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Effect of remittances on the food security status of smallholder farmers in Kyrgyzstan

MASTER'S THESIS

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Author: Bc. Begimai Usubalieva

Chief supervisor: doc. Ing. Miroslava Bavorová, Ph.D.

Declaration

I hereby declare that I have done this thesis entitled “Effect of remittances on the food security status of smallholder farmers in Kyrgyzstan” independently, all texts in this thesis are original, and all the sources have been quoted and acknowledged by means of complete references and according to Citation rules of the FTA.

In Prague 12.08.2023

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Begimai Usubalieva

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Abstract

The previous studies on effect of remittances on food security show that remittances can enhance household income and improve dietary. However, the relationship between remittances and food security within the context of Kyrgyzstan remains understudied. Hence this study analyses the effect of the remittances on the food security status of smallholder farmers in Kyrgyzstan. The data was collected between December 21, 2022, and January 20, 2023, in all three regions of the southern part of Kyrgyzstan: Jalal-Abad, Osh and Batken. The total number of the respondents surveyed was 337 and one missing case was excluded from the analysis. The data was analysed in the Statistical Package for the Social Sciences (SPSS) and since the study has two different items to measure the food security status (Food Consumption Score and Food Insecurity Experience Scale), two binary logistic regression models were performed to analyse how independent variables in the study affect the food security status of the households. The results of the study revealed that financial remittances had significant and positive effect on the food security status of smallholder farmer households over a 12-month period and did not have an impact within a shorter timeframe, such as 7 days. Based on the results, the study recommended to involve implementing measures for remittance facilitation and financial literacy, developing secure remittance transfers, and offering financial education to empower farmers in managing and investing their funds effectively.

Key words: remittances, migration, food security, Kyrgyzstan.

Contents

List of tables

List of figures

List of the abbreviations used in the thesis:

FAO – Food and Agriculture Organization of the United Nations

FCS – Food Consumption Score

FIES – Food Insecurity Experience Scale

GDP - Gross Domestic Product

HH - Household

IOM - International Organization for Migration

KGS – Kyrgyz som

KGZ – Kyrgyzstan

NSCK - National Statistical Committee of the Kyrgyz Republic

UN – United Nations

USAID - United States Agency for International Development

USD – United States Dollar

WFP – World Food Programme

1. Introduction and Literature Review

1.1. Introduction

The increasing number of people moving across the world has resulted in a substantial flow of remittances, which are sent by workers to their home countries. Remittances have a significant impact on the economies of developing countries, as they contribute to education, economic development, and poverty alleviation. Remittances can also potentially alleviate the issue of food insecurity in recipient countries.

The previous studies on effect of remittances on food security show that remittances can enhance household income and improve dietary diversity (Orrenius & Zavodny, 2009; Yang & Martinez, 2006). However, the relationship between remittances and food security within the context of Kyrgyzstan remains understudied. Hence this study aims to analyse the effect of the remittances on the food security status of smallholder farmers of Kyrgyzstan and fill a gap in the scholarly literature on this subject.

The findings of this study can be used to provide policymakers and development experts with valuable insights into the various factors that affect the food security and livelihoods of Kyrgyzstan's rural communities. It can also help them develop effective measures to improve the country's rural economy.

The study's findings are also relevant to the development of migration programs and policies. A deeper understanding of the link between food security and remittances can have a significant impact on the decisions that are made regarding labor migration (World Bank, 2021).

1.2. Literature review

1.2.1. Migration theories

The concept of migration refers to the process of moving from one place to another in order to maintain one's residence for a long time (Castles & Miller, 2009). It is complex and involves various factors such as social networks, political conditions, and economic conditions.

There are various types of migration, such as temporary and permanent. The former refers to moving to a new place for a specific period, while the latter involves permanently living in the new location (United Nations, 2019). International migration is a type of movement that involves crossing the borders of a country. On the other hand, internal migration is a type of movement that involves moving within a country.

Various theoretical viewpoints have been developed to study migration and its drivers. These include the theories of network, labor migration, and world systems. One of the most common theories that focuses on migration is the neoclassical theory, which states that individuals make their own decisions when it comes to moving. According to this theory, the decision to move is based on the expected benefits of moving (Borjas, 1989). The costs of moving are usually associated with social and financial issues, as well as the risks. On the other hand, the benefits of moving are usually associated with higher wages and better job prospects.

In 1985, a new theory was presented that expands on the neoclassical model by focusing on the role of social networks and household decision-making in migration (Stark & Bloom, 1985). It states that the goal of moving is to reduce risk and diversify income sources. Social networks are also important in helping migrants obtain information and financial support.

The notion of the segmented labor market states that the structures of the labor market can influence the types of migration that people make. There are two kinds of labor markets, namely the primary and the secondary. The primary market is composed of high-

paying jobs that provide good benefits and working conditions, while the secondary market is composed of low-skilled and low-paying work (Massey et al., 1993). Migrant workers are drawn to the secondary market due to the demand for their services.

The world systems theory states that the political and economic systems can influence the types and frequency of migration. It divides the global economy into peripheral, core, and semi-peripheral regions. According to this concept, the peripheral regions have the lowest developed economies, while the core regions have the most developed economies (Wallerstein, 1974). The main reason why people move is due to the unequal distribution of economic opportunities and resources across different regions. They are also looking for better opportunities in core regions.

Understanding migration's various complexities is very important to improve the understanding of its effects on both the receiving and sending societies. With the help of migration theories, researchers can gain a deeper understanding of the factors that influence the movement process.

1.2.2. Migration in developing countries

In developing countries, migration is a complex phenomenon that can be caused by various factors. Some of these include poverty, joblessness, and low wages. Individuals looking for better employment opportunities may migrate to countries with better prospects (World Bank, 2019). Political factors such as persecution, conflict, and repression can also result in people moving to other countries. Individuals who are victims of human rights violations or political upheaval in their home countries may look for refuge elsewhere (Massey et al., 1993). In addition, environmental issues such as climate change and natural disasters can affect migration. In 2011, Black and colleagues (Black et al., 2011) noted that people who are threatened by environmental disasters such as famine, drought, and flooding may be forced to migrate.

The effects of migration on the political, social, and economic aspects of developing nations are numerous. One of the most significant factors that impacts developing

countries is the remittances sent home by migrants. Remittances play a vital role in reducing poverty and increasing household consumption (Abdih et al., 2012; Chami et al., 2018.). Although remittances can help improve the lives of many people, they can also have negative effects on the labor force participation and development of local industries (Yang & Martinez, 2006).

The brain drain effect is also effect of migration which refers to the mass migration of highly skilled individuals from developing countries to advanced economies. This can lead, in turn, to a shortage of workers in developing nations, which can affect their economic development and quality of public services. Despite this, some studies claim that the brain drain phenomenon can have a positive impact by increasing the investment in health and education (Dustmann et al., 2010).

The effects of migration can have a positive or negative impact also on various social aspects, such as family dynamics and cultural diversity. Some studies claim that migration can lead to better gender equality by allowing women to work more and contribute more to household income (Chen & Wang, 2018). However, it can also cause the breakdown of traditional structures and lead to a loss of social support (Kroeger et al., 2016).

1.2.3. Migration and remittances in Kyrgyzstan

Kyrgyzstan is one of the countries with the longest history of migration. Approximately 800,000 to 1,000,000 citizens of Kyrgyzstan (about 40% labor force of the country) regularly work abroad, while about 50,000 Kyrgyzstanis leave the country for work every year (WFP 2021). Russia, Kazakhstan, and Turkey are the primary migration destinations. The main factors that have made these countries preferred destinations are their geographic proximity, language, and the availability of strong diaspora networks.

