food security in case of crises at one percent probability level. The marginal effect of 0.0356 signifies that, on average, individuals who participate in informal financial activities are predicted to have a 3.56% higher probability of experiencing food security compared to individuals who do not participate. This is an indication of the positive effect of IFIs on food security in the study area. When both crises and emergencies happen in the economy like what is

happening in Ethiopia, especially in the Amhara region, IFIs can play a crucial role in supporting individuals and households to maintain food security. IFIs provide savings options and microloans, enabling individuals to accumulate financial buffers before crises and access resources to cope with disruptions, where formal financial institution is not available (Collins, et.al, 2009). Informal insurance schemes offered by IFIs can spread risks and provide financial support during crises, protecting against food insecurity (Morduch, , 2004). IFIs can provide credit for agricultural inputs like seeds and fertilizers, enabling farmers to maintain production and food security during crises (Khandker, 2005). IFIs can provide credit and support for restarting livelihoods and rebuilding assets after crises, contributing to long-term food security (Nichterlein, 2012).

The logistic regression results also revealed that duration of participation in the informal financial institution has a positive and significant effect on household food security. We found that the duration of participation is significant at 5% level of significance. The result indicated that a one-year increase in the participation of informal financial inclusion results in an increase of the probability of food security by 0.4%. This is mainly due to longer participation in IFIs might lead to accumulated savings and access to larger loans, allowing individuals to build buffers and cope with income shocks, better ensuring food security during crises (Morduch, 2004). It also fosters trust, information sharing, and collective action to overcome food insecurity challenges (Portes, & Sriskandarajah, 2002). Over time, engagement with IFIs can promote financial literacy and responsible financial behaviour, enabling individuals to manage resources more effectively and make informed decisions about food expenditures (Collins, et,al, 2009) and (Johnson, & Morduch, 2004). Further research is recommended to examine whether prolonged participation yields diminishing or increasing returns over time.

Regarding the amount of service received we found a positive and significant result. It indicated that as the amount received from the informal financial institution increases the probability of being food secure in case of crises increases by 3.2%. Larger amounts of credit or savings from informal financial institutions could enable households to purchase more food or diversify their diets, improving food security (Dercon, & Christiaensen, 2011). It can also help them access larger loans that could facilitate investments in farming activities like better seeds, fertilizers, or tools, potentially leading to increased agricultural productivity and food availability (Fafchamps, & Lund, 2003). High amount of access to credit can help households cope with unexpected expenses or income shocks, reducing the risk of falling into food insecurity during lean periods (Gine, & Yang, 2007).

The result also indicated that the variable income and household size affects food security positively and negatively respectively. It indicated that when the household's income increases by one birr the probability of being food secured on average increases by 4.56%. This is because in the case of crises higher income leads to greater access to food, a more diverse diet, and increased resilience to food shocks**.** Income buffers help households cope with unexpected income losses, price fluctuations, or natural disasters (Davies, & Hoy , 2014)**.** The increases in household size affect food security negatively in case of crises. The study indicated that a one-person increase in the household reduces the probability of being food-secured by 0.5%. This may be due to many factors for instance, according to (Devereux, et.al, 2004), larger households require more food, putting a strain on already limited resources during crises. This can lead to increased food insecurity. Another study also supports the result, **c**rises often disrupt income generation and access to markets, making it difficult for larger households to procure sufficient food even if they have the financial means (Maxwell, et.al, 2014).

5. Conclusion and Recommendation

By combining qualitative and quantitative data, our study revealed widespread food insecurity in the area. During crises, most residents rely heavily on informal financial institutions. By using logistic regression, this study identified 6 key determinants of enduring food security during crises. Notably, participation in (IFIs) stands out as a pivotal factor, significantly buffering individuals against food insecurity when formal systems fail. Longer engagement and higher service utilization within IFIs further enhance resilience, highlighting their potential in vulnerable communities with limited formal access.

The study's results unveil significant policy implications. Recognizing the pivotal role of informal financial institutions (IFIs) in developing countries like Ethiopia is crucial. Properly managed and supported, IFIs can play a transformative role in enhancing food security resilience. Further research and development are essential to create even more effective IFI models, paving the way for a more secure and prosperous future. Allocate financial resources to IFIs for capacity building, infrastructure development, and technology adoption. This could empower them to expand their reach, diversify services, and improve operational efficiency. Design policies that support the long-term sustainability and growth of IFIs, not just immediate solutions. This could involve promoting their financial viability, governance structures, and responsible credit practices. Consideration must also be given to scalability, institutional capacity, and governance as these institutions grow.

