

Evaluating the impact of social capital on the food security of rural households (Case study: GhaniBigloo county, Zanjan Township)

Mehdi Cheraghi* 

Department of Geography, Faculty of Humanities, University of Zanjan, Zanjan, Iran

ABSTRACT

This study focuses on the relationship between social capital and food security in rural areas. Researchers have highlighted the importance of social capital in enhancing household food security in rural settings. This descriptive and analytical study uses library research and fieldwork (questionnaires) for data collection. Descriptive and inferential statistics (t-test and diagnostic analysis) were used for analysis. The study focused on 8 villages in the Ghani Bigloo district of Zanjan County, with a total of 2,471 households and 7,614 people. To obtain a sample size of 315, the Cochran formula was used, and simple random sampling was employed. According to the results of the analysis, there is a difference in the food security status of households, and it is feasible to create a formula to distinguish between two categories of households based on the studied factors. The coefficients of the discriminant function and the structure matrix coefficients demonstrate that social trust, social cohesion, local networks, and social participation are the most crucial factors affecting the food security of rural households. The presence of social capital plays a significant role in addressing food security and promoting development in different areas. By enhancing social capital, we can effectively reduce food insecurity in these regions. Hence, this article aims to explore the significance of social capital in enhancing the food security of rural households, offering valuable insights and original perspectives on the subject.

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*corresponding author

E-mail address:
mcheraghi@znu.ac.ir
(M. Cheraghi)

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1. Introduction

Food insecurity, hunger, and other forms of malnutrition continue to be significant challenges for global food systems, especially in rural and less developed areas. It is estimated that over 800 million people suffer from malnutrition (FAO, 2021).

In many developing countries, this trend is associated with increasing inequality, which affects people's ability to access relatively expensive food or food traded in remote markets (Oduniyi and Tekana, 2020; FAO, 2020). The majority of the poor population is exposed to food insecurity and malnutrition risks (Egah et al., 2023).

It is estimated that households in low-income countries spend 52% of their income on food, and the poorest households spend a higher percentage (FAO, 2022). Therefore, they are the most vulnerable to increasing inequality, as price increases or changes in food access have significant impacts on their food security status. The determinants of food access are complex and involve a set of interrelated political, social, and economic factors (Gibson, 2012; Chakona and Shackleton, 2017; Misselhorn and Hendriks, 2017). Food security has been positively impacted by international efforts in the past, but there has been a recent increase in severe food insecurity worldwide since 2014, with 1 in 10 people experiencing it in 2019.



It is predicted that by 2025, half of the world's population will suffer from malnutrition (GBD, 2017; FAO, 2018; Prosekov and Ivanova, 2018; FAO, 2020). Over the last few decades, researchers have carried out studies to comprehend the factors that impact the food security of rural households, including economic, social, political, and cultural factors. Although all these factors are important, economic factors have been given more attention (Gibson, 2012; Keller et al., 2018). To fully comprehend food security, it is crucial to conduct research that specifically focuses on food access in addition to research on food availability. Some studies suggest that social capital plays a role in food security, as individuals or families with higher social capital are less susceptible to shocks or crises, leading to improved food security. Limited research has been conducted on this topic, with studies conducted by Dzanja (2015), and Chriest (2017) Lamidi (2019), Thamaga-Chitja and Tamako (2017), Craig et al. (2023), indicating this association. The concept of social capital is particularly significant in situations where formal institutions are not functioning effectively or are absent altogether. In such cases, social capital is often regarded as an asset for people who are economically disadvantaged (Davenport and Hassan, 2020; Partelow, 2021). However, the current research on social capital and food security does not always explore social capital in all its dimensions and forms (Forrest, 2017; Lamidi, 2019). Moreover, only a limited number of studies have investigated the relationship between different types of social capital and food security. These studies have revealed that various typologies of social capital have different associations with food security (Frankenberger et al., 2016; Sseguya, 2018). Additional research is necessary in the study area to gain a better understanding of the potential connections between food security and social capital. The current lack of comprehension has hindered the creation of a theoretical framework linking the two concepts, resulting in social capital's role being disregarded in research and practical applications. However, investigating various forms of social capital can provide insight for empirical research and enhance the conceptualization of social capital and food security, particularly in the study area. The primary aim of this study is to initially comprehend the food insecurity status of the