The main reason why people leave Kyrgyzstan is due to the country's economic situation. Its reliance on agriculture is unstable, and it suffers from a lack of private sector investment and job opportunities (World Bank, 2021). The political instability in Kyrgyzstan is also one of the main factors that has caused migration to increase. Since it

became independent from the Soviet Union, the country has experienced numerous political crises (Nabiyev, 2020). This has led to a lack of trust and confidence in the government, which has caused many people to leave.

Remittances are one of the most important and tangible benefits of labor migration to Kyrgyzstan in terms of development and poverty reduction and are a vital part of the country's economy, accounting for over 30% of its GDP (World Bank, 2021). They allow recipient families to increase their overall income as well as diversify their sources of income, providing an important buffer against economic shocks (WFP 2021). Research on the costs of remittances in Kyrgyzstan shows that they are mostly spent on basic needs such as food, healthcare, education, and the purchase and renovation of houses. To cover other expenses, including traditional holidays, migrant families rely on loans or send another family member to work abroad. Such a consumption habit is formed due to social pressure and insufficient financial literacy of migrants (WFP 2021).

1.2.4. Food security concept

For decades, experts and policymakers have been talking about the importance of food security. The concept emerged during the 1970s when various food crises occurred due to political instability, natural disasters, and market failures. The first reference to this concept was made by the World Food Conference in Rome in 1974. According to the FAO, food security can be achieved by providing all individuals with the necessary nutrients and safe food to maintain a healthy lifestyle (FAO, 1974). A more complex definition was eventually adopted by the World Food Summit in 1996. It stated that food security can be achieved at the global, national, and individual levels by providing all people with adequate and nutritious food (FAO 1996). In 2001, the State of Food Insecurity released a revised definition of food security. It states that this concept exists when all people have access to nutritious and safe food that is appropriate for their daily needs (FAO 2002). Essentially, food security is a phenomenon that relates to individuals, and it is their nutritional status that is the most important concern (FAO 2003). The following outlines the working definitions of this concept:

- **Food security** can be achieved when all people at all times have the necessary means (economic, social, physical) to acquire nutritious food, which meets their dietary necessities and personal food preferences. This concept is the focus of household food security.

- **Food insecurity** can occur when individuals do not have sufficient economic, social, or physical means of access to food.

The concept of food security developed to include different aspects, such as availability, accessibility, utilization and stability. The availability of food refers to its physical presence, while accessibility is the capacity to obtain it through trade, aid, or production. Utilization is the process of using food to maintain good health and absorb nutrients. Finally, stability is the ability of people and societies to withstand the effects of natural disasters or price volatility (FAO, 2001).

A comprehensive approach to achieving food security involves considering various factors, such as the productivity of agriculture, trade policies, education, and infrastructure development. One of the most important factors that policymakers and experts consider when it comes to implementing a comprehensive strategy to achieve food security is the increase in agricultural productivity. This can be done using different technologies and fertilizers. According to the FAO, promoting sustainable practices, such as agroforestry and conservation agriculture, can help improve soil fertility and minimize the impact of agriculture on the environment (FAO, 2013).

1.2.5. Food security in Kyrgyzstan

Generally, in recent years, the food security in Kyrgyzstan has improved. The country's average calorie intake has increased to 120% of the recommended level, and its protein intake has also gone up by 30% (UN 2019). But despite the various factors that have contributed to the improvement of food security, the number of people who cannot afford a nutritious diet is still high. A vulnerability assessment conducted by the World Food Programme in December 2022 revealed that about 15% of Kyrgyzstan's population is

considered to be severely food insecure and 54% of its citizens still remain only marginally food secure.

Due to Kyrgyzstan’s heavy reliance on pastoralism and agriculture, which together contribute to the country's GDP and employment, it is vulnerable to natural disasters and changes in climate patterns. Moreover, fluctuating economic indicators have caused households' purchasing power to decline, making nutritious food more difficult to acquire (World Bank, 2019). The lack of money and affordability are also some of the factors that have been hindering the purchase of food and other items. The rising prices of food and the declining inflow of remittances have affected the household's resilience as well (WFP 2022). The lack of adequate transportation networks and post-harvest facilities contribute to food losses and prevent the efficient distribution of food in Kyrgyzstan. To address these issues, the government of Kyrgyzstan has launched various policies aimed at improving the country's rural infrastructure and agricultural productivity (UNDP, 2021). International organizations such as the WFP have also collaborated with the Kyrgyz government to provide assistance in enhancing food security (WFP, 2020).

1.2.6. Factors affecting food security

Insights from similar studies across various countries offer a comprehensive understanding of the factors influencing food security. For example, the household head's gender can have a big impact on a household's food security. Studies that were done on the effect of gender on the household food security have shown that female headed households are more likely to experience food insecurity than the households headed by men (Zakari, Ying, and Song 2014; Habyarimana 2015; Magaña-Lemus et al. 2016; Abdullah et al. 2019). Women have a gender gap in food security due to lower levels of education, access to productive resources, and lack of decision-making power. This can lead to lower agricultural productivity and vulnerability to economic shocks and environmental disasters. Additionally, women often do 75% of unpaid work, and women in rural areas spend 14 hours a day on care work. To reduce women's workloads and increase food security, it is important for women to participate in household and local decisions and share household responsibilities (CARE 2022).

The household head's age is also a significant factor that affects the food security status of a household. Previous studies revealed that food security varied depending on the age group of the household. For instance, households with an older head were more secure than households with younger heads (Abdullah et al. 2019; Magaña-Lemus et al. 2016).

Another factor that has an influence on a household's food security status and dietary diversity is the educational level of the household head. Higher educational level can result in better employment opportunities, improved knowledge about agriculture, better access to information, and increased purchasing power, all of which can positively affect household food security. This suggests that households with literate heads are more likely to be food secure (Mango et al. 2014; Feyisa, Haji, and Mirzabaev 2023; Magaña-Lemus et al. 2016).

Marital status is also one such factor that can impact a household's food security status. In 2022, a study conducted by Dudek revealed that people who are married are more likely to avoid experiencing food insecurity. This finding suggests that being in a committed relationship can help lower one's vulnerability to experiencing this issue.
Existing literature indicates that household size was associated with food security status as well. It was found that households with a larger family size were less likely to be secure and it is believed that the smaller the household, the greater the likelihood that it will become food insecure (Feyisa, Haji, and Mirzabaev 2023; Salau 2020).

The study on the relationship of income and assets (Chen, Wu, and Jin 2023) found that having higher assets and income was associated with a lower likelihood of households experiencing food insecurity over time. This suggests that having sufficient assets and income is very important for the food security households. The key assets of households are their livestock ownership and total land ownership. These were found to be associated with food security and consumption scores (Abdullah et al. 2019; Feyisa, Haji, and Mirzabaev 2023). Having livestock is known to increase food security (Mango et al. 2014b).

According to the results of the study in South Africa, social grants also have a significant impact on food security. A social grant can significantly affect food security for vulnerable individuals, such as those who struggle to afford nutritious food due to financial limitations. By increasing household earnings, recipients can purchase more variety and quantity of food, which may result in better overall health (Waidler and Devereux 2019).

Another factor that can help to improve a household's food security is the availability of credit. It enables household members to achieve a greater variety of diets (Bidisha et al., 2017). However, the study from Malawi (Salima et al., 2023) found that although formal credit provides households with more secure food supplies, access to informal credit can still worsen their situation.

1.2.7. Effect of remittances on food security

The money sent home by migrants has become an important source of income for developing countries. It can help to improve the living conditions of the receiving country's residents, as well as reduce poverty and improve access to food, healthcare, and education.

A study conducted in Mexico in 2009 revealed that remittances can have a positive impact on food security in the country. It found that they can help to increase household income and allow families to purchase more nutritious and high-quality food (Orrenius & Zavodny, 2009). A similar study was conducted in El Salvador, and it also revealed that remittances can help improve food security by allowing households to purchase more diverse food items (Yang & Martinez, 2006).

