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The Food-Insecurity-Migration Nexus: Investigating Barriers And Boundaries In Pakistan

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Abstract

This research delves into the nuanced relationships characterizing food insecurity and its interconnectedness with migration. Employing the Logistic Regression model to help us enable a more comprehensive analysis and to determine the relationship between migration and food insecurity. In addition to these core variables, the analysis considers the influence of other factors that may moderate the effects of migration. For instance, variables such as province, region, gender, age group, employment, monthly income and reasons for migration respectively. The results show that Provinces with higher food insecurity are associated with increased flow of migration. Results also suggests that these factors evidently contribute significantly to migration trends, rural inhabitants and unemployment exhibits a positive relationship with migration,[1] this implies that higher unemployment rates among rural inhabitants are associated with an elevated likelihood of individuals migrating. Decent income levels exhibit a negative relationship with migration, which suggests that individuals with higher levels of income do not feel the need to migrate, as individuals may perceive better opportunities within their region. This study provides valuable insights for policymakers seeking to formulate effective strategies to address migration and food insecurity in the region.

Keywords: *Migration; Food insecurity; Logistic Regression; Pakistan;*

Introduction

It is a need of time to realize that food insecurity is an issue that has affected millions and billions of people worldwide and will continue to do so in the coming decades. With that in consideration, one cannot overlook how it affects the already vulnerable population of Pakistan. With internal migration seeing new highs in Pakistan, it is very crucial to estimate how it affects food insecurity. There are so many families that are moving in search of better economic opportunities and jobs to find a safe haven for themselves- away from conflict, crimes, natural

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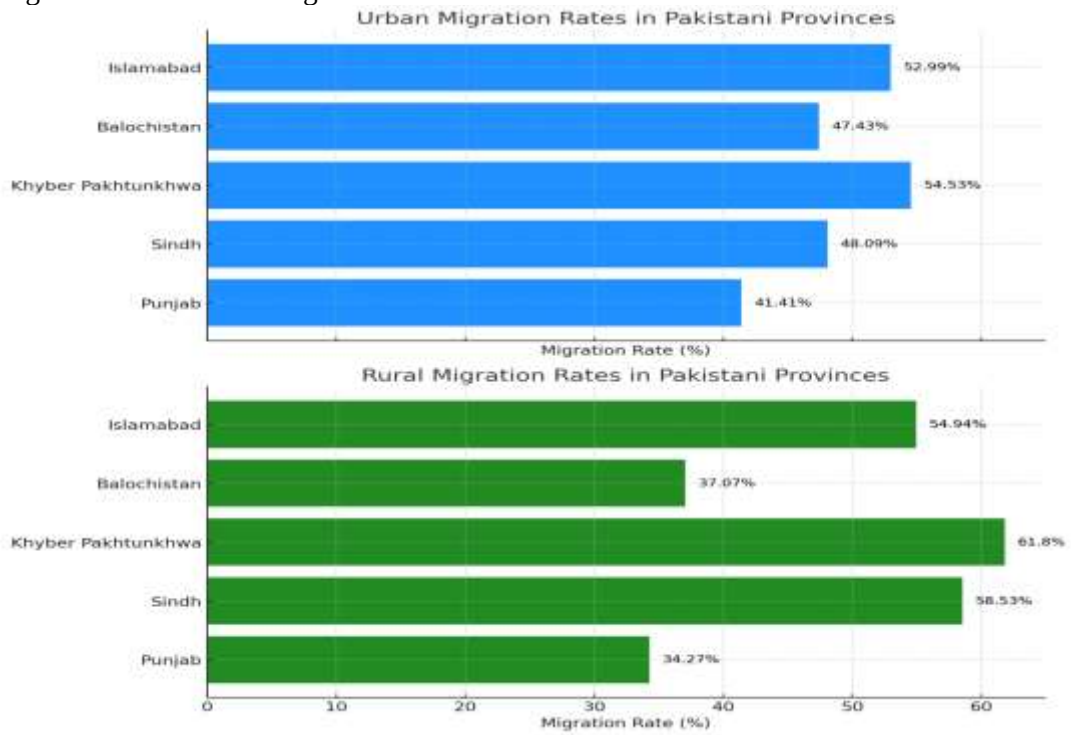
disasters, political unrest, and catastrophes. Families are so driven to move that adapting to a new city, making new social connections, disrupting the previous ones, and experiencing a lack of access to food sounds just like an overthought. That is exactly why we need to understand and gain an understanding of this complex relationship to minimize the effects migrants face due to food insecurity. Migrants encounter many barriers that restrict their ability to obtain education, secure jobs, find suitable housing, access transportation, receive healthcare services, and participate in recreational activities. Furthermore, migrants are usually living in extreme poverty, with a significant number of them residing in low and moderate-income brackets. As a result of the limited prospects available, a significant number of individuals are compelled to stay within the confines of their homes. However, because of a lack of understanding of different cultures and societies, migrants are seldom recognized as valuable contributors to economic progress. Individuals who migrate encompass a highly diverse population, making it challenging to provide a universally accepted description. It is crucial to establish an information bridge that is managed by migrants themselves, as they are the most effective advocates for their concerns. Following the catastrophic floods during the summers of 2022 (mainly in rural Sindh), the number of displaced individuals in the country has significantly multiplied. These concerns need to be resolved at every level. The classification of the migrant population according to several categories of migration reasons reveals that individuals migrating for economic opportunities have the highest proportion, followed by those migrating due to family reunification and environmental disasters. The global concern surrounding migration is growing in significance, including in Pakistan, due to the escalating challenge of food insecurity they are confronting. In addition, migrants face several barriers, including social, and economic limitations, which hinder their ability to access employment, education, and social services.