households under investigation and subsequently assess the impact of social capital on food insecurity. An innovative feature of this research lies in acknowledging the influence of social capital on the food insecurity experienced by rural households, a topic that has been relatively overlooked in prior literature.

Thus, this study aims to explore the correlation between social capital and food security in rural households and address the following questions: What is the level of food security in the study area? Which aspect of social capital has the most significant influence on household food security in the study area?

Food security refers to the condition in which individuals have equal access to healthy and nutritious food that fulfills their dietary requirements and preferences for a healthy lifestyle (FAO, 2009, 2018). A household is considered food secure when it can obtain safe and reliable food in a socially acceptable manner, ensuring well-being (Edeh and Gyimah-Brempong, 2014). Essentially, a food secure household can access an adequate quantity of high-quality food, promoting nourishment, satisfaction, and the ability to maintain a daily routine for a safe and healthy life. Food security encompasses various aspects including food availability, access, utilization, stability over time, as well as agency and sustainability. A family achieves food security when it has consistent physical, social, and economic access to sufficient, safe, and nutritious food that meets its dietary needs and preferences for an active and healthy life (FAO, 2016, 2019, 2020). Assessing food security is a complex task for policymakers as it encompasses various dimensions (Zhou et al., 2019). The measurement of food availability at the national level began in the post-World War I era, but the term "food security" only emerged in the 1970s with a focus on food availability (Jones et al., 2013). However, Sen (1981) argued that food availability alone is not enough to measure food security as poorer individuals may not be able to afford it, despite its sufficiency at the national level. Therefore, the definition of food security was revised in 1983 to include economic and physical access to food (FAO, 1983). The concept of food security has evolved over time, encompassing issues such as unequal distribution and access to food at both individual and familial levels. In addition to calorie intake, the elimination of micronutrient deficiencies has become a crucial aspect of food

security, with a focus on the quality of the diet. The Global Food Summit in 1996 defined food security as ensuring that all individuals have consistent physical and economic access to safe and sufficient food to meet their nutritional needs and maintain good health. This definition is now widely accepted. Addressing discrepancies in food allocation, dietary quality, and nutrient absorption among family members are all important components of achieving food security (Kolog et al., 2023). The issue of availability and accessibility of food is crucial for both household and national food security, as the production and availability of food still lags behind population growth rates (Ansah, 2019; Issahaku and Abdulai, 2020; Ogunpaimo et al., 2021). Several studies have highlighted the importance of access to food for food security, considering the community's response to food-related problems. Access to desired food items is influenced by factors such as food production, inventory levels, net trade, income, expenses, markets, and prices (Lawlis et al., 2018; Sseguya, 2018; Byker Shanks et al., 2020; Nosratabadi et al., 2020; Wood et al., 2021). Stability in food access refers to continuous rather than sporadic use of food. While food affordability is related to financial constraints, physical or geographical access and knowledge or information asymmetry are non-monetary constraints that individuals face. The latter mainly relates to the exploitation of food security, preventing people from utilizing food and resources in their new host countries (Harshada et al., 2023). The concept of social capital is multifaceted and constantly changing, lacking a universally agreed upon definition. Moor and Kawachi (2017) offer a comprehensive examination of this concept. They argue that two main perspectives have influenced public health research: the cohesion approach and the network approach. The cohesion approach emphasizes trust, social inclusion, and levels of civic or social involvement. On the other hand, the network approach focuses on measuring resources and social connections, highlighting disparities in access to social resources. However, there is overlap between these two perspectives (Ehsan et al., 2019). Social capital refers to the various laws, beliefs, norms, commitments, mutual obligations, and trust that are deeply rooted in social relationships, structures, and institutional arrangements (Aldrich, 2012). It comprises a complex web of social networks that can assist