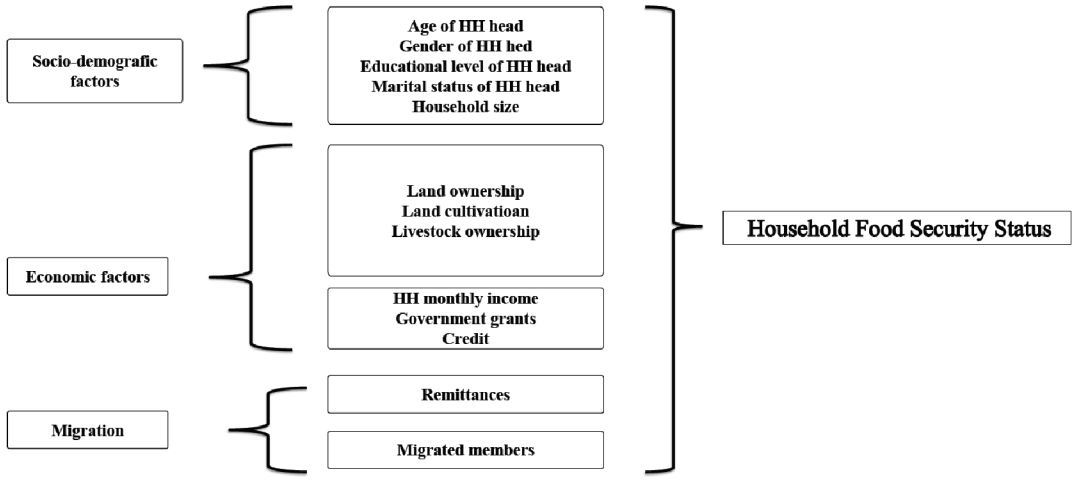
However, remittances can also have negative effects on food security security. Study in Guatemala revealed that the amount of money that migrants send home can increase their reliance on imported food, which can negatively affect the country's agricultural production (Lopez-Cordova & Olmedo, 2006). In Nigeria, a study conducted by Muhammad-Lawal and Suleiman also revealed that the funds sent home can lead to a decline in agricultural output (Suleiman & Muhammad-Lawal, 2014).

Although studies have shown varying effects of remittances on the food security of different countries, one thing is clear: remittances can increase household income and provide families with better nutrition (Matin & Jack, 2015).

1.3. Conceptual framework

Figure 1 illustrates the conceptual framework that was developed based on the literature review and supports the current study. It establishes a structure for understanding the interrelationships among different variables and concepts, and their effect on our research's objectives.

Figure 1: Conceptual framework



2. Aims of the Thesis

The main objective of the thesis is to determine the effect of remittances on the food security status of small farm holders in Kyrgyzstan.

2.1. Specific objectives

1. To determine and analyse the food security status of smallholder farmers in Kyrgyzstan.
2. To determine and analyse factors influencing the food security status of smallholder farmers in Kyrgyzstan.
3. To determine and analyse the effect of remittances on the food security status of smallholder farmers in Kyrgyzstan.

2.2. Research questions

1. What factors affect the food security status of smallholder farmers in Kyrgyzstan?
2. Do the remittances affect the food security status of smallholder farmers in Kyrgyzstan?

2.3. Hypotheses

Hypotheses below were formulated after conducting a thorough literature review and identifying the factors influencing food security.

H1: The gender of the household head has an effect on the food security status of the household.

H2: The age of the household head has an effect on the food security status of the household.

H3: The education level of the household head has an effect on the food security status of the household.

H4: The marital status of the household head has an effect on the food security status of the household.

H5: The household size has an effect on the food security status of the household.

H6: The ownership of agricultural land has an effect on the food security status of the household.

H7: The cultivation of agricultural land has an effect on the food security status of the household.

H8: The ownership of livestock has an effect on the food security status of the household.

H9: The level of household income has an effect on the food security status of the household.

H10: The grants received from the government have an effect on the food security status of the household.

H11: The presence of credit has an effect on the food security status of the household.

H12: The number of people migrated from the household has an effect on the food security status of the household.

H13: Remittances have an effect on the food security status of the household.

3. Methodology

3.1. Target area

The target area of the study is all three regions of the southern part of Kyrgyzstan: Jalal-Abad, Osh and Batken (Figure 1). These regions have experienced migration and food insecurity issues in the past years. According to the WFP, around 16% of the population in this part of the country are considered to be food insecure (WFP, 2021). The issue of migration is also a major concern in the south of Kyrgyzstan, because many people leave to find better economic opportunities in other countries such as Russia and Kazakhstan. According to the IOM (2021), around 200,000 individuals from Kyrgyzstan leave the country each year and most of these individuals are from the southern regions.

The factors that contribute to the development of migration and food insecurity in Kyrgyzstan's southern regions are complex. Some of these include political conflicts, economic issues, and ethnic tensions. Climate change is also contributing to the issue, as it has affected the region's agricultural production (UNDP, 2021).

Figure 2: Target area

Jalalabad region

Located in southern Kyrgyzstan, the Jalalabad region has a population of 1.3 million people (NSCK, 2022). Smallholder farmers play a vital role in the region's agricultural production. According to the FAO (2019), they contribute over 60% of the nation's agricultural output.

Osh region

The southern region of Kyrgyzstan known as Osh has a population of approximately 1.4 million people (NSCK, 2022). It has a diverse economy and is mainly known for its agriculture sector. About 80% of the agricultural land in the Osh region is under cultivation by smallholder farmers, according to the FAO (FAO, 2019).

Batken region

About 558,600 individuals live in the southwestern region of Batken (NSCK, 2022). Agriculture is the main source of income for many households in the area and about 85% of the region's agricultural land is owned by smallholder farmers (FAO, 2019).

3.2. Target group

The study was conducted on smallholder farmers in all three regions of the Southern part of Kyrgyzstan. The target group were household heads. The total number of the respondents surveyed was 337 and one missing case was excluded from the analysis.

3.3. Sampling method

A method called multi-stage sampling was used to choose the respondents who participated in our study:

1. In the first stage, we purposively selected three regions of Kyrgyzstan with high migration rates.
2. Next, we contacted Experts from the Department for Monitoring and Analysis of Reforms within the Department of Political and Economic Research of the Presidential

Administration of the Kyrgyz Republic who helped us by distributing our survey to the heads of the regions' local governments.

3. During the third stage, the regional leaders shared the survey link with the rural area heads via email, requesting them to further distribute it to smallholder farmers.

4. In the final stage, the leaders of these rural areas shared the link to our survey with the smallholder farmers via text messages in rural area community chats. Therefore, there's a possibility of a self-selection bias present in the study.

In total, we collected data from 73 rural areas: 16 rural areas in the Batken region, 21 rural areas in the Jalalabad region, and 36 rural areas in the Osh region. Detailed data, including the names of the rural areas and the number of respondents from each is presented in Table 1.

Table 1: Distribution of respondents by rural areas. Source: data collected by the author.

