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Determinants of Individual Worries on Food Insecurity in Afghanistan

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Abstract

According to the United Nations (UN), more than 30 per cent of the world's population experienced food insecurity moderately or severely in 2020 and Sustainable Development Goal 2 clearly claims to end hunger by 2030. Afghanistan within those regions with severe food insecurity has become prominent as both environmental deterioration due to climate change and ongoing conflict affects this situation twice as much. Using Food Insecurity Experience Scale (FIES-2018) data that was provided by Food and Agriculture Organization of the United Nations (FAO), this paper provides evidence on the determinants of individual worry on having enough food with a sample of 998 individuals through a probit model. Findings reveal that having a college degree significantly reduces the probability of being worried not to have enough food. Further, living in a rural area increases this probability, while being in a richer income quintile and having one more adults in the household decreases it. Empirical evidence of this research suggests a few policy implications. Education should be generalised in the society; and production techniques in the rural areas should be improved to increase the level of production and to save the environment. These efforts might increase the wage level that would help to increase household income to alleviate food insecurity.

Keywords: Afghanistan, Food Insecurity, Individual Worry on Food, Hunger

1. INTRODUCTION

According to Food and Agriculture Organization of the United Nations (URL 1), food insecurity refers to lack of regular access to sufficient nutritious and safe food to maintain normal growth, development, active, and healthy life. Millions of people experience a challenging issue of food insecurity across the globe. FAO statistics show that between 702-828 million people across the world faced hunger in 2021 (URL 2). Fallen crop yield due to low investment in infrastructure and research, climate change, HIV, and water scarcity are crucial factors threatening food security globally (Rosegrant & Cline, 2003). More than 30 per cent of the world's population experienced food insecurity in some degree in 2020 and Sustainable Development Goal 2 clearly states to end hunger by 2030 (URL 3). Considering a large number of people suffering from food insecurity and given timeline, every effort should be made to investigate various aspects of this critical issue.

Food insecurity has widely been discussed by the relevant literature in the case of US. Gundersen & Ziliak (2015) reviews the literature on the association between food insecurity and health outcome. The study highlights the importance of reducing food insecurity to eliminate negative health consequences. As a sub group of society, Cady (2014) investigates food insecurity among college student population in the US. The author emphasizes that food insecurity is likely to be related not only to academic performance but also health and behavioural issues. The Supplemental Nutrition Assistance Program (SNAP) which is the biggest food assistance

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programme in the US aims to mitigate food insecurity (Gundersen et al., 2011). Gundersen et al. (2011) provide suggestions from the literature that SNAP and the National School Lunch Program may reduce food insecurity; there might be negative health consequences of food insecurity; and there exist millions of ineligible but food-insecure Americans for food assistance programme (USDA). USDA establishes a comprehensive set of measures of food insecurity in this country through eighteen questions. Gundersen et al. (2021) examine food insecurity in their county level analysis. The study concludes that food insecurity might be worsen due to a breakdown in the agricultural supply chain following Covid-19 outbreak. Using United States Department of Agriculture six-item module of validated food security and a state-wide population-level survey conducted in Vermont, Niles et al. (2020) assess how Covid-19 affected food insecurity that is related to negative health outcomes among American households. Findings of this study reveal an about one-third increase in food insecurity of Vermont respondent households. Even though there are public assistance programmes, they may not guarantee food security of the society where these programmes are implemented. This crucial problem is addressed by Borjas (2004) in the case of the US. Using data from 1995–99 Annual Demographic Files and the Food Security Supplements of the CPS, the author finds that eligibility restrictions decreased the share of recipient population by ten percentage points and increased the share of food-insecure households by five percentage points. Hence, the study suggests that adverse effects of strict eligible rules should be considered, although they cost relief.