individuals in achieving their individual or collective objectives. Furthermore, it serves as a network-based resource for individuals, providing them with an additional source of benefits by integrating with others and the social environment. Social capital is a public or collective good that encompasses networks, norms, and trust that contribute to or generate common goals or outcomes (Abunywah, 2023). The classification of social capital, as discussed in works such as Coleman (1990) and Putnam (1993), can be divided into two categories: cognitive and structural. Cognitive social capital is associated with trust, cohesion, and mutual interaction, with trust being a significant aspect. There are two types of trust: generalized (related to an individual's perception of the trustworthiness of the social environment) and specific (Resulting from interpersonal relationships) (Glanville and Story, 2018; Moore and Kawachi, 2017). Structural social capital, on the other hand, is more focused on an individual's participation in social networks (Moore and Kawachi, 2017). At the macro level, it refers to opportunities for social engagement through civil society organizations or neighborhoods. The distinction between collective and individual social capital is also noteworthy. Social capital can be a group resource where individuals work together towards collective goals, or individuals can benefit directly from their own social networks (Poortinga, 2006). The impact of social capital on health may vary depending on an individual's position in society. The "buffer hypothesis" suggests that social capital may be more beneficial for poorer individuals than for wealthier ones (Glanville and Story, 2018). Qualitative research has been conducted to explore the correlation between social capital and food security. The studies have focused on the informal ways in which underprivileged households improve their food security and have emphasized the significance of life skills, including building a personal support system and accessing community resources for knowledge (Swanson, 2008; Sano et al., 2011). Several studies have examined the relationship between social capital and food security, with some focusing on indigenous populations. While some studies have found a positive correlation between the two variables, others have found no significant relationship. Examples of studies that have found a positive correlation include Swanson (2008), Mokari-

Yamchi et al. (2020), and Niles et al. (2021), and while Garasky et al. (2006), Kirkpatrick and Tarasuk (2010), and Lamidi (2019) are among those that have found no significant relationship. The research conducted indicates that social capital and household food security are linked (Morton et al., 2005). The interconnections between community members at every stage of the food supply chain, from production to consumption, can contribute to food security through the synergies created. The advantages society gains from network interactions and various groups are referred to as social capital (Rayamajhee and Bohara, 2019; Kansanga et al., 2020). In both wealthy and impoverished nations, there is additional proof that links social capital-specifically household involvement in groups or social organizations - to better food security results in both urban and rural settings. This is supported by studies conducted by Dean and Sharkey in 2011, Walker in 2007, and Misselhorn and Hendriks in 2017. The presence of social capital can contribute to better access and utilization of food security, as well as facilitate the sharing of information on where to find specific foods. Social networks can also play a crucial role in ensuring household food security, especially during times of crisis. Moreover, the positive correlation between household social capital and food security can be attributed to reciprocal behaviors like food exchange or lending among neighbors. This has been highlighted in studies conducted by Berggreen-Clausen et al. (2022), Bloom et al. (2018), Gingell et al. (2022), Cadger et al. (2016), Niles and Brown, 2017, and Quetulio-Navarra et al. (2018). Decentralized networks, such as common networks, can facilitate effective food security initiatives by distributing leadership and decision-making among many actors, thereby integrating local knowledge and enhancing organizational expertise. However, maintaining

many shared relationships among organizations in decentralized networks may lead to inefficiency and high transaction costs, reducing the resources available for food security and climate resilience initiatives. According to Hidrobo et al. (2018), social support programs can increase food consumption value by 13% and calorie intake by 8%, while also leading to asset accumulation. Lee et al. (2018) found that expanding social communications can improve household food security, and NGO support has been shown to increase the food security index for agricultural households in Bangladesh (Islam et al., 2018). The positive effects of social capital on the food security of rural households have also been indicated by Naderi Mahdavi et al. (2018) and Savari et al. (2021).