Batken region		Jalalabad region		Osh region	
Rural area name	**No. of respondents**	**Rural area name**	**No. of respondents**	**Rural area name**	**No. of respondents**
Ak-Say	6	Arimzhan	2	Ak-Kiya	3
Chimgen	6	Blagoveshenka	11	Altyn Bulak	8
Dostuk	6	Jany Diykan	4	Aravan	3
Golbo	10	Jany Jol	4	Birinchi may	5
Kara-Bulak	4	Jany-Aryk	4	Biy-Myrza	7
Katran	3	Jazy-Kechuu	16	Changet	4
Kok-Tash	5	Jenish	6	Chechebay	3
Korgon	3	Kara-Alma	6	Don-Bulak	2
Kulundu	3	Kazarman	10	Ilay-Talaa	2
Leylek	3	Kurulush	5	Jangakty	5
Maksat	13	Kuyo-Tash	2	Jeerenchi	6
Myrza-Patcha	5	Kypchyk-Talaa	6	Jerge-Tal	5
Samat	7	Kyzyl-Kiya	5	Jiyde	2
Sary-Dobo	5	Kyzyl-Say	6	Jylaldy	6
Uch-Korgon	12	Orto-Aziya	4	Kandava	2
Ak-Terek	3	Sabirov	6	Kan-Korgon	1
		Shatmanov	6	Kara-Diykan	1
		Sumsar	7	Kara-Kulzha	8
		Suzak	3	Kara-Suu	2
		Terksay	1	Konduk	6
		Zhunus	1	Kurshab	4
				Kyzyl Oktyabr'	8
				Kyzyl-Diykan	2
				Kyzyl-Too	4
				Kyzyl-Toy	5
				Maymak	2
				Mirza-Ake	3

		Myrza-Ake	4
		Nichke-Suu	4
		Oro	2
		Samat	1
		Sary-Bee	2
		Tash-Bashat	2
		Togotoy	2
		Tokboy-Talaa	1
		Tuyto	1

3.4. Data collection and processing

The data was collected between December 21, 2022, and January 20, 2023.

First, the questionnaire in English was developed. Then the questions were translated in two languages, Kyrgyz and Russian, and two Google Forms surveys in these languages were designed for data collection. The questions were in formats of multiple choice and short answers. The respondents were provided with a link to access the surveys. After data collection, responses on the surveys in both languages were downloaded and inserted into a single Excel file. Further, the collected data was coded and cleaned.

3.5. Data analysis

The data was analysed in the Statistical Package for the Social Sciences (SPSS) which is used by researchers for complex statistical data analysis.

1. First, descriptive statistics were presented for the variables in the study. The analyses were conducted separately for households with migrants and without migrants.
2. Next, Variance Inflation Factor (VIF) was utilized by to analyze the multicollinearity among different independent variables in the models as this can affect the interpretation of the results and the stability of the regression coefficients.
3. To test effect of the independent variables on the food security status, we employed a binary logistic regression analysis, which is a statistical technique that can predict outcomes with two possible categories. This method fits well with our research on the subject of food security.

Since the study has two different items to measure the food security status (FCS and FIES), two binary logistic regression models were performed to analyse how different variables in the study affect the food security status of the households of smallholder farmers. And as we focus on examining the effect of migration and remittances on food security status, the binary logistic regression analysis included only households with migrated members. The presentation of the variables' descriptions used in the analysis can be found in Table 2.

Table 2: Description of variables. Source: data collected by the author.

Variables	**Description**	**Migrant HH (n=130) Mean (SE)**
Depentent variables		
FCS (7 days)	Food Consumption Score (not secure=0, secure=1)	0.59 (0.34)
FIES (12 months)	Food Insecurity Experience Scale (not secure=0, secure=1)	0.44 (0.35)
Indepentent variables		
Gender	Gender of HH head (female=0, male=1)	0.62 (0.04)
Age	Age of HH head	41.43 (0.90)
Marital status	Gender of HH head (not married=0, married=1)	0.87 (0.03)
Highest level of education	Highest education level obtained by HH head (primary=1, secondary=2, university=3)	2.59 (0.05)
Household size	Number of HH members	6.25 (0.19)
Agric land ownership	Ownership of agricultural land by HH (no=0, yes=1)	0.72 (0.04)
Agric land under cultivation	Size of agricultural land cultivated by HH (ha)	1.05 (0.16)
Livestock ownership	Ownership of livestock by HH (no=0, yes=1)	0.59 (0.04)
HH income	Total monthly income of HH in Kyrgyz soms (0-20000=1, 21000-40000=2, 41000-60000=3, 61000-80000=4, 81000-100000=5, 101 000 and above=6)	1.98 (0.12)
	Exchange rates on 22.02.2023 in Kyrgyzstan: 1 USD = 87.34 KGS	

Government grants	Grants received from government in the last 12 months (no=0, yes=1)	0.12 (0.03)
Credit	Presence of credit that has to be paid from remittances (no=0, yes=1)	0.52 (0.04)
Migrated members	Number of people migarted from HH	1.72 (0.09)
Financial remittances	Receive remittances from migrated HH members (no=0, yes=1)	3.49 (0.12)

3.5.1. Dependent variables

The study has two different dependent variables which measured the food security status of the households. These variables are two food security indicators: Food Consumption Score (FCS) and Food Insecurity Experience Scale (FIES).

3.5.1.1. Calculation of Food Consumption Score

FCS is used to measure the extent to which people consume various food groups and represents the food security status over a 7-day period.

Table 3: Questions used to indicate FCS. Source: INDDEX Project (2018).

Food groups consumed in the household during the past 7 days:	How many days you consumed the following food groups during the past 7 days? 0 – was not consumed 1 - one day 2 - two days …. 7 - daily
Carbohydrates (bread, wheat flour products, rice, buckwheat, pasta, potatoes, and other cereals)	
Legumes and nuts or seeds (beans, peas, peanuts, etc)	

Vegetables (carrots, cabbage, tomatoes, cucumber, onion, pepper, etc…)	
Fruits (plumes, apples, etc)	
Meat, egg, fish	
Dairy product except butter (milk, yogurt, cottage, cheese)	
Oils and fats (butter, vegetable oils)	
Sugar and sweets (sugar, honey, jam, candies, cakes, cookies, sweet drinks)	
Spices (salt, garlic, tea, black pepper)	

To collect the data on the frequency of food groups consumption, a brief questionnaire was provided to respondents (Table 3). This information was then employed to calculate the FCS, wherein the numbers of days each food group were consumed were multiplied by their respective weight (Table 4). According to the results of calculation, households were then classified into three categories of food security: 0-21: Poor; 21.5-35: Borderline; >35: Acceptable (INDDEX Project, 2018).

For further analysis, the three categories were grouped into two categories of food security status. Poor and borderline were determined as “food insecure” and represented by 0 in the analysis. And the acceptable category was determined as “food secure” and was represented by 1.

Table 4: Weights of food groups (FCS). Source: INDDEX Project (2018).

Food Group	**Weight**
Main staples	2
Pulses	3
Vegetables	1
Fruit	1
Meat/Fish	4
Milk	4

Sugar	0.5
Oil	0.5

3.5.1.2. Calculation of Food Insecurity Experience Scale

The FIES method measures how effectively households or individuals can obtain the necessary food over a 12-month period. To calculate this indicator, we employed the eight-question survey module from the FIES survey, and responses to the questions had numerical values (FAO, 2018): "no" was calculated as 0, and "yes" was calculated as 1 (Table 5). Summing up these numbers, which varied between 0 and 8, we were able to measure the level of food insecurity of households (FAO, 2018):

- 0 = food secure;
- 1-3 = mildly food insecure;
- 4-6 = moderately food insecure;
- 7-8 = severely food insecure.

Further, to create a binary variable for the regression model, we merged the FIES categories into two. We considered moderately and severely food insecure categories as "food insecure," represented by 0 in the analysis. On the other hand, we grouped food secure and mildly food insecure categories as "secure," represented by 1.

Table 5: Questions used to indicate FIES. Source: FAO (2018).