India hosts one fourth of hungry people across the world with more than 190 million undernourished people (FAO, n.d.-b). Therefore, food insecurity is a great concern for this developing country. Radhakrishna (1996) shows that per capital cereal consumption decreased annually by 0.52 per cent in the rural areas and by 0.23 per cent in the urban areas of India from the beginning of 1970's to the beginning of 1990's. Kumar et al. (2014) also investigate food security and its progress over years in the same country. It is highlighted that India made a progress on food security, although it still needs to continue improving. Major concerns in the country are malnutrition in subgroups of the society such as age, income, gender, children (with acute malnutrition of about one-fifth of them), decreasing availability of cereals, decreasing calorie and protein intake, and poor health of women. Food price increases are mentioned to be an important challenge for this country that hits poor households. Rising milk price is seen as a major contributor to rising food prices (Rajeshwaran et al., 2014).

South Asia constituted the second largest share of undernourished people as percentage of the total population between 1999 and 2001 with 22 percent, while country level comparisons reveal that this region consistently has lower values on health, education, and nutrition indicators particularly for women (Ramachandran, 2007). Rajeshwaran (2007) points out that gender inequality in the region contributes to malnutrition and hunger in the region. Therefore, women empowerment is suggested to be a valuable tool to food insecurity problem.

According to the latest records, Afghanistan, Ethiopia, South Sudan, Somalia, and Yemen reveal all-time high level of hunger which is ten times more than five years ago (Anthem, 2022). Given the limit of the scope of this paper, the main focus of this paper is to explore this issue in the case of Afghanistan. Population in Afghanistan is extremely vulnerable to food insecurity, and infrastructure does not provide trustworthy support to food security interventions by the international community (Mittal & Sethi, 2009). The major food security programme in the country is World Food Programme which targets vulnerable women and girls in particular, along with chronically poor and food insecure families, schoolchildren, teachers, illiterate people, tuberculous patients and their families, and internally displaced persons (Mittal & Sethi, 2009).
Kamali et al. (2021) review food insecurity status among Afghan refugees hosted in Iran. Meta-analysis that covers the period from the beginning of 2000 to the end of 2019 shows that prevalence of food insecurity in Afghan refugees was 89 per cent. This problem was more likely for those immigrants with illegal residential status, female headed, and bigger size family. Another

study about Afghan refugees is given by Khakpour et al. (2019) in the case of Karachi/Pakistan where about 1.6 million refugees were hosted. Based on the analysis of 25 in-depth interviews with Afghan refugee households, the study finds that low income, ambiguous immigrant status and living conditions, and the vicious cycle of poverty are considered to be some important barriers to food security for the Afghani people. Interestingly, the length of stay in the host country has not contributed to mitigating this issue.

Deaton and Lipka (2015) provide information on seven developing countries which have the highest level of food insecurity including Afghanistan. It is seen that undernourishment has been prevalent in these countries, and the highest increase in undernourishment has been seen in these countries in the last five years according to the FAO. More than 75% of Afghanistan's population lives in rural areas, about 90% of them lives in poverty, a quarter of GDP come from agricultural product, and about half of the households in the country have agricultural income (World Bank, 2014). As most of the population live in rural areas and receive income from agricultural activities, food security among farmers becomes crucial. Samim et al. (2021) investigate socio economic drivers of food insecurity applying an ordered probit model in which categorical food insecurity measure (i.e., severe food insecurity, moderate food insecurity, mild food insecurity, and food security) is utilised as a dependent variable. Findings of the ordered probit estimation reveal that education level, access to non-agricultural income, dependency ratio, and farm income, farmer organization membership, livestock units, informal credit, flood, farm disease, and war are found to be significant predictors of food insecurity in Afghanistan. According to Oskorouchi & Sousa-Poza (2021), households were adversely affected by floods through a reduction in calorie consumption of approximately 60 kcal per day per adult equivalent, using 2011/2012 Afghanistan National Risk and Vulnerability Assessment (NRVA) survey data.