Figure 1: Urban/Rural Migration Rates in Pakistani Provinces



Source: Pakistan Bureau of Statistics

Above figure 1 illustrates the proportion of individuals who relocated across various provinces in Pakistan, distinguishing between those who migrated to urban regions and those who

migrated to rural regions. The graph illustrates the influx of individuals into urban areas within each province. Federal area i.e. Islamabad exhibits the highest urbanization rate, with around 53% of its population relocating to urban areas. Khyber Pakhtunkhwa and Sindh show a rise in these rates, which is greater than 48%. However, at 41% we have Punjab with the lowest percentage of all.

- As you can see, standing at 62% Khyber Pakhtunkhwa has the highest rate of relocation to rural areas.
- Islamabad has the lowest percentage, approximately 55%.
- Provinces such as Balochistan and Sindh have rates ranging from 34% to 58%.

This research stands at the forefront of addressing a pressing concern in Pakistan—the intricate interplay between migration, and consequential food insecurity. The significance of research lies not only in acknowledging these challenges but also in providing valuable insights that extend beyond academic discourse. This paper aims to address this gap in the literature by providing a critical review of the existing research on food insecurity in Pakistan, with a focus on its nexus with migration. The problem of food insecurity is a significant concern in Pakistan, particularly impacting marginalized groups such as migrants. What we require is an in-depth assessment of migrants as well as their ability to obtain food. This study aims to understand and address this gap in the literature by providing a critical review of the existing research on food insecurity in Pakistan, with a focus on its nexus migration by employing research methods such as Logistic Regression Model- It tells us about a technique that can be utilized to determine the relationship between a dependent variable, such as "migration" in our particular instance, and one independent factor that is food insecurity. The main objectives of this research are to examine the effects of internal migration patterns on local food markets and agricultural output, paying particular attention to areas where migration is common. To identify the specific vulnerabilities and resilience factors that impact the food security status of migrating groups.

Literature Review:

Exploring the intricate link between migration and food insecurity, this literature review takes a closer look at recent research findings that illuminate the challenges faced by migrants with a specific focus on food insecurity in Pakistan. The purpose of the study done by (Kurtenbach et al., 2020) is to get a conceptual understanding of the links that exist between environmental change, violent conflict, and food insecurity as factors that influence migration. This is the goal of the research, and it will be accomplished by undertaking a comprehensive analysis of the literature that elucidates the interaction between these three components on a conceptual level, as well as the material that has been developed for the specific situations of Colombia, Myanmar, and Tanzania. The article by Manrique et al. (2020) talks about the connection between migration and food insecurity. However, the authors emphasize that they know a little about how much the migration patterns are affected by food insecurity to be exact. In order to combat that they draw a general framework of this relationship and used empirical literature to further justify their results. The results concluded with individuals migrating due to food insecurity which was a reason of land grabbing or erosion among many other things. Adding to the discourse, is a study done by Butrica et al. (2022) which adds that there is a positive correlation between food insecurity and migration patterns, meaning that food insecurity and migration move in the same direction. It further suggested that the migrants do not enjoy the same variety of dietary options as compared to non-migrants. It also suggests that migrants encounter more challenges such as trying to build a new home that is well-built and secure in addition to food insecurity. The authors further shed light on how intricate the relationship is between employment, migration and other variables, with a particular emphasis on food insecurity- not to mention, how different consumer requirements can act differently on this kind of relationship. According to the findings of their investigation, it is clear that assets

belonging to the household, such as financial resources, have the potential to act as a protection against the difficulties that are associated with moving. Conversely, Niger State had a notable growth in agricultural land and built-up areas during the same period. Our research, which included a household survey, stakeholders' meetings, and interviews, revealed a consistent and significant trend of individuals, especially young farmers, migrating to cities. As a result, a large portion of agricultural lands are being left uncultivated. This was a result of the decline in agricultural land and the transformation of certain other land use and land cover (LULC) categories into barren land. In summary, if this unregulated permanent migration continues, it would have substantial adverse effects on Nigeria's food security in the future. It is advisable for the government and its subordinate administrative bodies to allocate resources towards improving the infrastructure and creating a more appealing living environment for rural residents. This would help to decrease the rate of migration from rural to urban areas in the studied regions. The findings are connected to the presence of food establishments that provide migrants a variety of unhealthy dietary options to choose from. Needless to say, the phenomenon of worsening migratory patterns and problems need to be taken a closer look at. With that said, the findings from Sambo (2020) conducted a study that confirms the prevalence of migration as a phenomenon that can have varying impacts on the living standards of households in their place of origin, both good and negative. This study provides novel data on the impact of migration on the food security of households that stay behind. Ethiopia is cited as an exemplar due to its significant internal migration rates and acute food scarcity. The estimation technique utilizes a variety of robustness checks and the Heckman two-stage estimate to address the self-selection bias associated with migration. The results indicate that migration has a positive effect on the variety of nutrients consumed, but it negatively affects the amount of calories consumed per person in a household. In general, however, the evidence indicates that migration has a negative effect on the ability of migrant households in Ethiopia to get food. Priority should be given to those households when implementing programs aimed at improving food security in Ethiopia. Moreover, there is another study that was conducted by Choithani (2017) and he argues in his paper that migration should be a part of future study in food policy. It makes sense becasue it looks into how moving within the country as a way to make a living affects food security in rural families. Migration has become an important part of many country families' plans to make a living in developing countries. Finally, there is more and more agreement among researchers and policymakers about how migration might help reduce poverty and promote long-term human growth. Meanwhile, "food security for all" has become a more important slogan as a key economic goal, especially since the global food crisis of 2007–08. Still, academic and official discussions on these two issues have mostly happened separately, with little thought given to how they are connected. The main goal of this study is to fill in the gaps in our knowledge about how relationships work by using survey data from 392 rural families in an area in western Bihar, India. Another article by Park et. al (2020) looks at some of the reasons why migration and food security in poor countries might not be linked. Following that, a poll of Indian families in rural areas is used to find out how people's movements affect their ability to get food at the household level. The study looks at the often-overlooked effect that migrants' money transfers have on the food security of rural families back home. According to the findings, remittances improve household food security by giving households more money to spend and making it easier to invest in agriculture.

There are lot of different articles who have employed data to explore the connection between migration, and food insecurity. Although these studies provide valuable insights, but poses limitations in definitively establishing causality, Similar to this, previously there has not been very comprehensive research on the reasons of migration (except for natural disasters) and how cultural and societal norms merged with rural and urban settings in Pakistan affect the food security, so this study aims to fill that gap, the reason behind this is, studying food insecurity in Pakistan is crucial as it hampers the region's potential for economic growth, Future research

in this field could greatly benefit from the utilization of logistic regression, which will help in enabling a more comprehensive analysis determine the relationship between migration and food insecurity, Therefore, In conclusion, while the current availability of literature helps with a solid groundwork, but there is still room for additional research to enhance our comprehension of the complex situation of food insecurity and its effects on migration in Pakistan.