During the last 12 months was there a time when you or others in your household were worried you would not have enough food to eat because of a lack of money or other resources?	0	No
	1	Yes
Still thinking about the last 12 months, was there a time when you or others in your household were unable to eat healthy and nutritious food because of a lack of money or other resources?	0	No
	1	Yes
During the last 12 months, was there a time when you or others in your household ate only a few kinds of foods because of a lack of money or other resources?	0	No
	1	Yes
During the last 12 months, was there a time when you or others in your household had to skip a meal because there was not enough money or other resources to get food?	0	No
	1	Yes

Still thinking about the last 12 months, was there a time when you or others in your household ate less than you thought you should because of a lack of money or other resources?	0	No
	1	Yes
In the past 12 months, was there a time when your household ran out of food because of a lack of money or other resources?	0	No
	1	Yes
In the past 12 months, was there a time when you or others in your household were hungry but did not eat because of a lack of money or other resources for food?	0	No
	1	Yes
During the last 12 months, was there a time when you or others in your household went without eating for a whole day because of a lack of money or other resources?	0	No
	1	Yes

4. Results

4.1. Descriptive statistics and sample description

4.1.1. Socio-demographic characteristics of households

The socio-demographic characteristics of the respondents are presented in the Table 6. They include gender, age, marital status, level of education of the household head and household size, and were split to migrant and non-migrant households.

Table 6: Socio-demographic characteristics. Source: data collected by the author.

Variables	Description	Migrant HH (n=130) Value	Non-migrant HH (n=206) Value
Gender	Female	38.5%	44.9%
	Male	61.5%	55.1%
Age	Minimum	23	20
	Maximum	63	69
	Mean	41.43	42.35
Marital status	Not married	13.1%	11.2%
	Married	86.9%	88.8%
Level of education	Primary	2.3%	1.5%
	Secondary	36.2%	27.2%
	University	61.5%	71.4%
Household size	Minimum	1	1
	Maximum	15	12
	Mean	6.25	5.68

Gender. The results presented in the table show that the proportion of male-headed households is higher than female-headed in both migrant and non-migrant households. Migrant households have a slightly higher proportion of males (61.5%) compared to non-migrant households (55.1%).

Age. The minimum age of HH head in migrant households is 23 years, while the minimum age in non-migrant households is 20 years. The maximum age of HH head in migrant households is 63 years, and the maximum age in non-migrant households is 69 years. The mean age of HH head in migrant households is 41.63 years, which is slightly lower than the mean age of HH head in non-migrant households (42.35 years).

Marital status. The majority of HH heads in both migrant and non-migrant categories are married. Migrant households have a slightly lower percentage of married HH heads (86.9%) than non-migrant households (88.8%).

Level of education. Migrant households have a lower share of HH heads with university education (61.5%) compared to non-migrant households (71.4%). On the other hand, non-migrant households have a slightly lower proportion of HH heads with secondary education (27.2%) compared to migrant households (36.2%).

Household size. The mean household size is slightly higher in migrant households (6.25 people) compared to non-migrant households (5.68 people). The maximum household size is 15 people in migrant households, while it is 12 people in non-migrant households.

4.1.2. Economic characteristics of households

Table 7 presents findings on monthly household incomes, highlighting differences between migrant and non-migrant households. Among migrant households, 48.5% have 0-20000 KGS monthly income, compared to 42.2% of non-migrant households. 28.5% of migrant households and 39.3% non-migrants fall in the 21000-40000 KGS bracket. Differences become smaller in higher brackets: 12.3% of migrant households and 11.7% of non-migrant households have 41000-60000 KGS monthly income. Overall, non-

migrant households tend to have higher incomes; 39.3% of them reach 21000-40000 KGS in comparison to 28.5% of migrant households.

Table 7: Household monthly income (in shares of households). Source: data collected by the author.

HH total monthly income	Migrant HH (n=130)	Non-migrant HH (n=206)
0-20000	48.5%	42.2%
21000-40000	28.5%	39.3%
41000-60000	12.3%	11.7%
61000-80000	3.8%	3.9%
81000-100000	0.8%	1.5%
101000 and above	6.2%	1.5%

Table 8: Agricultural land ownership (in shares of households). Source: data collected by the author.

Land ownership	Migrant HH (n=130)	Non-migrant HH (n=206)
Do not own land	28.5%	26.2%
Own a land	71.5%	73.8%

Table 8 shows the distribution of agricultural land ownership among non-migrant and migrant households. The percentage of households that own agricultural land is highest among migrant households at 71.5%. On the other hand, only 28.5% of these households do not own land. The findings also show that 73.8% of the non-migrant households own land, which implies that this group also has similar ownership prevalence. On the other hand, 26.2% of such households do not own land.

Table 9: Agricultural land under cultivation (in shares of households). Source: data collected by the author.

Agricultural land under cultivation (ha)	Migrant HH (n=130)	Non-migrant HH (n=206)
Minimum	0.00	0.00
Maximum	12.00	7.00
Mean	1.05	0.91

Table 9 shows the agricultural land that are under cultivation in different households. Migrant households tend to have a larger area of cultivated land than those from non-migrant households, with a maximum area of 12 ha, compared to 7 ha for non-migrant households. Also, the average size of land that is cultivated by migrant households is slightly larger than that of non-migrant households, at 1.05 ha.

Table 10: Livestock ownership (in shares of households). Source: data collected by the author.

Livestock ownership	Migrant HH (n=130)	Non-migrant HH (n=206)
Do not own livestock	40.8%	16.2%
Own livestock	59.2%	83.8%

According to the data in Table 10, 59.2% of migrant households own livestock and around 40.8% of them do not own any livestock. In case non-migrant households, 83.8%, of them own livestock, while the remaining 16.2% do not have any.

Table 11: Government grants received by households. Source: data collected by the author.

Government grants	Migrant HH (n=130)	Non-migrant HH (n=206)
Did not receive	85.4%	90.3%
Received	14.6%	9.7%

Table 11 presents the results on received government grants within the past 12 months and shows that among the migrant households, 14.6% received government grants, while

85.4% did not. Among the non-migrant households, 9.7% received government grants, while 90.3% did not. These results suggest that there is a difference in government grant receipt between migrant and non-migrant households, with a slightly higher proportion of migrant households receiving government grants.

Table 12: Credit presence among migrant households. Source: data collected by the author.

Credit	Migrant HH (n=130)
Do not have credit	47.7%
Have credit	52.3%

The data regarding credit presence was exclusively collected from the dataset of migrant families. This is because the credit-related information was available by analyzing their remittances spendings. The findings in Table 12 show that a significant proportion of them (52.3%) have credit and allocate their remittances to repay it. On the other hand, the remaining 47.7% of them do not have any credit.

4.1.3. Food security status of households

Table 13: Food Consumption Score (share of households) . Source: data collected by the author.

Food security status	Migrant HH (n=130)	Non-migrant HH (n=206)
Food insecure	50.0%	40.8%
Food secure	50.0%	59.2%

Table 13 shows the situation of the food security of the households of smallholder farmers over a period of 7 days. The results of the analysis indicate that the food security of non-migrant and migrant households is similar within a seven-day timeframe.

Table 14: Food Insecurity Experience Scale (share of households). Source: data collected by the author.

Food security status	Migrant HH (n=130)	Non-migrant HH (n=206)
Food insecure	72.3%	56.3%
Food secure	27.7%	43.7%

Table 14 presents the food security status of the households of smallholder farmers throughout the past 12 months. It shows that, among the migrant households, only around 27.7% were secure, while 72.3% experienced food insecurity. On the other hand, in non-migrant households, 56.3% stated that they were secure, while 43.7% were insecure.

4.1.4. Remittances received by households

The data regarding remittances received by households is illustrated in the figures below.

Figure 3: Frequency and types of remittances received by households. Source: data collected by the author.