2. Material and Methods

An applied research was conducted to collect data in a survey manner with a quantitative approach. The study focused on 8 villages in the Ghanibeyglu district of Zanzan City, which has a population of 7,614 people and 2,471 households. A sample size of 315 was selected using Cochran's formula and simple random sampling. The data collection tool was a researcher-made questionnaire with two sections. The first section gathered demographic information such as age, education, and marital status. The second section contained 18 items related to food security assessment and four dimensions of social capital: social trust, social cohesion, social participation, and local networks. The validity of the questionnaire was confirmed by 10 experts, and its reliability was determined using Cronbach's alpha coefficient for each dimension. The research data were analyzed using IBM SPSS Statistics 27 software (Table 1).

Table 1. Cronbach's alpha related to the constructs of the questionnaire

Cronbach's alpha	Source	Number of questions	Dimensions
0.81	Bickel, 2008; Arshadi and Karimi, 2013	18	Food security
0.82	Mohammadi Yeganeh et al., 2017	9	social trust
0.76	Shafiei Sabet and Ebrahimipour, 2022	8	social solidarity
0.79	Ghadermarzi et al., 2021 and Sonboli et al., 2021	9	social participation
0.84	Ahmadpour et al., 2019	7	Local networks

Source: research findings

Study area is the GhaniBigloo County, which is located in the County of Zanzan township. This County is situate between 47°66' to 48°11' east longitude and 36°65' to 36°75' north latitude.

According to the general population and housing census in 2021, GhaniBigloo County has 28 villages with a population of 9,043 individuals and 3,417 households. Ghani Bigloo

County is located in the western part of Zanjan province and is part of the Zanjan Rud County. It is bordered by Chaypareh-e Paein and Bala, Zanjan Rud, Qaltuq, Boqda Kandi from the

north, and Gharaposhlu-e Bala from the east. It also shares a border with Mahneshan township to the west. Fig. 1 shows the map of the political situation of the studied area.