Data, variables and Methods

The data is taken from PSLM (Pakistan Social and Living Standards Measurement) which happened in year 2019-2020, as it provides crucial insights into the complex relationship between food insecurity and migration. The data that is used in this study was gathered in such a way that individuals from different regions of Pakistan both rural and urban could easily participate through surveys. This is a cross sectional design that happened all across Pakistan at the same time and they divided Pakistan into smaller sections called "Strata." Because of these stratas, the study could take into consideration the individuals that have migrated from one place to another. Mostly from smaller rural areas to larger more urban areas for better growth and opportunity. This is particularly true for individuals from areas experiencing food scarcity either due to unfavorable soil conditions in agriculture-oriented regions or others such as economic difficulties.

Variable Description:

Table 1: Variable, Description and Construction

No.	Variable Labels	Description	Construction	
1	Migration	Dependent Variable	*Rural, Urban	0,1
2	FIES	Key Independent Variable	*No Food Security, Mild FS, Moderate FS, Severe FS	0,1,2,3
	Regional Characteristics:			
3	Province:	Control Variable	*KPK, Punjab, Sindh, Baluchistan	1,2,3,4
4	Region:	Control Variable	*Rural, Urban	1,2
	Head Characteristics:			
5	Gender:	Control Variable	*Male, Female	1,2
6	Age Group:	Control Variable	*Below 21, 21-35, 36-50, 51 and above	1,2,3,4
7	Employment:	Control Variable	*Employer, Paid/Self, Agriculture, Unpaid	1,2,3,4
	Family Characteristics:			
8	Monthly Income:	Control Variable	*No income, below 10000, 10000-30000, 30000-100000,	0,1,2,3,4

			above 100000	
9	Reasons for Migration: 1,2,3,4,5	Control Variable	*Better Economic Opportunities, Family Accompany/Marriage, Law/Disasters, Education, Others	

The model's dependent variable is migration, whereas its independent variable is food insecurity. Control factors, such as gender, employment status, province, geographical area, age group, and income, are illustrative instances used to represent different variables Logistic regression allows us to assess the influence of food insecurity on migration by analyzing the complex interconnections between these factors.

This study utilizes bot statistical methods to comprehensively present the data. Bivariate studies analyze the correlation between food insecurity outcomes and migration, allowing for the detection of any initial associations We utilized a logistic regression model, commonly referred to as the Logit Model, to do a multivariate study in order to acquire a comprehensive understanding of the issue and explore potential factors that could influence the outcomes, Logistic regression is a resilient and direct statistical modeling method that offers excellent insights into the correlation between predictors and binary outcomes. It is an essential tool in this field.

Results and Discussions

The table 2 sum-up the results of logistic regression by giving odd ratios and marginal effects. Table shows the degree to which the probability of the result (migration) increases or decreases when the predictor variable is increased by one unit and all other factors remain same. When it comes to food insecurity, there is a scale that ranges from mild to severe for food insecurity. Each level has a value that is less than 1. For example, the number for "severe food security" is 0.691. So, the odds ratios in some cases are shown are less than 1, which means that higher levels of food insecurity are linked to lower chances of migration. Some people may find this strange, but it could mean that people who are severely hungry don't have the means to move. Statistical Significance: Since the P-values are 0.000, it means we are very sure that this finding is true and not just by chance. The values are greater than 1 for Punjab = 1.792, Sindh = 2.94, and Balochistan = 2.493 which means that people from these places are more likely to move than people from the reference/base region, which is Khyber Pakhtunkhwa, based on the higher odds ratios. This could mean that the economy is getting better or that there are other reasons that are making people want to move. Statistical Significance: The very low P-values (0.000) make us confident that this pattern is accurate and will likely be seen in other similar studies. Value of cities versus rural areas is 2.619 which means that people who live in cities are more likely to move than people who live in rural areas. This may be because people in cities have easier access to resources and income that help people move to ever better places as compared to poor people residing in rural areas with less income. Statistical Significance: The P-value of 0.000 tells us this result is very reliable