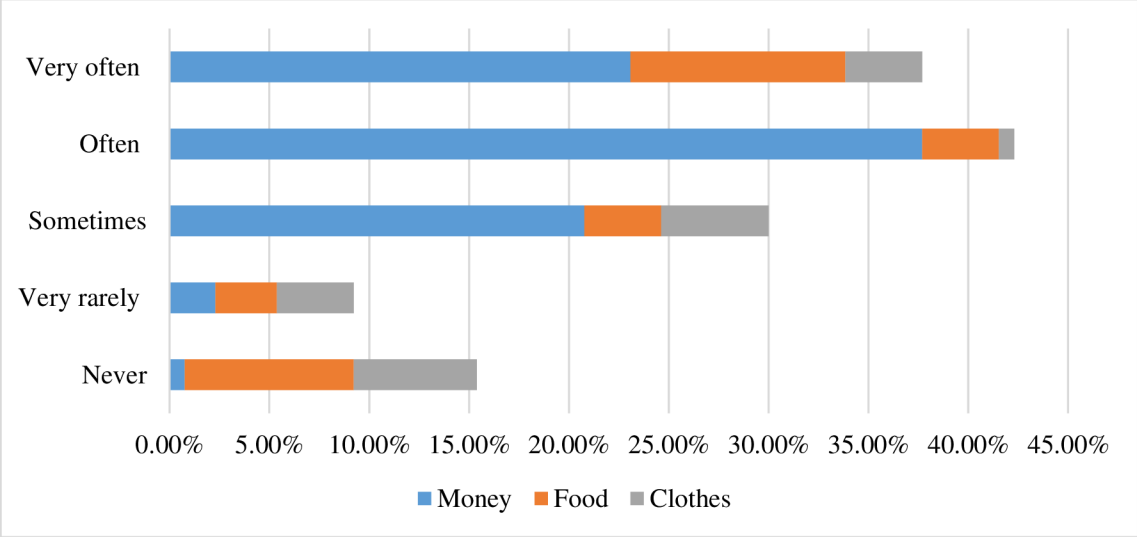


Figure 3 shows the distribution of remittances among migrant households at various frequency levels.

Financial remittances. Around 0.77% of the households did not receive any financial support. About 2.31% of the households receive such remittances very rarely (every few years). Around 20.77% of the households receive financial remittances sometimes (once a year), while 37.69% of them receive them often (several times a year). And 23.08% of the households receive financial remittances very often (once a month).

Food. 8.46% of migrant households never received food from their migrated members. Moreover, 3.08% receive food very rarely (every few years), 3.85% receive it sometimes (once a year), another 3.85% receive it often (several times a year), and the highest portion, 10.77%, receive food very often (once a month).

Clothes. 6.15% of the households never receive clothes from their migrated members. Additionally, 3.85% receive clothes very rarely (every few years), 5.38% receive them sometimes (once a year), 0.77% receive them often (several times a year), and another 3.85% receive clothes very often (once a month).

Figure 4: Allocation of financial remittances by households. Source: data collected by the author.

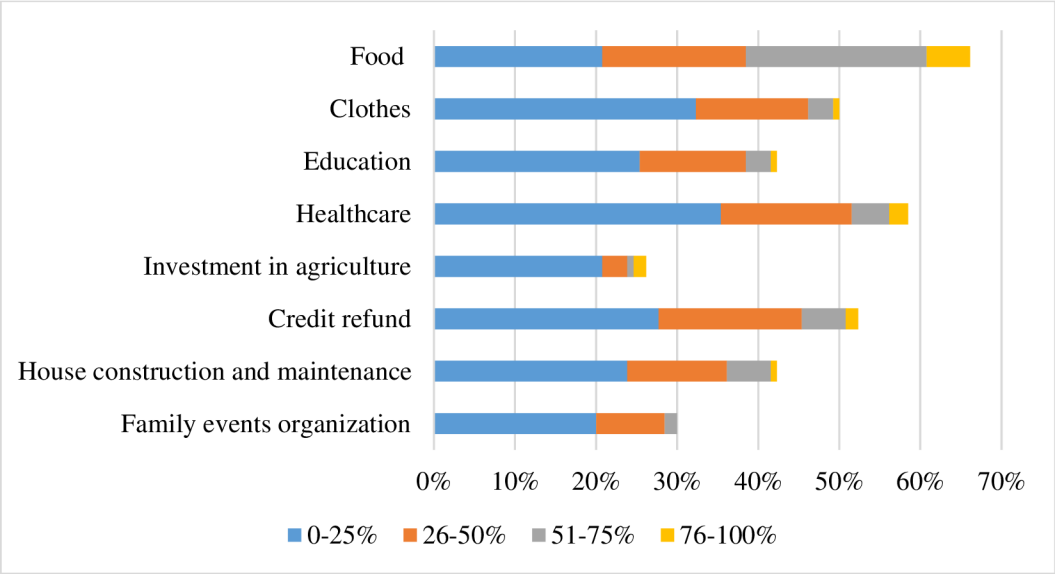


Figure 4 presents the allocation of financial remittances by households across various expenditure categories and gives us a good look at how households use their remittances

in different areas. It shows that families have diverse priorities, from food and clothing to education and healthcare.

Food. About 20.77% of households spend up to a quarter of their remittances to buy food. This tells us that a good number of households really focuses on making sure they have enough to eat. On the other hand, only 5.38% of people spend more than 76% of their remittances for buying food.

Clothes. Around 32.31%, use up to a quarter of their remittances for buying clothes. This shows that quite a few households think clothing is important. But when it comes to spending over 76% on clothing, only a tiny 0.77% of families do that.

Education. About 25.38% of households spend up to a quarter of their remittances on education, which shows that quite a few families try to invest in it. But only 0.77% use spend 76% of their remittances for education.

Healthcare. About 35.38% of households use up to a quarter of their remittances on health-related things. This shows how important is healthcare for many households. However, only 2.31% of people spend more than 76% of their remittances on healthcare.

Investment in agriculture. Not many households spend their remittances on investment in agriculture. Just 20.77% spend up to a quarter on this. Even fewer, only 1.54%, spend over 76% on investment in agriculture.

Lastly, there's a mix of patterns in credit refunding, house construction and maintenance, and family event organization. This tells us that households have different priorities and ways of spending.

4.2. Assessment of Multicollinearity

Table 15 presents Multicollinearity test results obtained by utilizing VIF to analyze the multicollinearity among our independent variables in the models. According to the VIF values which were less than equal to 10 we concluded that no multicollinearity existed in our models, hence we were able to proceed with binary logistic regression analyses.

Table 15: Multicollinearity test results. Source: data collected by the author.

Variable	VIF value	Interpretation
Gender	1.239	Low
Age	1.238	Low
Highest level of education	1.182	Low
Marital status	1.120	Low
Household size	1.223	Low
Land ownership	1.644	Low
Land use	1.349	Low
Livestock production	1.625	Low
HH income	1.339	Low
Grants	1.324	Low
Access to credit	1.266	Low
Migrated members	1.211	Low
Financial remittances	1.230	Low
Dependent Variables: FCS, FIES		

4.3. Effect of remittances on food security

Since our research objectives were analyses of the effect of migration and remittances on the food security status of smallholder farmers in Kyrgyzstan, along with identifying other factors that influence on their food security status, we exclusively employed a binary logistic regression model for households with migrants. Also, according to Figure 1, most of the remittances that are sent to the households of smallholder farmers are in the form of money. Hence, we analyzed the effect of financial remittances on the food security of these households.

Table 16: Effect of remittances on the food security status of households over a period of 7 days (FCS). Source: data collected by the author.

