

Identifying the causes of food insecurity and household coping behaviors in Southern Niger

Seydou Zakari^{1*)} 

¹International Institute of Tropical Agriculture (IITA), Niamey, Niger

*Corresponding author: zakaryaou@yahoo.com

Article Info

Research article

Article history

Received: 11 March 2025

Accepted: 18 October 2025

Online Publication: 22 October 2025

Keyword:

Copying Strategies; Food Insecurity; Household; Niger

To cite this article:

Zakari, S. (2025). Identifying the causes of food insecurity and household coping behaviors in Southern Niger. *Dynamics of Rural Society Journal*, 4(1), 70–80. <https://doi.org/10.37905/drsj.v4i1.92>

Abstract

Despite significant efforts by the Nigerien government and several international organizations, such as the World Food Program (WFP) and various non-governmental organizations (NGOs), food insecurity continues to affect a substantial portion of the Nigerien population. This study aims to identify the causes of food insecurity and examine the coping strategies adopted by households to mitigate hunger. A structured survey was conducted in 15 villages in the Kollo region of Niger, where household heads were randomly selected for interviews. A total of 500 households participated. Using the Multinomial Probit model, the study explores factors influencing households' choices of coping strategies, hypothesizing that these behaviors are shaped by socio-economic and demographic characteristics. The results reveal that food insecurity is driven by factors such as drought, soil infertility, lack of agricultural inputs, crop pests and diseases, and limited financial resources. In response, households employ strategies such as selling livestock, migrating in search of better opportunities, consuming less preferred foods, and resorting to unusual borrowing. The study concludes that enhancing the sustainability of agricultural production through the promotion of climate-smart agricultural technologies is crucial for improving food security and strengthening household resilience to future challenges.

Introduction

Niger, located in the Sahel region, frequently experiences natural disasters that pose significant challenges to its socio-economic development. One of the country's most pressing issues is ensuring food security for its population, particularly for its most vulnerable groups.

Given that over 80% of the population relies on agriculture as their primary source of livelihood, domestic food production plays a crucial role in maintaining national food security. Millions of rural households contribute to the majority of agricultural output. Agriculture accounts for approximately 40% of Niger's GDP and is primarily rain-fed, providing most of the population with the food they need.

The agricultural system in Niger is largely subsistence-oriented and rain-fed, supplemented by livestock husbandry and small-scale commercial activities. Cereals and legumes—particularly cowpea—constitute the main agricultural products (Figure 1). Cassava, cowpea, sorghum, and millet are staple crops. Rainfall is a critical determinant of Niger's capacity to sustain its agricultural and livestock production. Droughts have frequently caused shortages, leading to food imports and humanitarian aid. Variability in rainfall distribution,



timing, and intensity, along with other meteorological conditions and the availability of crop-specific inputs, are major factors influencing fluctuations in cultivated area and yield.

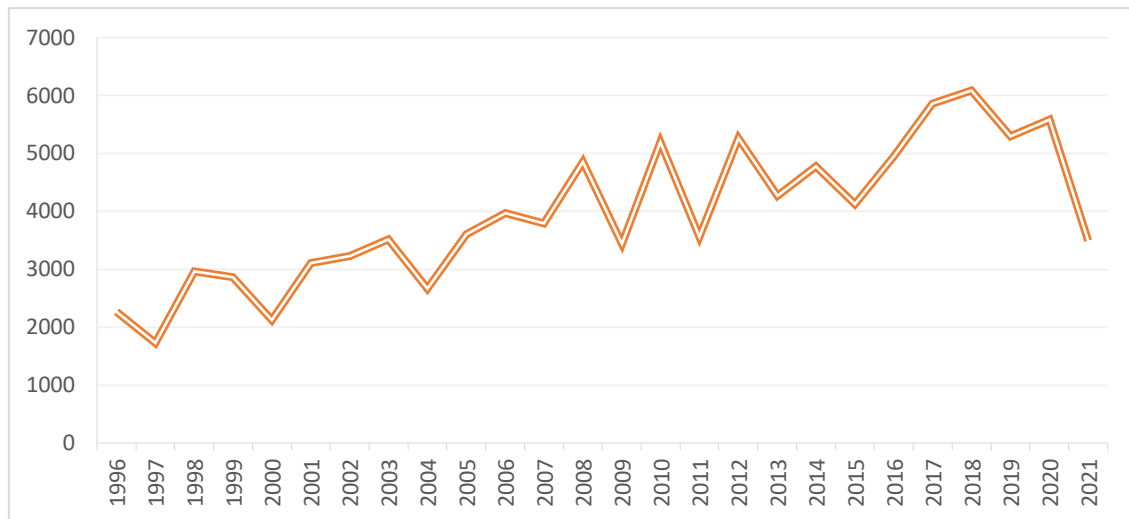


Figure 1. Trend in cereal production (1000 tonnes)

Source: (National Institute of Statistics of Niger)

Niger's arable land is limited and continues to decline due to population growth and the effects of climate change. Land is typically inherited, and as the population expands, farm sizes are increasingly fragmented and overexploited. Population growth and agricultural expansion lead to the conversion of 70,000 to 80,000 hectares of new land each year, often at the expense of forests and wildlife habitats (Figure 2) (Zakari, 2014).