Rising food prices is a big concern for food insecurity. D'Souza and Jolliffe (2012) investigate if rising wheat prices have any impact on food security of households in Afghanistan with years of political instability, conflict, weak infrastructure, and mountainous terrain. In the empirical investigation in which data from the National Risk and Vulnerability Assessment is used, 20,491 households from 394 districts in all 34 provinces in Afghanistan are utilised. Findings show that urban households and landless rural households chose to make larger reductions in the diversity of their diets. Cutting micronutrient-rich foods because of high food prices is suggested to have negative outcomes such as physical and mental disabilities, maternal and child deaths, and lower productivity. Empirical evidence shows that when staple food price increases, households that suffer from food insecurity forgo quality of food to maintain calories (D'Souza & Jolliffe, 2012a). Dizon et al. (2019) examine the cost of nutritious food in South Asian countries of Sri Lanka, Pakistan, Afghanistan, and Bangladesh using a set of food based on national dietary guidelines. 2011 Living Conditions Survey is utilised for Afghanistan. Findings reveal that 41 per cent of the population in Afghanistan spends less on food than the Cost of a Recommended Diet (CoRD). Moreover, Covid-19 pandemic process is likely to worsen food security in this country, as well as several countries. Afghanistan has faced a rise in food shortages because of its dependence on neighbour countries which resulted difficulty to access daily needs (Islam et al., 2022).

The focus of this paper is important from a few aspects. First, Afghanistan has experienced severe food insecurity issue for years due to climate change that has severely affected the country through heavy drought and lack of water, and ongoing conflicts that obstruct the access of international aid and investments in the region, as well as individual safety. In spite of aforementioned studies in the literature, it is barely known what individual characteristics of worries to have enough food are. As seen, literature tend to focus on food intake or daily calories rather than individuals' subjective position on the worry of having enough food. This study takes advantage of Afghanistan Food Insecurity Experience Scale data where subjective food insecurity measure is available. The performance of subjective measures seems better than objective measures in the examination topics like individual worry as done in this paper. Jahedi & Méndez

(2014) argue that objective data is more preferable if a well-defined concept is to be measured, whilst it may not be that preferable for broadly defined concepts since this type of data overlooks implicit components of the variable of interest. As this paper attempts to shed some light on the concept of individual worry to have enough food which is not a very well-defined concept, author prefers using subjective measure to explain this concept. This preference is not widely used in the relevant literature for this case country, hence, it is expected to provide a useful starting point that might be extended by the future researches. Additionally, this paper provides evidence from an empirical analysis of about a thousand individual observations in 2018. This relatively higher number of individual observations and more up-to-date data than aforementioned studies in the literature on Afghanistan constitute another strength of this paper. Based on this discussion, this paper tests the hypothesis that effects of individuals demographics, socio-economic indicators, and household characteristics on food insecurity security which is far beyond the actual calorie intake or consumption. Therefore, findings of this study is expected to provide important insights that might be useful for policy makers.

The remainder of this paper is categorized as follows. In the second section, the material and methods are developed. In the third section, the findings of the empirical investigation are elaborated. The fourth section presents the conclusions and recommendations of this study.

2. DATA AND METHODOLOGY

In this study, individual level data is used. The data comes from Afghanistan Food Insecurity Experience Scale (FIES-2018) that is provided by FAO upon a request procedure. The sample covers a thousand individual observations. Yet, the final sample consists of 998 individuals since two missing observations were dropped off. Those individuals are 15 years old or older, hence, children below 15 are not included.

Dependent variable, concern over food, is based on a survey question of "*During the last 12 months, was there a time when you were worried you would not have enough food to eat because of a lack of money or other resources?*". This question is responded as yes or no. The distribution of the responses is given in Figure 1 below. According to the figure more than 67 per cent of the sample was worried on not having enough food to eat because of lack of money or other resources. This very high number of people draws attention to investigate determinants of it.