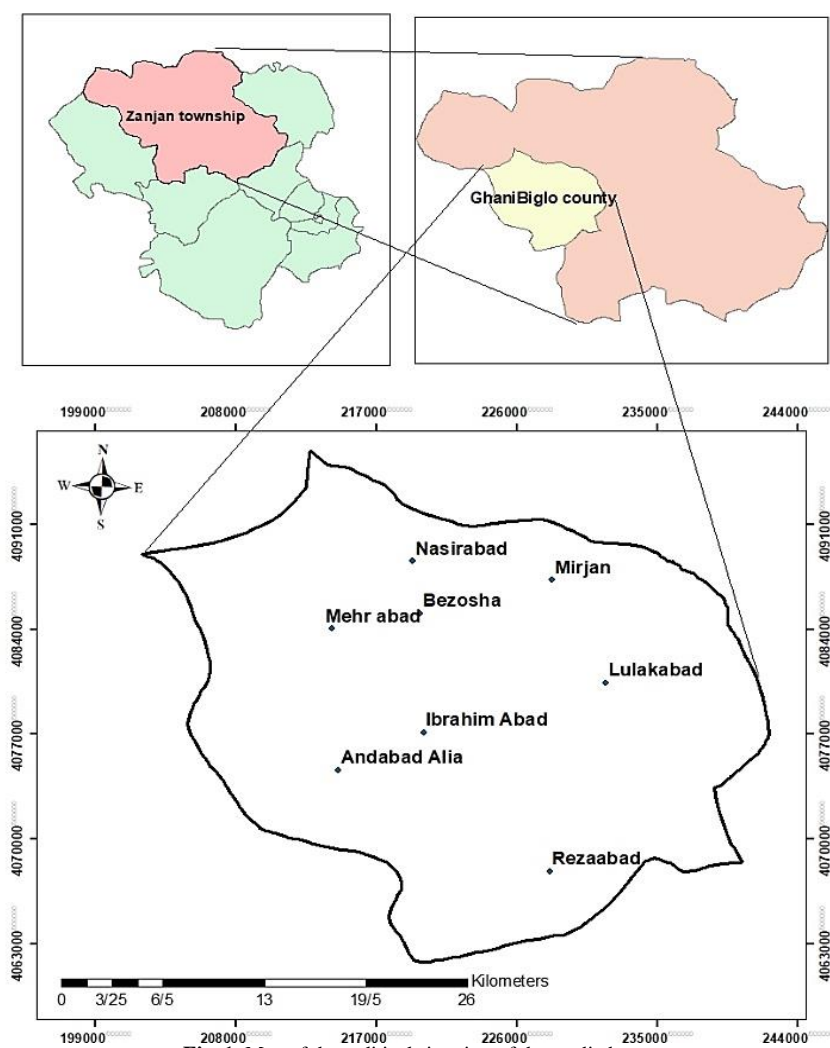


Fig. 1. Map of the political situation of the studied area

3. Results and discussion

The descriptive statistics of the dimensions of social trust among two groups with food security and those without food security were shown in Table 2. According to a recent study, it was found that 71.48% of households were classified as food secure. This means that these households had access to enough food that was also nutritious. However, a significant majority of households, specifically 97.31%, experienced some level of food insecurity without actually experiencing hunger. This indicates that these households were concerned or worried about not having enough food in the future. Furthermore, the study revealed that 63.12% of households experienced moderate

hunger. This suggests that these households had a noticeable and consistent lack of food, which likely affected their overall well-being and nutrition. On the other hand, only 69.6% of households reported experiencing severe hunger, indicating that a smaller percentage of households faced extreme levels of food deprivation. These findings highlight the prevalence of food insecurity and hunger within households. While a considerable number of households may have access to sufficient and nutritious food, a significant percentage still face concerns about future food availability. Additionally, a substantial portion of households experience various levels of hunger, with moderate hunger being more common than severe hunger.

Table 2. The descriptive statistics of the dimensions of social trust among two groups with food security and those without food security

Food security situation	Mean	standard deviation	Mean	standard deviation
Lack of food security	social trust	2.28	0.672	
	social solidarity	2.37	0.417	
	social participation	2.52	0.841	
	Local networks average	2.62	0.741	
Having food security.	social trust	2.44	0.602	
	social solidarity	3.84	0.711	
	social participation	3.34	0.812	
	Local networks average	3.29	0.891	
total	social trust	3.23	0.601	
	social solidarity	3.42	0.641	
	social participation	3.06	0.741	
	Local networks average	2.85	0.840	
	Local networks average	2.90	0.821	
		2.92	0.736	
		2.93	0.655	

Source: research findings

The average dimensions of social trust among two groups, one with food security and one without, were analyzed using the independent t-test. The findings revealed that households with food security had higher averages in all four

dimensions, and a significant difference in the dimensions of social trust was observed between the two groups with a 99% confidence level (Table 3).

Table 3. Analyzing the notable contrast between households that have food security and those that lack food security

Dimensions of social capital	F	Sig
social trust	24/31	0/000
social solidarity	14/12	0/000
social participation	8/19	0/000
Local networks	10/17	0/000

Source: research findings

The Hosmer-Lemeshow test is utilized in logistic regression to assess the model's overall effectiveness and explanatory power. The third

step's results, including the C-statistic and significance level, indicate that the model fit is satisfactory (Table 4).

Table 4. Evaluation of the entire logistic regression model

Final step	Chi-square	DF	Sig
Block	25.676	2	0.000
Model	25.676	2	0.000

Source: research findings

The suitability of the diagnostic analysis method for dividing households into two groups with and without food security is determined by the proximity of the Wilks' Lambda value to one

and the level of significance. The Wilks' Lambda test is utilized to assess the significance in the diagnostic function (Table 5).