Most agricultural lands are acquired through traditional inheritance, which remains the dominant means of land ownership. However, rapid population growth has led to the excessive subdivision and misuse of available land. Land scarcity often triggers disputes within families and between farmers and pastoralists. On average, rural households own about five acres of dryland. In some cases, families also have access to small irrigated plots, usually less than one hectare in size (Zakari, 2014).

The degradation of biophysical environments caused by climate factors has resulted in severe negative impacts. These include the impoverishment of croplands and pastures, silting of basins, drying up or disappearance of water points, and the loss of biodiversity, leading to the extinction of certain plant species. As soil quality declines, farmers are compelled to expand cultivation into new areas, often encroaching on pastoral lands. This expansion heightens the risk of conflict between farmers and herders (FAO, 2021).

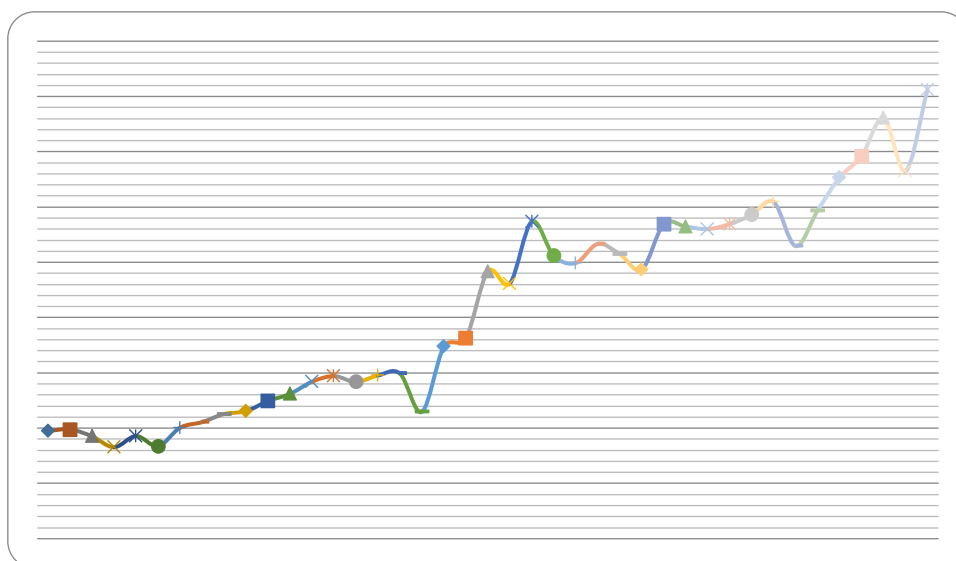


Figure 2. Trends in total harvested area (1970-2010) unit: 1000Ha

Source: (National Institute of Statistics of Niger)

Food insecurity remains a persistent issue in Niger, with its severity varying across regions and seasons. Previous studies have identified multiple determinants influencing food security. According to the World Food Programme (WFP, 2025), the major drivers of hunger in the Central Sahel—including Burkina Faso, Chad, Mali, and Niger—are the climate crisis, conflict, inter-communal tensions, declining agricultural production, and global economic downturns that elevate food and fuel prices. Similarly, the International Monetary Fund (2022) reported that rural households are the most affected by climate shocks, which reduce domestic agricultural output, decrease consumption, erode household assets, and ultimately exacerbate urban–rural inequalities.

The vulnerability of individuals, households, or groups is shaped by their exposure to risk factors and their capacity to cope with or withstand stress (FAO, 2011; FAO, 2008). A critical question therefore concerns the effectiveness and efficiency of food security assessments within Niger. Because household food security can fluctuate over time, it is essential to examine its underlying determinants to anticipate future shocks and understand how households adapt to food insecurity. Understanding rural households—who contribute significantly to food surpluses for urban areas—is crucial for maintaining national food security. Threats to household food security ultimately jeopardize the broader stability of the nation.

Recent regional and national reports by FAO (2024) reveal a sharp increase in acute food insecurity across the Central Sahel and Niger, driven by climate shocks, conflicts, and economic stressors. These trends underscore the urgent need for precise, timely, and context-specific evidence to guide effective interventions and sustainable solutions. Strengthening the quality of data, methodologies, and evaluation systems will improve the timeliness, equity, and cost-effectiveness of policy responses.

Therefore, examining food insecurity in Niger is justified, as it addresses a persistent and multidimensional challenge that threatens livelihoods, social stability, and sustainable development. Insights derived from this study can inform national policy, enhance program effectiveness, and contribute to the resilience of one of the world's most vulnerable regions.