Table 2: Logistic Regression Odd ration and Marginal Effects

Migration	**Odd Ratio**	**P-value**	**Marginal effect**	**P>z**

Food Insecurity (No Food Insecurity)	1			
MILD FS	.699***	0.000***	-0.064	0.000
Moderate FS	.642***	0.000***	-0.078	0.000
SEVERE FS	.691***	0.000***	-0.066	0.000
Province (Khyber pak)[B]	1			
Punjab	1.792 ***	0.000***	0.092	0.000
Sindh	2.941 ***	0.000***	0.188	0.000
Balochistan	2.493 ***	0.000***	0.154	0.000
(Rural)[B]	1			
Urban	2.619	0.000	0.176	0.000
Gender (Male)[B]	1			
Female	1.055	0.178	0.010	0.178
Age (Below 21)[B]	1			
21-35	1.109**	.031**	0.018	0.032
36-50	1.181***	.004***	0.030	0.005
51 and above	1.169**	.015**	0.028	0.016
Employment Status: (Employer)[B]	1			
Paid/Self	.628***	0.000***	-0.090	0.000
Agriculture	.425***	0.000***	-0.156	0.000
Unpaid	.639**	.011**	-0.087	0.012
Income (No income)[B]	1			
below 10000	1.297**	.044**	0.042	0.039
10000-30000	1.604***	0.000***	0.080	0.000
30000-100000	2.534***	0.000***	0.171	0.000
Above 100000	4.072***	0.000***	0.247	0.000
Reasons for migration (Better Economic Opportunities)[B]	1			
Family Accompany	1.824***	0	0.104	0.000
Law/Disaster	.902	.482	-0.015	0.473
Education	.701**	.046**	-0.050	0.030
Other	1.765***	0***	0.097	0.000
Constant	.08***	0***	-	- 2.521***

*,**,*** shows significance at 10%, 5% and 1% respectively.

. From the table women (1.055) are a little more likely to move as compared to men (1.000) probably because of factors such as marriage etc. Statistical Significance: The P-value of 0.178 indicates that this finding is likely true, though not as strongly confirmed as some other findings. Values and economic factors, especially money, are linked in a good way. Values go up when income goes up. For example, the number is 2.574 when income is more than 100,000.

It has been found that better incomes are linked to a higher likelihood of moving, which suggests that having enough money is a key factor in being able to move. Statistical Significance: With P-values like 0.044, we can be sure that income really affects whether people decide to move. Employed/self-employed and agricultural jobs have different values. In the case of Agriculture, the number is 4.625. Because the number for agriculture is so important, there is a good chance that agricultural workers will move, possibly because of unstable jobs or seasonal job trends in the agricultural business. Also because of the need for finding better work or escaping poor farming conditions. Statistical Significance: A P-value of 0.000 shows this is a strong and true pattern. People move for a variety of reasons, such as to get a better education, avoid legal trouble, or escape natural disasters. The number for education is 0.701, which is not 1. A value of odds ratio less than 1 for education as a cause of migration means that going to school lowers the chance of moving, which could mean that there are educational opportunities in the area. Which ultimately signifies that if there are good schools around, people prefer to stay put. Statistical Significance: The P-value of 0.046 indicates that this finding is likely true, though not as strongly confirmed as some other findings.