Table 5. Evaluation of the entire model of the detection function

Detection function test	Landai Wilkes	Chi-square	DF	Sig
First function	0.812	31/02	0	0/000

Source: research findings

The Landay-Wilcox statistic is a statistical measure that has been used in a study to examine the differences between households that are food-secure and those that are food-insecure in terms of social capital dimensions (Table 6). The Landay-Wilcox statistic has shown that there is a significant difference in the status of these households in terms of food security. It has been able to establish a function that can differentiate between food-secure and

food-insecure households based on the variables being studied. The standardized coefficients of the discriminant function and the structure matrix coefficients have provided insights into the factors that are most influential in distinguishing between these two types of households. Specifically, social trust, social cohesion, local networks, and social participation have been identified as the most important factors. This suggests that these

dimensions of social capital play a crucial role in determining a household's food security status. In other words, households that have higher levels of social trust, social cohesion, local networks, and social participation are more likely to be food-secure. Further research in this area could be valuable in developing effective interventions and policies to improve the food security situation of vulnerable households. By understanding the role of social

capital dimensions in food security, policymakers and organizations can design targeted strategies to enhance these factors and ultimately improve the overall well-being of households experiencing food insecurity. The findings presented in the article are consistent with the results of studies conducted by Lee et al. (2018), Islam et al. (2018), Naderi Mahdavi et al. (2018), and Savari et al. (2021).

Table 6. Significance of differences between food secure and food insecure households

Sig	Wilks' Lambda	Chi Square	Standardized coefficients	Coefficients of the structure matrix	Dimensions
0.000	0.834	39.61	0.695	0.863	social trust
			0.633	0.708	social solidarity
			0.182	0.260	social participation
			0.201	0.245	Local networks

Source: research findings

Based on the analysis results, the logistic regression model can be expressed as follows (Eq. 1, 2):

(1)

$$\ln\left(\frac{n}{1-n}\right) = a + B_1X_1 + B_2X_2 + \dots + B_kX_k$$

(2)

$$\ln\left(\frac{n}{1-n}\right) = 1.411(\text{constant})$$

$$+0/695X_1+0/633X_2+0/182X_3+0/201X_4$$

4. Conclusion

Food security stands as a cornerstone for both individual well-being and societal health, playing a pivotal role as a catalyst for the advancement and prosperity of communities. Its significance is underscored by global institutions such as the World Bank and the Food and Agriculture Organization (FAO), which have recognized food security as a paramount development objective for the third millennium. Within this context, social capital emerges as a critical determinant influencing the prevalence of food insecurity. The nexus between food security and social capital is multifaceted and profound. Social capital, encompassing the networks, relationships, and norms within a community, plays a crucial role in shaping access to food resources and resilience against food crises. Strong social bonds foster trust, cooperation, and mutual support among individuals, thereby enhancing the capacity to manage and distribute food effectively. The recent research findings indicate that social capital plays a crucial role in enhancing food security. The results suggest that individuals who exhibit higher levels of

trust and cooperation are better able to effectively manage and distribute food resources. Conversely, food security also contributes to the reinforcement of social bonds and the augmentation of social capital. When individuals have access to sufficient and nutritious food, they are more likely to engage in social interactions and collaborations. Furthermore, the study highlights that societies with stronger social capital are less susceptible to food crises, as robust social networks can provide support during times of hardship. Overall, there exists a reciprocal relationship between food security and social capital, where the enhancement of one aspect can positively impact the other. This dynamic has been explored in various studies and holds significant theoretical and practical implications. As a result, it can be inferred that households possessing greater social capital typically benefit from broader support networks. These networks can assist households in accessing food resources through means such as food sharing, group buying, and even financial assistance. This relationship highlights the importance of social and institutional requirements in ensuring food security in a society.

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