Previous studies such as Zakari (2014), FAO (2008; 2011; 2021), and the World Food Programme (WFP, 2025) have provided valuable insights into the determinants of food insecurity in Niger and across the Central Sahel. These studies have emphasized macro-level factors including climatic variability, land degradation, population growth, and declining agricultural productivity. Similarly, analyses by the International Monetary Fund (2022) have highlighted the economic vulnerability of rural households to climate shocks and price fluctuations. However, most of these works have primarily adopted national or regional perspectives, relying on aggregate data that offer limited understanding of micro-level dynamics within rural communities.

Few studies have explored how socio-economic and demographic characteristics jointly influence the coping behaviors of households facing food shocks. Furthermore, prior research has often conceptualized food insecurity as a static phenomenon, without adequately examining the adaptive strategies households employ to manage risk and uncertainty. This study seeks to address these gaps by analyzing the determinants of household coping strategies in Southern Niger. By combining socio-economic perspectives with behavioral insights, it contributes novel empirical evidence to inform more context-sensitive and resilience-oriented food security policies in the Sahelian region.

The main objective of this study is to identify the causes of food insecurity and to analyze the coping strategies adopted by households in response to food shocks in the Sahelian region of Niger. This research aims to contribute to the growing body of knowledge on food security and provide policy-relevant evidence to help reduce population vulnerability to food poverty.

Method

Description of study area

The survey took place in the Kollo department of Southern Niger between June and July 2019. The region is located between longitudes 1°30' and 2°55' and latitudes 12°30' and 13°53'. The climate in this area is classified as Sudano-Sahelian, characterized by two seasons:

- A short rainy season that extends from June to September, marked by an abundant but very irregular rainfall regime in time and space, a long dry season (October to May);
- A cold period (October to February) where average temperatures vary by around 20°C. A hot period (March to June) with temperatures reaching up to 45°C in some places.

This area is full of significant surface water resources which are composed of the Niger River which crosses the department for nearly 45 km in length.

The infrastructure is underdeveloped. Over 90% of the people in the area work in agriculture, which is their primary source of income. Subsistence farming is a type of agricultural production in which the size of production is determined by the needs of rural households. Renewable resources such as sunlight are also abundant, supporting agriculture and livestock farming.

Despite all these resources, Food insecurity is affected Kollo and is caused by a combination of factors, including conflicts that limit access to markets and agricultural and livestock activities, an economic crisis affecting product supply and prices, chronic household poverty, and an environmental crisis manifested by a sharp decline in grazing. The depletion of fodder resources and restrictions on herd mobility due to insecurity also exacerbate the situation. This is why it is rational to conduct this study.

Data collection

The survey was conducted in the form of a structured interview using a questionnaire where household heads were randomly selected in 15 villages. The villages were randomly selected considering accessibility and security. The study collected both quantitative and qualitative information about the economic, demographic, and social characteristics of homes. Additionally, we added information about the region's food insecurity causes, coping mechanisms used by households, market accessibility, food assistance receipt, and the village's distance from the main road. A total number of 500 households was covered.

Econometric modelling

When selecting coping strategies, the goal of the household is to ensure its members receive their daily food requirements by choosing from available alternatives. The concept is that the head of the household selects a combination (J, K, L, M, N, etc.) of coping strategies to maximize utility and ensure food availability for the household members, particularly when facing food insecurity. A rational household head will always choose the preferred combination from a set of alternative coping strategies to secure sufficient food for the family.

Let us assume that the head of a household, aiming to meet the needs of their family, must choose among various coping strategies (e.g., borrowing, selling livestock, selling land, etc.). If a number of household heads prefer option J over option K, because the perceived benefit of J outweighs the utility of K, we can express this as:

$$U_{ij}(\beta_j X_i + \varepsilon_j) > U_{ik}(\beta_k X_i + \varepsilon_k), k \neq J \quad (2)$$

where U_{ij} and U_{ik} are the perceived utility by household head i in selecting coping behaviors J and K , respectively; X_i is a vector of explanatory variables (for example: level of education of the head of the household, household size, asset, etc) that influence the choice of the options; β_j and β_k are parameters to be estimated; and ε_j and ε_k are the error terms.

We can relate the fact that a household prefers or selects a coping strategy for its utility maximization ie to provide enough food for its members and not choosing the other option to a discrete choice. The outcome Y is then a dichotomous dependent variable taking the value of 1 when the household head adopts an option and 0 otherwise.

The probability that household i will adopt a coping strategy j among the set of options could be defined as follows:

$$\begin{aligned} P(Y=1) &= P(U_{ij} > \frac{U_{ik}}{X}) = P(\beta_j' X_i + \varepsilon_j - \beta_k' X_i - \varepsilon_k > \frac{0}{X}) \\ &= P([\beta_j' - \beta_k'] X_i + \varepsilon_j - \varepsilon_k > \frac{0}{X}) = P(\beta^* X_i + \varepsilon^* > \frac{0}{X}) = F(\beta^* X_i) \end{aligned} \quad (3)$$

Where ε^* is a random disturbance term, β^* is a vector of unknown parameters that can be interpreted as the net influence of the vector of explanatory variables influencing coping strategies, and $F(\beta^* X_i)$ is the cumulative distribution of ε^* evaluated at $\beta^* X_i$.