Figure 2: Roc Curve

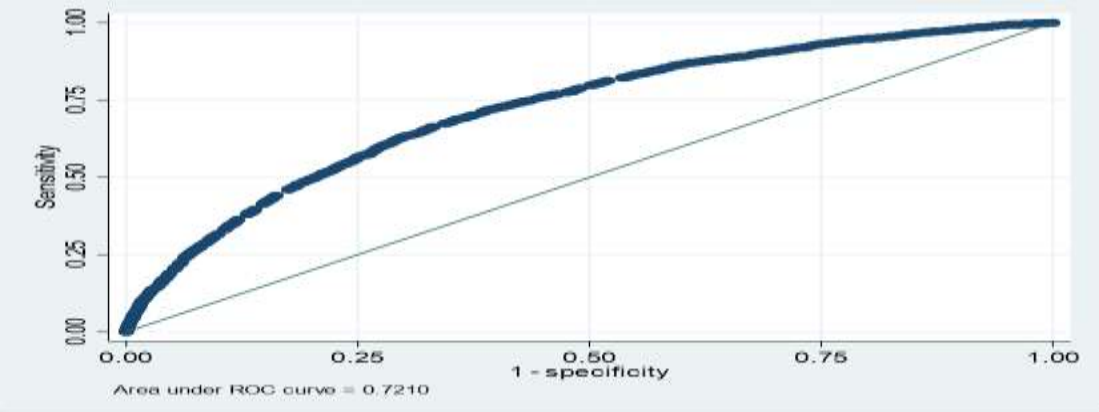


Fig 2: Receiver operating characteristic (ROC) curve test shows prediction powers of the estimated model and its value should be greater than 0.7. The estimated model has the area under the ROC curve fairly greater than 0.7

Conclusion and Policy Implications

Overall, this study revolves around the idea of providing crucial insights into the complex dynamics of 0, migration, and food insecurity, with a specific focus on Pakistan. The empirical evidence drawn from statistical analyses and models provides valuable insights into the interplay of these factors within the regional context, importantly as we observed, a positive correlation was identified between migration and food insecurity, which through the results can be concluded that the more a region is food-secure, the more migrants are going to move there, but that results in them leaving their cities which further exacerbates food insecurity in areas from where people move out- this highlights the importance of the need for targeted interventions, similarly by referencing specific papers and articles relevant to this topic, this study contributes to the growing body of knowledge on Food Insecurity in Pakistan, some other variables were also used in this paper which were gender, employment and age groups. The relationship between gender, employment, age groups, and food insecurity is complex. A strong urge to migrate often correlates with economic opportunities, influencing employment prospects (as individuals seek better opportunities elsewhere), which further exacerbates food insecurity. Moreover, gender plays an important part in food security- by reviewing other studies it was clear that households that are headed by women experienced more food

insecurity. With that kept in mind, variables such as income and employment go hand in hand with migration and food security. If there are fewer opportunities available, people deem it necessary to move out for a better standard of living to earn a good income. So, the higher the income the more food secure that individual would be, so it's very clear that individuals cope with food insecurity by simply migrating. It must be kept in mind that migration causes urban sprawl that ultimately affects food security as well. Therefore, addressing economic diversification, reducing unemployment, ensuring good governance, and enhancing accountability are pivotal in mitigating food insecurity, ultimately shaping the socio-economic landscape of our country.

As Pakistan aims for development, it is only crucial to comprehend and address the factors contributing to food insecurity, this study, with its tailored approach and regional emphasis, lays the groundwork for more research. These interventions can effectively balance economic growth, migration, and food security all across Pakistan. Introducing and increasing food stamp coverage through different programs—especially for migrants—is essential to improving not-so-great outcomes in Pakistan. The supply of targeted assistance to disadvantaged groups, such as those with lower incomes, fewer educational attainments, or those dwelling in rural regions, will be adopted in order to boost the accessibility of food for migrants. This objective will be accomplished by implementing the provision of targeted aid. This is going to be done to significantly improve the condition as a whole. In particular, the execution of projects that are meant to educate individuals about the problem of food insecurity is of the utmost importance to raise awareness, not only among the communities of migrants but also among the general public. To put that into perspective, improved economic prospects have the ability to boost the amount of money that families bring in and to make it easier for a greater number of individuals, particularly women, to consume meals that are high in nutrients. For the purpose of encouraging the implementation of these efforts for the betterment of society, it is also advised that financial incentives or subsidies be made available to help facilitate their implementation. In the case of migrants, it is of the utmost importance to establish stringent monitoring and evaluation procedures in order to investigate and guarantee the effectiveness of food security initiatives. This is the final requirement, but it is certainly not the least important one. However, there are certain limitations that come with these policies- this is easier said than done because it is possible that not all individuals may receive the necessary assistance.

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