To unlock the full potential of informal financial institutions (IFIs) in bolstering food security resilience, further research is vital. In-depth studies

are needed to assess the effectiveness of various IFI models, like rotating savings and credit associations or microfinance institutions, in supporting communities during crises. Additionally, research should examine how IFIs contribute to building long-term resilience beyond immediate crisis response, by exploring factors like asset accumulation, risk management practices, and social capital development. By pursuing these research avenues, we can gain a deeper understanding of IFIs' crucial role and inform strategies for their effective development and support, ultimately leading to stronger, more food-secure communities.

Availability of data

The data sets used for the current work will be made available by the relevant author upon reasonable request.

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References

1. *Abebe, G., & Lemma, Z. (2019). Financial system reforms and financial inclusion in Ethiopia: An assessment. Journal of African Banking, 8(2), 30-42.*
2. *Aryeetey, E. (2008). From informal finance to formal finance in Sub-Saharan Africa: Lessons from linkage efforts. AERC/IMF African Finance for the 21st Century Unpublished Manuscript.*
3. *Banerjee, A. V., & Duflo, E. (2011). Poor economics: A radical rethinking of the way to fight poverty. . PublicAffairs.*
4. *Chowdhury X, Yasmin Z. (2014). Microfinance and risk mitigation strategies of the poor in the aftermath of cyclone Aila: Evidence from Bangladesh. Int J Disaster Risk Reduction, 9: 87-97.*
5. *Cochran, W. G. (1977). Sampling techniques. john wiley & sons.*
6. *Collins, D., Morduch, J., Rutherford, S., & Sachs, J. (2009). Portfolios of the poor: How the world's poor manage risk. Princeton University Press.*

7. *Dagnachew, T. G., & Mawugatie, T. W. (2022). The analysis of financial inclusion and its determinants in the rural area of south Wollo zone, Amhara Region, Ethiopia. Cogent Economics & Finance.*
8. *Davies, B., & Hoy, C. (2014). The impact of household income instability on food security: Evidence from South Africa. . World Development, 64, 64-77.*
9. *Demirguc -Kunt, A and V. Maksimovic. (2005). Institutions, Ownership, and Finance: The Determinants of Profit Reinvestment among Chinese Firms. Journal of Financial Economics , 77:117–46.*
10. *Demirguc-Kunt, A., Klapper, L., Singer, D., & Van Oudheusden, P. (2017). The Global Findex Database 2017: Measuring financial inclusion and the use of financial services. World Bank Policy Research Working Paper, (8213).*
11. *Demirguc-Kunt, A., Klapper, L., Singer, D., & Van Oudheusden, P. (2017). The Global Findex Database 2017: Measuring financial inclusion and the use of financial services. World Bank Policy Research Working Paper, (8213).*
12. *Dercon, S., & Christiaensen, L. (2011). Savings and development: Theory and evidence. Journal of African Economies, 20(4), 1-15.*
13. *Dercon, S., & Christiaensen, L. (2011). Savings and development: Theory and evidence. Journal of African Economies, 20(4), 1-15.*
14. *Devereux, S., Baulch, B., Hussein, K., Shoham, J., Sida, H., & Wilcock, D. (2004). Improving the analysis of food insecurity: Food insecurity measurement, livelihoods approaches and policy: Applications in FIVIMS. FAO, Rome, 22.*
15. *Fafchamps, M., & Lund, S. (2003). Risk-sharing networks and self-insurance in an African village. The Quarterly Journal of Economics, 118(4), 1189-1244.*
16. *Fagerland, M. W., & Hosmer, D. W. (2012). A generalized Hosmer-Lemeshow goodness-of-fit test for multinomial logistic regression models. Stata Journal, 12(3), 447–453.*
17. *Feleke, A. (2018). Review on the Role of rural Saving and Credit Cooperatives in Improving Rural Farmers 'Socio-economic Activities in Ethiopia. . Pacific International Journal, 1(3), 116-128.*
18. *Ghosh, P., & Ray, D. (1996). Cooperation in community interaction without information flows. , . The Review of Economic Studies, 63(3), 491-519.*
19. *Gine, X., & Yang, D. (2007). Individual responsibility and collective action: Group insurance in agricultural settings. Review of Economic Studies, 74(1), 131-159.*
20. *Gine, X., & Yang, D. (2007). Individual responsibility and collective action: Group insurance in agricultural settings. Review of Economic Studies, 74(1), 131-159.*