The choice between using a logit or probit model for estimation depends on the assumed distribution of the random error term. Several qualitative choice models, including the linear probability model, logit, and probit models, are available for estimation (Greene, 2007; Molua, 2012). In this study, the household head has multiple coping strategies to choose from. Therefore, the Multinomial Probit model is suitable for examining how the socio-economic and demographic factors of respondents influence the selection of coping strategies

that a household head might adopt to ensure sufficient food for their family members when facing food insecurity (Greene, 2007; Molua, 2012).

The probability of household i choosing coping option Y_i and the set of explanatory variables X_i is specified as follows:

Thus, the probability of household i choosing coping option Y_i and the set of explanatory variables X_i is specified as follows:

$$P_{ij} = \text{prob}(Y=1) = \frac{e^{x'_i \beta}}{1 + \sum_{j=1}^J e^{x'_i \beta}}, \quad j = 1 \dots J, \quad (4)$$

where β is a vector of parameters that satisfy $\ln(P_{ij}=P_{ik}) = X'_i(\beta_j - \beta_k)$ (Greene, 2007, Molua, 2012).

The marginal effects of the explanatory variables are given as:

$$ME_{ijk} = \frac{\partial \text{Pr}(y_i=j)}{\partial x_{ik}} = \frac{\partial F_j(x_i, \theta)}{\partial x_{ik}} \quad (5)$$

Coefficients are understood to be marginal effects associated with differences in utility. The explanatory variable J has a positive impact on the utility difference if the coefficient in the equation is positive. A household head is more likely to select option J over the benchmark option if the utility difference widens. A negative coefficient reduces the likelihood that the head of the household would select option J .

Table 1 presents the independents variables used in the probit model that expected to influence the choices of these cropping strategies.

Table 1. Description of socio-economic variables used Multinomial Probit model

Variable	Description	Mean	SD
Household and farm characteristics			
Gender	Dummy = 1 if household head is male	0.82	0.37
Age	Age of the household head	49.19	13.83
Household size	Total size of the household	10.99	6.32
EHH	Dummy = 1 if head of household can read and write	0.73	1.214.636
Household asset	Total quantity of assets	0.49	1.66

Source: (Field survey 2019)

Results and discussion

Causes of food insecurity

As indicated in Table 2, the survey allowed us to identify a number of potential reasons of food insecurity in Niger. Food insecurity in Niger appears to be primarily caused by drought. Drought is a contributing factor to household food insecurity, according to 94.2% of 500 respondents.

Table 2. Causes of food insecurity

Causes of food insecurity	Responses	
	Frequency	Percent
Drought	471	94.2
Diseases and insects	289	57.8
Lack of enough labor	208	41.6
Flooding	181	36.2
Soil infertility	310	62.0

Lack of enough inputs	292	58.4
Land not enough	226	45.2
Lack of money	282	56.4
Increased in food prices	359	71.8

Source: (Field survey 2019)

The timing and unpredictability of rainfalls, along with other meteorological conditions, have a significant impact on Niger agriculture. The primary issue restricting crop production is low precipitation. In fact, [Kafle and Balasubramanya \(2022\)](#) found that farmers using irrigation experienced higher cash incomes, sold a higher share of the harvest, and had higher crop revenues. There is relatively little and irregular rainfall, and destructive flash floods frequently follow dry spells. Water supplies are few, dispersed unevenly, and difficult to get to. As a result, natural pastures are being lost and a sizable portion of the nation is unsuited for rain-fed agriculture. The cost of food items frequently rises during droughts, and the majority of households who rely entirely on self-production lack the funds to purchase food to meet their members' needs. High food costs have an impact on a sufficient daily ration, according to 71.8% of the households surveyed. Another significant barrier to Niger agriculture is soil sterility.

Agricultural productivity is severely hampered by land degradation, especially when it results from soil erosion and fertility loss. Niger's severe climate makes it impossible to cultivate all crops, which restricts agricultural output to a small number of crops. Because of their low carbon content and lack of plant nutrients, Niger's soils are naturally delicate. Thus, the consequences for human well-being and environmental sustainability can be severe when these soils are not properly managed, as is frequently the case.

A lack of farm inputs has a major impact on agricultural output. Farmers may experience low productivity and food insecurity if they are unable to purchase inputs that increase output. Cereal productivity is low on most traditional farms because they lack the funds to buy expensive inputs like fertilizer, pesticides, herbicides, and farm equipment. Most farmers in Niger do all aspects of farming by hand, from clearing land to harvesting and processing crops, using basic equipment including hoes, cutlasses, ax, sickles, and other native agricultural implements. the lack of innovative technologies in agriculture will impede the increase in agricultural output and the decrease in rural poverty.

Crop diseases and pests are major issues that have an impact on Niger's grain production. Termites, locusts, birds, and animals like rats are a few of the frequent pests of Niger's cereal crops. Moreover, Niger crop farms are frequently impacted by flooding. A reduction in harvest and production areas results from the frequent flooding of rice plantations near the Niger River.