Variables	B	S.E.	Sig.	Exp(B)	Hyposthesis testing
Gender	-.064	.424	.880	.938	H1a Not supported
Age	-.019	.020	.337	.981	H2a Not supported
Level of education	-.438	.377	.246	.646	H3a Not supported
Marital status	.135	.569	.813	1.144	H4a Not supported
Household size	-.052	.093	.576	.949	H5a Not supported

Land ownership	.154	.525	.769	1.167	H6a Not supported
Land under cultivation	-.128	.133	.334	.879	H7a Not supported
Livestock ownership	-.411	.482	.394	.663	H8a Not supported
HH income	.207	.156	.184	1.230	H9a Not supported
Credit	.293	.409	.474	1.341	H10a Not supported
Government grants	**-1.580**	**.708**	**.026**	**.206**	**H11a Supported**
Migrated members	-.020	.205	.923	.980	H12a Not supported
Financial remittances	.024	.156	.876	1.025	H13a Not supported

	Chi-Square	**Sig.**
Omnibus test	10.980	.612

	Sig.
R-square	0.108
P-value	1

Based on the analysis covering a period of 7 days (Table 16), only one factor had a statistically significant impact on the food security status of smallholder farmer households. This statistically significant factor was governmental grants, which showed a negative effect, indicating that households receiving governmental grants were more likely to experience food insecurity. On the other hand, all other factors examined in the analysis were found to have statistically insignificant effects on the food security status of smallholder farmer households within a 7-day timeframe. Marital status, land ownership, household income, financial remittances, and credit showed insignificant positive effects, while factors such as gender, age, level of education, household size, land use, livestock ownership, and the number of migrated members had insignificant negative effects.

Table 17: Effect of remittances on the food security status of households over a period of 12 months (FIES). Source: data collected by the author.

Variables	**B**	**S.E.**	**Sig.**	**Exp(B)**	**Hyposthesis testing**
Gender	.711	.520	.172	2.036	H1b Not supported
Age	**.045**	**.024**	**.060**	**1.046**	**H2b Partially supported**
Level of education	.072	.424	.865	1.074	H3b Not supported
Marital status	-.251	.647	.698	.778	H4b Not supported

Household size	.135	.108	.215	1.144	H5b Not supported
Land ownership	-.175	.617	.777	.839	H6b Not supported
Land under cultivation	-.332	.203	.102	.717	H7b Not supported
Livestock ownership	**1.152**	**.575**	**.045**	**3.166**	**H8b Supported**
HH income	-.102	.200	.611	.903	H9b Not supported
Government grants	.804	.667	.228	2.233	H10b Not supported
Credit	-.506	.501	.312	.603	H11b Not supported
Migrated members	**-.469**	**.277**	**.090**	**.626**	**H12b Partially supported**
Financial remittances	**.594**	**.230**	**.010**	**1.811**	**H13b Supported**

	Chi-Square	**Sig.**
Omnibus test	24.094	.030

	Sig.
R-square	0.244
P-value	0.001

According to the findings presented in Table 17, financial remittances had a statistically significant and positive impact on the food security status of smallholder farmer households in Kyrgyzstan during the previous 12 months.

Furthermore, certain factors, such as livestock ownership and household head age, also showed statistically significant and positive effects on the food security status of smallholder farmer households in Kyrgyzstan over the same period. Specifically, households with an older household head and higher levels of livestock production were observed to be more likely to achieve food security. In opposite, the number of migrated household members had a statistically significant negative effect. Households experiencing a higher level of migration among their members tended to have a lower food security status during the past 12 months.

The results also show that several factors had an insignificantly positive effect on the food security status of smallholder farmer households during the previous 12 months. These factors included gender, level of education, household size, and governmental grants. In opposite, certain other factors, such as marital status, land ownership, land use, household income, and credit, were found to have an insignificantly negative effect on the food security status of these smallholder farmer households during the same period.

5. Discussion

Since we were analyzing the impact of remittances and other factors of interest over different time periods, we were able to identify which factors had effect on the food security status of smallholder farmers within a short timeframe of 7 days, as well as over a longer period of 12 months.

According to the results of the analysis of the factors' influence on the food security status of smallholder farmers over a 12-month period, financial remittances had a significant positive effect. This aligns with the broader context of other similar studies, which demonstrated varying impact of remittances on food security.

Financial remittances can increase the purchasing power of smallholder farmers, enabling them to buy additional food items during periods of scarcity or market fluctuations. The increased access to a diverse and nutritious diet positively impacts the food security status of these households (Lanjouw & Lanjouw, 2001), (Adams & Page, 2005). Furthermore, the findings of a study conducted by Reardon et al. (2003) and Barrett et al. (2001) demonstrated that remittances enable smallholder farmers to broaden their sources of income and decrease their dependence on a single source of income, i.e., agriculture. This, in turn, allows them to better go through tough times, enhance their resilience, and improve their overall food security. However, the outcomes of other studies indicate that financial remittances can also bring negative consequences. According to Gubert et al. (2010) and Munshi (2003) overreliance on remittances could reduce the motivation of some farmers to undertake agricultural activities, decreasing the output of the agricultural sector and raising concerns about food security. In other cases, remittances may not be evenly distributed among household members, which could lead to food and nutrition inequality (Lucas & Stark, 1985). Gender may play a significant role in how remittances are allocated within households (Quisumbing et al., 2014).

Another interesting finding of our study on the impact of financial remittances was that even though our results revealed a notable enhancement in the food security of migrant households in Kyrgyzstan over the previous 12 months, the prevalence of food secure households was significantly higher among non-migrant households at the same time (Table 14). One of the explanations of it might be the data presented in Figure 4 which

indicates that migrant families allocate their remittances to address also other needs and non-food expenses, which may result in insufficient funds for ensuring a satisfactory and nutritious diet. Also, remittances may be sent in an irregular manner or in response to certain events. This irregularity can lead to periods of food insecurity between remittance transfers. The data on frequency of remittances received by migrant households in Kyrgyzstan over the past 12 months is presented in Figure 3.

Other important factors that had a significant positive effect on the food security status of smallholder farmers in Kyrgyzstan over a 12-month period in addition to financial remittances were livestock ownership and age.

According to the results of our analysis having livestock makes migrant households more food secure. Additionally, the positive impact of livestock ownership on food security status could be also supported by linking the data provided in Table 10 and Table 14, indicating that non-migrant households having a larger percentage of food-secure households also have a higher prevalence of livestock ownership. Various similar studies explain why owning livestock helps improve food security. Livestock products are known to contain various nutrients that are crucial for human health. These include vitamins B12, zinc, and iron (Ritchie and Roser, 2020). Also, through the production of livestock, people can have a wider variety of food options. This can help fight malnutrition and improve dietary diversity (Herrero et al., 2020). For millions of pastoralists and smallholder farmers in developing countries, livestock farming provides them with income opportunities that can help improve their food access and reduce poverty (Henderson et al., 2016). But nevertheless, certain research indicates that livestock could also potentially undermine food security. The livestock sector often competes with the production of crops for various resources, such as feed and water. This can lead to reduced agricultural output and land degradation, decreasing the availability of food in the future (Gerber et al., 2013). Also, to produce smaller portions of meat and dairy products, livestock require large quantities of feed. This leads to resource inefficiencies, according to Mottet et al. (2017).

Age appears as also an influential factor that significantly contributed to the positive impact on the food security of smallholder farmers in Kyrgyzstan, as we can see from our

study. This implies that households led by older heads are more likely to achieve food security. FAO (2017) states that young farmers, especially those who are still in their early adulthood, typically face various issues when it comes to farming productivity. These include inadequate training, limited access to equipment, and lack of experience. Also, young farmers may face financial and social obstacles when it comes to accessing modern farming techniques and resources, such as fertilizers and seeds. This can have a significant impact on food security and farm productivity. On the other hand, government support and policies customized to the needs of smallholder farmers can play a crucial role in ensuring food security. Younger farmers may benefit from youth-focused agricultural initiatives, providing them with training, resources, and financial assistance (Davis et al., 2017). Talking about middle-aged farmers, they may have more experience, support through agricultural extension services and better access to credit that they can invest in the resources (Davis et al., 2017). But there are also cases when elderly farmers, who are typically over 60 years old, face unique challenges when it comes to their physical abilities and lack of access to new technologies. This can lead them to lower their productivity and decrease their food production. In addition, they may also face issues with generational succession, which could affect their food security concerns (Van den Berg & Jiggins, 2018). Based on the information provided in Table 6, the age of the heads of smallholder farmers' households in Kyrgyzstan ranged from 20 to 23 years as the minimum, and from 63 to 69 years as the maximum.