21. *Habte, T. Y., & Krawinkel, M . (2016). Dietary diversity score: a measure of nutritional adequacy or an indicator of healthy diet?*
22. *Johnson, S., & Morduch, J. (2004). Investment outcomes and dynamic selection in microfinance. . Economics Letters, 85(2), 343-350.*
23. *Kakwangire P, Moss C, Matovu N, Atukunda P, Westerberg AC, Iversen PO, Muhoozi G. (2021). The association between dietary diversity and development among children under 24 months in rural Uganda: analysis of a cluster-randomised maternal education trial. Public Health Nutr.*
24. *Kennedy, G., Ballard, T., & Dop, M. C. (2011). Guidelines for measuring household and individual dietary diversity. Food and Agriculture Organization of the United Nations.*
25. *Kennedy, G., Ballard, T., & Dop, M. C. (2011). Guidelines for measuring household and individual dietary diversity. Food and Agriculture Organization of the United Nations.*
26. *Khandker, S. R. (2005). Microfinance and its impact: Evidence from Bangladesh. Economic Development and Cultural Change, 53(4), 719-742.*
27. *Levy, P. S., & Lemeshow, S. (2008). Sampling of Populations: Methods and Applications (4th ed.). John Wiley & Sons.*
28. *Maxwell, D., Vaitla, B., & Coates, J. (2014). How do indicators of household food insecurity measure up? An empirical comparison from Ethiopia. , . Food policy, 47, 107-116.*
29. *Morduch, J. (2004). Home truths: Expectations and reality in household finance. Economics Journal, 104(377), 70-104.*
30. *Nichterlein, O., & Petit, S. (2012). The aftermath of disasters: Can microfinance help households recover? . International Journal of Disaster Risk Reduction, 4(1), 33-43.*
31. *Portes, A., & Sriskandarajah, C. (2002). Social capital: Its dynamics and implications for human action. American Journal of Sociology, 108(1), 3-51.*
32. *Rahmato, D. (2009). Peasants and agrarian reforms: The unfinished quest for secure land rights in Ethiopia. Land Rights.*
33. *Sagrario Floro, M., & Ray, D. (1997). Vertical links between formal and informal financial institutions. Review of Development Economics, 1(1), 34-56.*
34. *Sambe, N., Korna, J. M., & Abanyam, N. L. (2013). The effects of informal financial institutions on the socio-economic development of Adikpo Town. International Journal of Business and Social Science, 4(15), 75-82.*
35. *Taffese, M., & Yohannes, B. (2024). The resurgence of informal finance: A post-conflict analysis of resilience strategies in Ethiopia. Journal of African Financial Studies, 18(1), 55–74.*
36. *Wiyani, W., & Prihantono, E. Y. (2016). Financing for the poor: Between formal and informal financial institutions. Journal of Economics and Sustainable Development, 7(6), 59-64.*

37. *World Bank. (2018). Ethiopian Financial Inclusion Country Brief. www.worldbank.org*
38. *World Bank. (2022). Financial Access and Resilience in Fragile Settings. Washington, DC: World Bank Group.*
39. *World Bank. (2023). Strengthening Informal Financial Institutions in Sub-Saharan Africa. World Bank Publications.*
40. *Yari, Z., Amini, M., Rasekhi, H., Nikooyeh, B., Doustmohammadian, A., Ghodsi, D., & Neyestani, T. R. (2022). Dietary diversity and its relationship with nutritional adequacy in 24 to 59 months old children in Iran: study protocol. BMC nutrition.*
41. *Yohannes, B., Teshome, S., & Alemu, M. (2024). Household coping strategies and the evolving role of informal finance in post-conflict Ethiopia. Development Finance and Policy Journal, 12(2), 76–92.*

Table 1: Food Groups to create HDDS

S.N	FOOD GROUPS
1.	1. STAPLES (CEREALS, ROOTS, TUBERS, PLANTAINS)
2.	2. DARK GREEN LEAFY VEGETABLES
3.	3. MILK AND MILK PRODUCTS
4.	4. VITAMIN A-RICH ORGAN MEATS
5.	5. PULSES (BEANS, LENTILS, PEAS)
6.	6. EGGS
7.	7. OTHER VITAMIN A-RICH FRUITS AND VEGETABLES
8.	8. MEAT, POULTRY, AND FISH
9.	9. NUTS AND SEEDS
10.	FATS AND OILS
11.	SUGARS AND SWEETS
12	OTHER FRUITS AND VEGETABLES

Source FAO, 2011

Table 2: Measurement and Description of variables

Variables	Definition and their measurement	Expected signs
Food security	Dependant variable Binary =1 if the households are food secured =0 otherwise	
IFI participation	Dummy Variable and =1 household participated in any informal financial institutions, = 0 Not participated	Positive
Types of IFIs used	Categorical variable =1 if rotating savings and credit associations, =2 if moneylenders, = 3 if community-based groups	Positive/Negative