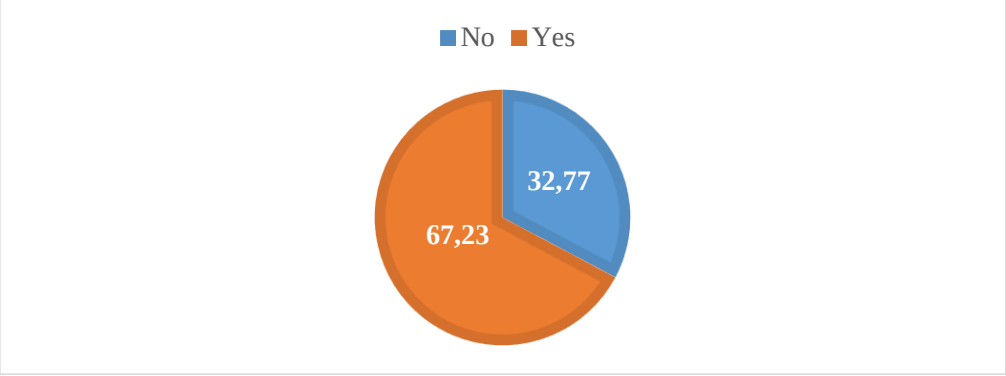

Figure 1. Worried about food, percentage (Author's own calculation based on FIES 2018 data)

Several right-hand side variables (i.e., explanatory variables) are included to predict worries over food that covers demographics (i.e., age, gender), socio-economic indicators (i.e., income quintile,

education), and household characteristics (i.e., area, number of children in the household, number of adults in the household).

Table 1 presents summary statistics of the variables included in the empirical investigation. Summary statistics of the demographics of the sample show that the mean age is 31 which suggests that individuals in the sample are generally young. Gender distribution is balanced, that consists of about 50 per cent of female and 50 percent of male. Findings of the summary statistics of socio-economic indicators indicate that most of the sample has poor educational background. That is to say, 68 per cent of the sample had elementary or less level of education; 28 per cent of them had secondary level of education; and only 3 per cent of them had college level education. Another socio-economic indicator is income level which is given by income quintiles. 26 per cent of the sample population are categorised him/herself in the richest income quintile. Middle and fourth quintiles had 20 per cent each, while 17 per cent and 16 per cent were placed in the second quintile and in the poorest quintile, respectively.

Table 1. Summary statistics of the variables used in the analysis

	Variable	Obs.	Mean	SD.	Min	Max
Worry	Worried you would not have enough food to eat because of lack of money or other resources					
	No	998	0.328	0.470	0	1
	Yes	998	0.672	0.470	0	1
Age		998	31.612	12.422	15	75
Education	Education of the respondent					
	Elementary or less	998	0.682	0.466	0	1
	Secondary	998	0.287	0.452	0	1
	College	998	0.031	0.174	0	1
Area	Residential area					
	Urban/Suburbs	998	0.199	0.400	0	1
	Towns/Rural	998	0.801	0.400	0	1
Gender	Gender of the respondent					
	Male	998	0.501	0.500	0	1
	Female	998	0.499	0.500	0	1
Income	Income quintile					
	Poorest 20%	998	0.161	0.368	0	1
	Second 20%	998	0.172	0.378	0	1
	Middle 20%	998	0.200	0.401	0	1
	Fourth 20%	998	0.200	0.401	0	1
	Richest 20%	998	0.266	0.442	0	1
# of children		998	3.987	2.436	0	10
# of adults		998	6.246	2.489	2	10

Summary statistics of the environmental indicators indicate that sample population commonly lives in rural areas (i.e., 80 per cent). The number of children in the household is hypothesized to increase concerns over food insecurity as it adversely affects wage labour hours and it increases

food needs of household as done in Ratcliffe et al. (2011). In a similar way the number of adults are expected to decrease concerns over food as they are likely to contribute to household income.