Our study also identified a factor that had a significant negative effect on the food security status of smallholder farmers in Kyrgyzstan over a 12-month period. This factor is a number of migrated household members. And despite our results, which indicated a positive effect of migration in the form of financial remittances on the food security of smallholder farmers, a higher number of migrated household members had a detrimental impact on the food security status of household. This finding could be also supported by the data presented in Table 14 which shows that the prevalence of food secure households was higher among households that did not have any migrated members. Other studies on the impact of migration on food security uncovered reasons that may be associated with such a negative effect. The migration of able-bodied individuals from rural areas to cities or other foreign countries for better employment opportunities can lead to a reduction in the labor force in the agricultural sector, which can have a negative impact on food

production and productivity (Black et al., 2011; Martin et al., 2017). The phenomenon of migration also often leads to the emigration of skilled individuals in the agricultural sector such as scientists, researchers, and farmers. This brain drain may impact the adoption of new technologies, the establishment of sustainable practices, and the advancement of agricultural innovation, all of which can potentially threaten the country's long-term food supply (Lowder et al., 2016; Rozelle et al., 2000). Additionally, remittances sent home by relatives working abroad often become one of the primary sources of financial support for families left behind by migrants. Although these can help address immediate needs, they can lead to change in local economies, a reduction in agricultural investments, and a long-term reliance on external resources (Ratha, 2003).

The only factor that exhibited a significant effect on the food security status of smallholder farmers within a shorter timeframe, such as 7 days, was government grants, and the effect was negative. This suggests that households receiving government grants tend to be food insecure. The relationship between government grants and food security was also explored in several similar studies. Numerous studies have demonstrated that government aid, such as food vouchers and cash transfers, can increase the purchasing power low-income families have and can help prevent people from going hungry during times of natural disasters or economic crises. In Bangladesh, a study conducted by Ahmed and Del Ninno (2002) revealed that cash transfer schemes helped improve the food security of recipients. A study conducted in Ethiopia revealed that providing food assistance to vulnerable households helped to prevent starvation and malnutrition (Devereux & Sabates-Wheeler 2004). But some critics believe that giving cash transfers to families in need can discourage able-bodied individuals from participating in the workforce, which could lead to a reduction in economic growth and food production. However, a study conducted in Kenya by Haushofer and Shapiro (2016) did not find evidence of a reduction in labor supply. In certain contexts, food voucher programs can have negative effects on food security by disrupting local markets. And implementing effective voucher programs can help improve food security by minimizing market distortions (Barrett, C. B., et al. 2010).

5.1. Study limitations

Despite the rich insights gained from this study, a limitation that impact the interpretation of the data must be addressed. Such limitation is the unavailability of precise data regarding amounts of financial remittances received by families from their migrant members.

The study's methodology relies on data collected from remittance receipt frequency, categorizing replies depending on the degree of frequency. Responses indicating different frequencies of receiving financial remittances were categorized as receipt of financial remittances. Responses indicating the absence of financial remittance reception, on the other hand, were classified as cases of no reception. While this method provided insight into the occurrence of financial remittance transactions, it did not provide a full assessment of the financial quantity involved.

Moving forward, future research efforts could investigate more thorough approaches, such as integrating frequency data with actual remittance amounts, to provide a more precise picture of migrant members' financial contributions.

6. Conclusion and policy recommendations

6.1. General conclusions

The main objective of our study was to determine the effect of remittances on the food security status of smallholder farmers in Kyrgyzstan. Our results lead us to conclude that financial remittances significantly and positively affected the food security status of smallholder farmer households over a 12-month period. This shows the crucial role of financial inflow from migrated household members in enhancing the farmers' ability to maintain a consistent and sufficient food supply. However, when considering a shorter timeframe, such as 7 days, financial remittances did not have a significant impact on the households' food security status. This observation highlights the effectiveness of assessing the influence of remittances on food security through the food security indicators like FIES, which cover a longer timeframe.

Furthermore, our study aimed to identify other factors influencing the food security status of smallholder farmers in Kyrgyzstan. According to our findings, the study highlights the significant positive influence of factors like age and livestock ownership on food security status over a 12-month period. Nevertheless, our results also revealed a negative impact of the number of migrated household members on the food security status of households within the same period. Additionally, an analysis of factors within a shorter 7-day timeframe revealed a significant negative effect of government grants on the food security status of smallholder farmers in Kyrgyzstan.

6.2. Policy recommendations

According to the results of our study, several policies can be recommended. Those involve implementing measures for remittance facilitation and financial literacy, developing secure remittance transfers, and offering financial education to empower smallholder farmers in managing and investing their funds effectively. To counter the impact of household migration, policies should mitigate migration impact by creating opportunities for seasonal labor migration while ensuring sufficient labor for crucial

agricultural periods. Livestock development initiatives should include veterinary services, animal husbandry trainings, and accessible credit to promote livestock ownership, diversify income sources, and improve overall food security. Acknowledging the value of intergenerational knowledge, efforts should focus on supporting intergenerational knowledge transfer through mentorship programs and knowledge-sharing platforms, preserving traditional practices. To prevent unintended short-term food security consequences, reevaluating governmental grants is essential, involving assessments of fund timing, allocation efficiency, and alignment with broader agricultural strategies.

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Appendices

List of the Appendices:

Appendix 1: Income sources of households

Figure 1: Income sources of non-migrant households. Source: data collected by the author.

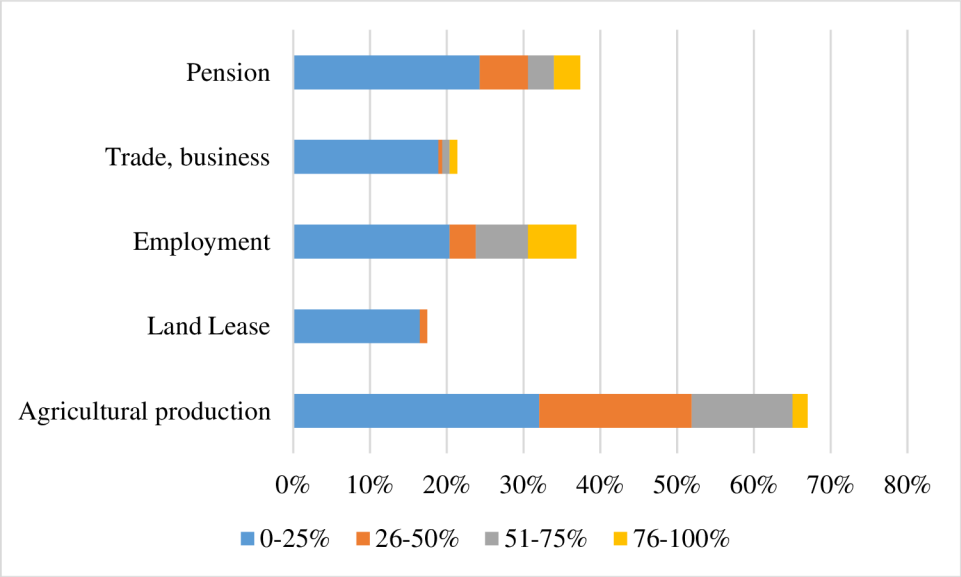

Figure 2: Income sources of migrant households. Source: data collected by the author.