Although 41.6% of respondents believe that labor limitations influence the daily food intake due to the average family size, they do not consider it a primary cause of household food insecurity. The availability of labor may be impacted by certain families' members moving to nearby countries. This is supported by a recent study conducted by [Vo \(2023\)](#).

Household coping strategies

Coping strategies are employed by households to mitigate the effects of food insecurity, particularly when they lack sufficient food to meet the needs of their members. These strategies vary both within and between households ([Maxell ,1995, 1996; Maxwell et al.,1999, 2003,2008](#)). As shown in [Table 3](#), migration to other regions is the most prevalent coping strategy among respondents facing food shocks, with 70.2% of households adopting this approach, followed by the sale of animals (69.4%).

Table 3. Coping strategies adopted by the household members to meet their food needs

Coping behaviors	Responses	
	Frequency	Percentage
Eat the same food every day	247	49.4
Reduce the ration for adults	165	33.0
Reduce number of meals	224	44.8
Consumption of less preferred food	313	62.6
Unusual borrowing	227	45.4

Unusual consumption of wild leaves	265	53.0
Spend one or several days without eating	97	19.4
Migration to other places	351	70.2
Sale of animals	347	69.4
Sale of productive assets	116	23.2
Sale of non-productive assets	186	37.2
Sale of land	144	28.8
Send children to live with relatives	95	19.0
Others	3	6

Source: (Field survey 2019)

According to a survey conducted during the 2005 food crisis by IRAM (Institut de Recherches et d'Applications des Méthodes de Développement), 90% of the households surveyed reported that at least one member had migrated (Kone & Toure, 2006; Cornia & Deotti, 2008). Nigerien migrants primarily relocate to regional coastal nations, including Ivory Coast, Ghana, Togo, and other neighboring countries. These migrants often support their families by remitting money from their savings. In addition, the sale of livestock serves as a vital source of capital for many households and plays a key role in overcoming food shocks.

In Niger, famine periods are typically followed by a decline in animal prices, compelling agro-pastoralists to sell an even larger proportion of their herds. Consumption of less preferred foods and eating the same food daily are additional coping mechanisms to address hunger, which help households reduce food expenditures. Many household heads prioritize the quantity and availability of food over its quality, ensuring that their members have food to eat at all times. Borrowing, as well as the sale of productive assets and land, is frequently used to alleviate food shortages. While strategies such as borrowing and asset sales may help households manage short-term shocks and stabilize income, they can have a detrimental effect on the household's productive assets in the long term, thereby increasing vulnerability to future food insecurity (Devereux, 1993,2009; Corbett, 1988; Maxwell *et al.*, 2008). Additionally, reducing the number of daily meals and cutting rations for adults were also identified as coping strategies employed by household members in the survey.

Factors influencing the choice of the coping strategies

To ensure sufficient daily rations for the family, a rational head of household is expected to select the most preferred coping strategy that maximizes their utility, particularly the supply of food for household members. This study hypothesizes that the choice of coping behaviors among households is determined by socio-economic and demographic characteristics (Mjonono *et al.* 2009). Five independent variables were used to examine how they influence the coping strategies that a household may adopt to secure enough food for its members. The results of the multinomial probit model are presented in Table 4. The model is highly significant (LR $\chi^2 = 232.09$, $p < 0.001$), shows a good improvement over the null model, and achieves a reasonably strong fit (Pseudo $R^2 = 0.373$).

The level of education of the head of the household significantly and negatively influences several coping strategies, including the consumption of wild leaves, skipping one or more days without eating, selling animals, selling non-productive assets, and sending children to live with relatives. This is consistent with the findings of FAO (2021) which reported that education helps households “move from reactive to preventive coping,” focusing on risk mitigation rather than consumption reduction. However, education positively and significantly influences the decision to reduce the number of meals for household members. This suggests that higher-educated heads of households are more likely to prefer reducing the number of meals over other coping strategies.

Gender also plays a significant role in shaping coping behavior. Male-headed households are more likely to adopt strategies such as eating the same food every day, consuming less preferred food, consuming wild leaves, skipping meals, selling non-productive assets, and sending children to live with relatives. Conversely, the gender of the head of the household negatively influences the adoption of unusual borrowing and the reduction of food quantity for adults. These results indicate that male heads of households are more inclined to adopt these strategies in response to food insecurity compared to other options. Gendered coping behaviors may affect social cohesion — for instance, women may rely on social networks (borrowing food or money), while men might migrate for work, weakening local community ties. During crises, women may assume new roles (income generation, decision-making), which can shift social norms and expectations — sometimes

empowering, but also potentially causing tension or backlash. Men and women often have unequal access to and control over assets, income, and information. In many households, men may decide on economic coping strategies (e.g., selling livestock), while women handle consumption-based strategies (e.g., rationing food). Therefore, understanding gendered coping can help design gender-sensitive resilience and food security programs (e.g., supporting women's access to credit or productive assets). Programs that reduce the need for harmful coping (e.g., food transfers, cash-for-work, child feeding programs) can mitigate gendered burdens. Promoting equitable access to education, income, and decision-making helps to reduce gendered disparities in coping strategies over time. The Finding of [World Bank \(2022\)](#) showed that *female*-headed households are less likely to sell assets or take formal loans and more likely to adopt consumption-based or informal coping (e.g., reducing food consumption, relying on social networks).