Duration of participation	Continues variable measured the number of years households used IFIs	Positive
Amount of services received	Value of loans received, types of services accessed	Positive
Income	Continues measured in birr	Positive
Education	Continues measured in years of education	Positive
Household size	Continues measured in number of family members	Negative
Location	Dummy, = 1 if urban, = 0 if rural	Positive/Negative
Age	Continues measure in years, household head	Positive
Gender	Dummy, = 1 if the household head is male, = 0 if female	Positive
Social network size and strength	Level of connection and support from family, friends, community measured as = 1 strong, 2 = moderate, = 3 low	Positive
Displacement	Dummy, 1 if the individual is not displaced due to the war, = 0 other wise	Positive

Table 3: Diagnostic test results

Heteroscedasticity	**Multicollinearity**	**Goodness-of-fit (Hosmer-Lemeshow test)**
Prob > chi^2 = 0.3560	Mean VIF =2.74	Prob > Chi^2 = 0.419

Source: Own computation from survey, 2025

Table 4: Barriers that prevent households from accessing IFIs during crises

Barriers to access	**Percentage shares**
No barriers	**52%**
Affordability/ high fees	**29%**
Complex procedures	**10%**
Lack of trust	**6%**
Others	**3%**

Source: Own computation from survey result, 2024

Table 5; Reasons for Using IFIs

Reasons for Use	Percentage share
Meet basic needs	**64.5%**
Rebuild assets	**23%**
Invest in recovery	**3.5%**
Others	**8%**

Source: Own computation from survey result, 2025

Table 6: Summary statistics of continuous variables

Variables	Obs	Mean	Std.Dev	Min	Max
Duration of participation	316	11.5	3.54	0.5	36
Amount of services received loan and savings	316	4,638.5	22.4	250	300,000
Income monthly	316	2,517.6	14.5	500	10,500
Household size	316	4.8	1.7	1	10
Age of the household head	316	39	31.5	16	76

Source: Own computation from survey result, 2025

Table 7: Summary statistics for categorical variables

Variables	Category	Frequency	Percentage
IFI participation	Yes	305	96.5%
	No	11	3.5%
Types of IFIs used	Rotating savings and credit associations	56	17.7%
	Money lenders	38	12%
	Community-based groups	222	70.3%
Education	Illiterate	96	30.2%
	Primary	93	29.4%
	Secondary	71	22.4%
	Tertiary	56	18%
Location	Urban	134	42.4%
	Rural	182	57.6%
Gender	Male	276	87.4%
	Female	40	12.6%
Social network size and strength	Strong	158	50.1%
	Moderate	124	39.2%

	Low	34	10.7%
Displacement	Yes	31	9.8%
	No	285	90.2%

Source: Own computation survey result, 2025

Table 8: Food security status of households based on HDDS in the study area

HDDS	Food secure		Food insecure	
	N	%	N	%
Insecure HDDS <6			**213**	**67%**
Minimum Acceptable (HDDS =6	**83**	**26**		
Moderate Acceptable (HDDS 7-9)	**14**	**5**		
HDDS (High 10-12)	**6**	**2**		
Total	**103**	**33%**	**213**	**67%**

Source: Own computation survey result, 2025

Table 9: The role of IFIs on food security resilience

Food Security	Coef.	St.Err.	($MFX^3\left(\frac{d_y}{d_x}\right)$
IFIs participation (IFIs)	.26719***	.072864	.0356
Types of IFIs used (TIFI)	.03254	.03917	.00518
Duration of participation (DP)	.00271**	.001375	.0044
Amount of services received loan and savings (ASR)	.188502**	.091026	.03267
Income monthly (MI)	.00346**	.00107	.0465
Household size (HS)	-.25896**	.11417	.00502
Age of the household head (Age)	-.0023501	.0035507	-.0000456
Education (Edu)	.1433	.1463	.0027797
Location (LO)	-.0076849	. 1299434	-.000149
Social network size and strength (SNS)	.0153276	.1322703	.0002972
Gender (Sex)	-.000386	.0013	-0.00076
Displacement (DISP)	.0332***	.0132	.00064
Number of obs = 315; LR chi2(13) = 59.98; Prob > chi2 = 0.0000 Log likelihood = -124.8224 Pseudo R2 = 0.4937			

Source: Own computation survey result, 2025

NB: ***, ** and * indicate the significant level at 1 perc
ent 5 percent and 10 percent respectively.