In this study, food insecurity is measured through individual worries over food. As mentioned earlier, this variable has two categories (i.e., yes or no). To investigate such binary data, logit or probit framework might be applied. Choosing one of those two approaches is a matter of convenience and which one is more commonly preferred in the literature (Samim et al., 2021). This study chooses probit model as this particular framework is widely used in the literature and it is pretty convenient. Accordingly, following equation is specified:

$$W_i^* = X_i\beta + \varepsilon_i$$

where W_i^* presents individual's worry over food which is coded as "0" if an individual is not worried about not having enough food to eat because of lack of money or other resources, and "1" if otherwise. X_i is a vector of observed explanatory variables (age, gender, income, education level, area, number of children in the household, and number of adults in the household) that are likely to influence worry over food. Finally, ε_i is a mean zero and variance one random error term.
In terms of weighting strategy, FIES (2018) data set provides post-stratification weights in which population statistics are used to weight the data by demographics or socio-economic status. In the empirical analysis, therefore, presented results show weighted coefficients which are important to represent the findings to the population.

3. FINDINGS

Table 2 presents the coefficient estimate from probit model. Because the coefficient of probit estimate does not directly tell the size of the effect of the variables to explain concern over food, post estimated marginal effects are provided to interpret each coefficient. As seen, the table has four columns of specification. Column 1 includes the explanatory variables explained in the data and methodology section. Column 2 includes gender and income interaction as well to control gender-based income differences. Column 3 instead includes gender area interaction to control for if gender is treated differently across areas. Finally, Colum 4 includes area and number of adults in the households to control if wage labour hours differ across areas.

Findings reveal that age of the respondent does not have a significant effect to explain worry over food. Like the other demographics, gender was found to be insignificant. So, there is no gender and age difference to explain this worry across specifications.

Starting from Specification 1, college education which constitutes the highest level of education in the survey categories was found to have a statistically significant association with worry over food. More clearly, having a college degree rather than elementary or less decreases the probability of being worried about not having enough food to eat because of lack of money or other resources by 22 percentage points. This finding implies that a higher level of education alleviates this concern of individuals. The other socio-economic indicator, income level, was also found to be a significant predictor. As expected, being in the fourth and fifth quintiles (i.e., richest) rather than the poorest one significantly lowers the probability of being worried by 11 and 15 percentage points, respectively. Moreover, living in a rural area rather than an urban area increases the probability of being worried by 12 percentage points. Finally, number of adults in the household lowers the probability of being worried over food. So, having one more adult in the household decreases this probability by 1.6 percentage points.

Table 2. Findings of the probit model, marginal effects

Variables	**1**	**2**	**3**	**4**
Age	0.001	0.001	0.001	0.001
	(0.002)	(0.001)	(0.002)	(0.001)
Education of the respondent (Base: Elementary or less)				
Secondary	-0.057	-0.062	-0.058	-0.062
	(0.045)	(0.045)	(0.045)	(0.043)
College	-0.226**	-0.207**	-0.220**	-0.198**
	(0.100)	(0.101)	(0.100)	(0.100)
Residential area (Base: Urban/Suburbs)				
Towns/Rural	0.128***	0.133***	0.125***	0.151***
	(0.048)	(0.048)	(0.048)	(0.046)
Gender of the respondent (Base: Male)				
Female	0.005	0.006	0.007	-0.008
	(0.039)	(0.038)	(0.038)	(0.037)
Income quintile (Base: Poorest 20%)				
Second 20%	0.007	0.004	0.006	0.000
	(0.052)	(0.052)	(0.052)	(0.052)
Middle 20%	-0.049	-0.056	-0.054	-0.053
	(0.057)	(0.057)	(0.057)	(0.055)
Fourth 20%	-0.113*	-0.119**	-0.110*	-0.102*
	(0.060)	(0.060)	(0.060)	(0.058)
Richest 20%	-0.156**	-0.149**	-0.153**	-0.168***
	(0.066)	(0.066)	(0.066)	(0.064)
Children	-0.013	-0.013	-0.013	-0.011
	(0.008)	(0.008)	(0.008)	(0.008)
Adults	-0.016**	-0.015*	-0.015*	
	(0.008)	(0.008)	(0.008)	
Gender and income interaction		Yes		
Area and gender interaction			Yes	
Area and # of adults interaction				Yes
Observations	998	998	998	998
Pseudo-R2	0.0352	0.0410	0.0376	0.0613