Age has a significant effect on the coping strategies selected. As the age of the head of the household increases, there is a negative influence on the likelihood of unusual borrowing, skipping multiple days without eating, and selling livestock. However, older heads of households are more likely to adopt the strategy of reducing the number of meals for their family members. This suggests that older individuals tend to prioritize reducing meal frequency rather than other coping options. Older household heads often have more farming experience, better social networks, and accumulated assets, which can enhance resilience to food shocks and ensure long-term food stability. At advanced ages, physical capacity and income-generating potential decline, reducing food security if younger labor or alternative income is lacking. Studies in Niger and Burkina Faso show that elderly-headed households are more vulnerable during droughts due to reduced farm labor and limited adaptive capacity ([WFP, 2023](#)). Younger farmers are generally more open to adopting improved technologies (seeds, irrigation, digital tools) that support long-term food security. [FAO \(2022\)](#) found that younger farmers in the Sahel were 30% more likely to adopt improved seeds than those above 55. Age influences food security through its effects on labor productivity, innovation capacity, and intergenerational resource transfer. Youth-inclusive policies (land access, credit, agri-innovation) are crucial for sustaining long-term food systems.

Household size also significantly affects the choice of coping strategies. Larger households are more likely to adopt strategies such as reducing rations for adults, consuming wild leaves, and selling livestock. Additionally, larger household sizes are associated with a negative influence on the adoption of strategies like eating the same food every day, skipping meals, and selling non-productive assets. These results imply that heads of larger households are more likely to reduce rations for adults, consume wild leaves, and sell livestock as coping strategies. Overall, Large and aging households without access to non-farm income or remittances may face asset depletion, reduced diet diversity, and poor nutrition outcomes — undermining intergenerational food security. Youthful households with moderate size tend to show better adaptability, diversification, and technology use — critical for long-term resilience.

Finally, asset ownership, or wealth, is expected to negatively influence the choice of coping strategies, as wealth determines a household's purchasing power. Wealthier households generally have a greater ability to provide adequate food in both quantity and quality. However, in this study, asset ownership was found to negatively influence the choice of consuming less preferred food. Notably, none of these household characteristics influenced the choice of strategies such as migration, sale of productive assets or land. Usually, people migrate for looking for better life. Temporary rural to urban migration is often practiced by youth after rainy season. The productive assets or land are precious articles on which household depends for producing food. Their sale can serious negative impact on household livelihood.

Table 4. Multinomial Probit model's parameters of factors influencing the choice different coping behaviors of the households

Dependent variables	EHH	Gender	HHAge	HSize	Asset	const
Eat the same food every day	0.087 (0.137) [-0.034]	0.846*** (0.190) [0.337]	0.005 (0.005) [0.002]	-0.027** (0.013) [-0.010]	-0.585 (0.483) [-0.222]	-0.167 (0.538)
Reduce the ration for adults	-0.177 (0.142) [-0.063]	-0.764*** (0.177) [-0.277]	-0.009* (0.005) [-0.003]	0.032** (0.013) [0.011]	0.080 (0.447) [0.028]	0.379 (0.509)
Reduce number of meals	0.267* (0.136) [0.106]	0.382** (0.179) [0.151]	0.009* (0.005) [0.003]	-0.010 (0.013) [-0.004]	-0.025 (0.419) [-0.009]	-0.882* (485)

Consumption of less preferred food	0.194 (0.143) [0.071]	1.031*** (0.188) [0.387]	0.008 (0.005) [0.003]	-0.019 (0.013) [-0.007]	-1.227* (0.625) [-0.311]	0.374 (0.665)
Unusual borrowing	-0.166 (0.137) [-0.065]	-0.517*** (0.176) [-0.205]	-0.012** (0.005) [-0.005]	0.010 (0.013) [0.004]	-0.224 (0.438) [-0.089]	1.113 (0.506)
Unusual consumption of wild leaves	-0.412*** (0.137) [-0.163]	0.291* (0.174) [0.116]	-0.009* (0.005) [-0.003]	0.022* (0.013) [0.008]	-0.424 (0.438) [-0.161]	0.591 (0.501)
Spend one or several days without eating	-0.396** (0.164) [-0.095]	0.725*** (0.248) [0.191]	-0.013** (0.006) [-0.003]	-0.032* (0.016) [-0.008]	-0.425 (0.462) [-0.132]	-0.147 (0.566)
Migration to other places	0.028 (0.143) [0.009]	-0.056 (0.185) [-0.019]	-0.004 (0.005) [-0.001]	0.017 (0.014) [0.005]	-0.732 (0.564) [-0.195]	1.351** (0.623)
Sale of animals	-0.359** (0.141) [-0.0129]	0.109 (0.181) [0.037]	-0.016** (0.005) [-0.005]	0.052*** (0.015) [0.018]	-0.370 (0.485) [-0.114]	1.218** (0.551)
Sale of productive assets	0.046 (0.147) [0.014]	0.176 (0.193) [0.055]	-0.004 (0.005) [-0.001]	-0.011 (0.015) [-0.206]	-0.576 (0.434) [-0.206]	-0.007 (0.511)
Sale of non-productive assets	-0.250* (0.141) [-0.092]	0.521*** (0.191) [0.196]	-0.001 (0.005) [-0.0007]	0.037*** (0.014) [-0.014]	0.480 (0.472) [0.162]	-0.806 (545)

Notes: *, **, *** indicate significance at 10%, 5% and 1% respectively. In () and [] are standard errors and marginal effects (dF/dx) respectively. $LR\chi^2=232.09$, log pseudo likelihood=-302.119, PseudoR²= 0.373.

Source: (Author's own calculation)

Food insecurity remains a major challenge in Southern Niger due to recurrent climatic shocks, land degradation, limited livelihood options, and market disruptions. The study highlights how households respond to food shortages and what factors drive their vulnerability. Understanding these determinants provides valuable evidence for designing effective and sustainable food security and resilience policies. Thus, by identifying these causes (e.g., drought, land degradation, low income, market access issues), policymakers can design area- and group-specific interventions rather than one-size-fits-all programs. These patterns reproduce long-term gender inequality (lost schooling, asset depletion) and can increase vulnerability to exploitation. Women-headed or larger households are more food insecure, therefore, policies should prioritize gender-sensitive and household-size-adjusted food assistance. Combine cash transfers with measures that protect women's time (e.g., childcare, fuel subsidies) and link to productive assets for women. Food insecurity coping has direct mental-health consequences that are gendered and amplify social harms. It is very important to encourage the adoption of soil and water conservation, drought-tolerant crops, and irrigation where feasible to increase local food production.

Expanding access to Irrigation and Fertilizers Improves Household Food Resilience by Reducing dependence on Rainfall and Climatic Shocks. Irrigation allows farmers to produce crops even during dry spells or irregular rainfall seasons. This stabilizes agricultural production, reduces crop failure risk, and ensures more reliable food availability at the household level. In regions like southern Niger, where rainfall is short and erratic, access to irrigation can transform subsistence farming into year-round production. For example, Small-scale irrigation using wells or motor pumps can enable dry-season vegetable gardening, providing income and dietary diversity when rain-fed crops are unavailable. Indeed, when combined with irrigation, fertilizers ensure optimal nutrient uptake, leading to higher and more stable yields. This helps households meet consumption needs and have surplus for sale, improving both food access and income resilience.

Conclusion

The purpose of this study is to investigate the causes of insecurity and the coping mechanisms used by households to lessen hunger. According to the study, a number of problems, including drought, infertile soil, a lack of inputs, agricultural pests and diseases, a lack of funding, etc., contribute to food insecurity. Coping

mechanisms in the meanwhile include selling animals, moving to a new location in search of a better life, eating less desirable food, borrowing unusually, etc. It is predicted that the socioeconomic and demographic factors of households influence the coping strategies they use.

The multinomial probit model's findings demonstrate that the head of the household's educational attainment has a negative and significant impact on decisions to sell animals, send children to live with relatives, skip one or more days of food, and consume unusual amounts of wild leaves. In response to food insecurity, male-headed households are more likely to sell non-productive assets, send children to live with relatives, eat the same food every day, consume less preferred foods, eat unusual amounts of wild leaves, or skip one or more days of meals.

The findings underscore that addressing food insecurity in Southern Niger requires integrated and evidence-based approaches combining social protection, climate resilience, and community empowerment. Policies that reduce vulnerability and promote adaptive coping strategies will build a stronger foundation for sustainable food and nutrition security in Niger.

Strengthening the sustainability of the agricultural production system through the promotion of intelligent agricultural technologies in the face of climate change is one of the solutions promoted within the framework of national strategies for food and nutritional security, since 80% of the Niger population relies on their own production as their main source of food.

Statement of Originality and Plagiarism-Free

We inform that this article is original article and free of plagiarism.

Declaration of Conflicts of Interest

The author declares no conflicts of interest related to this research, authorship, or publication.