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

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percentage points, respectively. Moreover, living in a rural area rather than an urban area increases the probability of being worried by 12 percentage points. Finally, number of adults in the household lowers the probability of being worried over food. So, having one more adult in the household decreases this probability by 1.6 percentage points.

Specification 2 in which gender and income interaction is involved reveals similar to Specification 1 with no interaction is allowed, although magnitudes and significance differ slightly. The rest 2 specifications also present similar findings. However, it should be noted that in Specification 4 where area and the number of adults in the households are allowed to interact, the negative effect observed in the richest income quintile, and positive effect of living in a rural area are at the highest level, while the effect of higher education is lower than the previous specifications. This finding suggests regional income differences matter in this respect.

4. CONCLUSION

Using individual level data from Afghanistan Food Insecurity Experience Scale (FIES-2018) that is provided by FAO, this research provides evidence on the determinants of food insecurity in Afghanistan. Food insecurity is measured via a binary variable of worry (i.e., Worried you would not have enough food to eat because of lack of money or other resources) instead of actual food or calorie intake. Zero hunger goal of UN includes Afghanistan too, along with 192 other countries across the world. As stated by UN , "*..By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round… end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons.*". Therefore, it is seen that food insecurity issue in Afghanistan must be mitigated within a short span of time.

Findings of the probit estimate reveal that having a college degree significantly reduces the probability of being worried about not having enough food. Further, living in a rural area increases this probability, while being in a richer income quintile and having one more adults in the household decreases it. These findings suggest that the reasons behind the worries on not to access enough food are significantly associated with insufficient education level, regional differences, and insufficient income of households.

Based on the empirical findings of this study, a few policy recommendations might be suggested. While doing so, it would be useful to make a distinction between short, medium and long term. Short term interventions should cover direct food aid that could relieve households and alleviate the stress of access to food. This might be organized by local authorities that would probably know what local people need there better. Medium term interventions may cover establishing or improving more international cooperation that could help those who suffer from worries over food. As a result of this cooperation, more sustainable and technology-based agricultural production technics might be adapted. Also, systems like insurance might be developed or improved to protect local producers from several risks. Long term interventions, however, require more substantial measures. One finding of this paper is that education is a strong tool to alleviate food insecurity. Therefore, access to education is very important in this country to increase welfare of individuals in a way of sustainable development. Educational institutions in the country should be supported and generalised within the population. Besides, the progress of the country in this way of development should be tracked, evaluated regularly, and revised based on individuals' or country' needs when necessary.

Moreover, data shows that most of the population lives in rural areas, and living in rural areas increases the probability of worrying on not having enough food. Rural areas are characterised with an agriculture-intensive production. It is necessary to increase household income in these regions. For this purpose, better production techniques must be adopted for both increasing the level of production and reducing the damage in the environment (i.e., future-friendly solutions), along with a better wage level due to the fact that the number of adults as working age population in the household and being in a richer income quintile significantly reduce worry on food.

Even though this study shed some light on the importance and factors affecting concerns over food, it is still worth to mention a couple of limitations of the current research. Firstly, the empirical investigation of this paper is based on data from 2018 only. That means it is unable to see time trend in such a worry over food. However, reliable and continuing individual data availability is not always possible in this field that limits the research. Second, a more variety of explanatory variables (e.g., employment statues, occupation, access to health/education services, access to human rights, and so on) with more individual observations would provide better information on the topic.

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