References

- Corbett, J. (1988). *Famine and household coping strategies*. *World Development*, 16(9), 1099–1112. [https://doi.org/10.1016/0305-750X\(88\)90103-9](https://doi.org/10.1016/0305-750X(88)90103-9)
- Cornia, G. A., & Deotti, L. (2008). *Niger's 2005 food crisis: Extent, causes and nutritional impact* (Working Paper No. EUDN/WP 2008–15). European Commission. https://www.eudnet.net/download/wp/EUDN2008_15.pdf
- Devereux, S. (2009). *Why does famine persist in Africa?* *Food Security*, 1, 25–35. <https://doi.org/10.1007/s12571-009-0005-8>
- Devereux, S. (1993). *Goats before ploughs: Dilemmas of household response sequencing during food shortages*. *IDS Bulletin*, 24(2), 52–59. <https://doi.org/10.1111/j.1759-5436.1993.mp24002007.x>
- Food and Agriculture Organization. (2011). *The state of food insecurity in the world 2011* (Working Paper). FAO. <http://www.fao.org/publications/sofi/en/>
- Food and Agriculture Organization. (2008). *The state of food insecurity in the world 2008: High food prices and food security – Threats and opportunities* (Working Paper). FAO. <http://www.fao.org/docrep/011/i0291e/i0291e00.htm>
- Food and Agriculture Organization. (2021). *Climate change response strategies for agriculture: Challenges and opportunities for the 21st century*. FAO. https://www.fao.org/fileadmin/templates/em2009/docs/World_Bank_2008c_.pdf
- Food and Agriculture Organization. (2022). *Youth in agriculture and food systems transformation in Africa*. FAO.
- Food and Agriculture Organization. (2024). *Regional report on food and nutrition security for West Africa and the Sahel 2024: In brief*. FAO.
- Greene, W. H. (2007). *Econometric analysis* (7th ed.). Prentice Hall.
- International Monetary Fund. (2022). *Economic effects of climate change and food insecurity in Niger*. <https://www.imf.org/en/Publications/Departmental-Papers-Policy-Papers/Issues/2022/09/13/Climate-Change-and-Chronic-Food-Insecurity-in-Sub-Saharan-Africa-522211>

- Kafle, K., & Balasubramanya, S. (2022). *Reducing food insecurity through equitable investments in irrigation: The case of Niger*. *Journal of Agricultural and Applied Economics*, 1, 494–515. <https://doi.org/10.1002/jaa2.40>
- Koné, M., & Touré, O. (2006). *Évaluation du dispositif de prévention et de gestion des crises alimentaires du Niger durant la crise de 2004–2005: Enquêtes sur les conditions de vie des ménages dans les régions de Maradi et Zinder*. IRAM.
- Maxwell, D. (1996). Measuring food insecurity: The frequency and severity of coping strategies. *Food Policy*, 21(3), 291–303. [https://doi.org/10.1016/0306-9192\(96\)00009-7](https://doi.org/10.1016/0306-9192(96)00009-7)
- Maxwell, D. (1995). *Measuring food insecurity: The frequency and severity of “coping strategies”* (FCND Discussion Paper No. 8). International Food Policy Research Institute.
- Maxwell, D., Ahiadeke, C., Levin, C., Armar Vo Duc, H. (2023-Klemesu, M., Zakariah, S., & Lamptey, G. (1999). Alternative food security indicators: Revisiting the frequency and severity of ‘coping strategies’. *Food Policy*, 24(4), 411–429. [https://doi.org/10.1016/S0306-9192\(99\)00031-4](https://doi.org/10.1016/S0306-9192(99)00031-4)
- Maxwell, D., Caldwell, R., & Langworthy, M. (2008). Measuring food insecurity: Can an indicator based on localized coping behaviors be used to compare across contexts? *Food Policy*, 33(6), 533–540. <https://doi.org/10.1016/j.foodpol.2008.04.004>
- Maxwell, D., Watkins, B., Wheeler, R., & Collins, G. (2003). *The Coping Strategies Index: A tool for rapid measurement of household food security and impact of food aid programs in humanitarian emergencies*. CARE and World Food Programme.
- Mjonono, M., Ngiidi, M., & Hendricks, S. L. (2009). Investigating household food insecurity coping strategies and the impact of crop production on food security using the Coping Strategy Index (CSI). *17th International Farm Management Congress*. Bloomington/Normal, Illinois, USA.
- Molua, E. L. (2012). Gendered response and risk-coping capacity to climate variability for sustained food security in Northern Cameroon. *International Journal of Climate Strategies and Management*, 4(3), 277–307. <https://doi.org/10.1108/17568691211238948>
- Vo, D. H. (2023). Does domestic migration adversely affect food security? Evidence from Vietnam. *Heliyon*, 9, e13789. <https://doi.org/10.1016/j.heliyon.2023.e13789>
- World Bank Group. (2022). *Gender differences in household coping strategies for COVID-19 in Kenya* (Policy Research Working Paper No. 9959). <https://documents1.worldbank.org/curated/en/861451646668280669/pdf/Gender-Differences-in-Household-Coping-Strategies-for-COVID-19-in-Kenya.pdf>
- World Food Programme. (2025). *FAO and WFP early warning report reveals worsening hunger in 13 hotspots: Five with immediate risk of starvation*. <https://www.wfp.org/news/fao-and-wfp-early-warning-report-reveals-worsening-hunger-13-hotspots-five-immediate-risk>
- World Food Programme. (2023). *Comprehensive Food Security and Vulnerability Analysis (CFSVA) – Niger*.
- Zakari, S. (2014). *Factors affecting Niger food security: An analysis at national and household levels* [Doctoral dissertation, Huazhong Agricultural University]. College of Economics and Management, Wuhan, China.