

# The Status of Household Food and Nutritional Insecurity in Uttar Pradesh, India

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**Abstract:** *Food security in its deepest sense implies sustainable access to a nutritious diet in sufficient quantity by all. Even though enough food exists for all, hunger and malnutrition remain a huge challenge for many. Food insecurity remains a major challenge in improving people's quality of life and well-being. The study intends to address the occurrence of food insecurity issues among households in Uttar Pradesh, the most populated state of India. Food insecurity diverges based on geographical areas. Household food insecurity and the level of awareness regarding nutrition and hygiene are significantly different in four areas of Uttar Pradesh. The present research strongly asserts that household food insecurity significantly differs on the basis of geographical areas. A uniform policy for all areas may not resolve the issue. Therefore, the government must propose a comprehensive food policy to cater to the diverse needs of all for accomplishing household food and nutritional security.*

**Keywords:** Food insecurity, food nutrition, health and hygiene, quality of life

## 1. Introduction

The countries are still encountering the food insecurity issue when only seven years remain for accomplishing Sustainable Development Goals. India has ranked 107 out of 121 countries in Global Hunger Index (GHI) 2022. Its score places it in the 'serious' category. Food security is not only related to producing and accessing the minimum required quantity of food, but it is concerned with desirable nutritional outcomes with stability. Food insecurity reflects when people do not have sustainable physical or economic access to adequate, safe, nutritious, and socially acceptable food for a healthy and productive life. Food insecurity results in poor physical and cognitive development. It affects overall human productivity and pushes them towards poverty and the hunger trap. The paradox of food insecurity is that it comprises all forms of malnutrition including stunting, wasting, micronutrient deficiencies on one side, and overnutrition that results in overweight and obesity.

The State of Food Security and Nutrition in the World (SOFI) Report 2022 highlights that food security further deteriorated in 2021. After remaining relatively unchanged since 2015, the prevalence of undernourishment (PoU) jumped from 8.0 to 9.3 percent from 2019 to 2020 and rose at a slower pace in 2021 to 9.8 percent. Globally in 2020, among children under five years of age 22 percent were stunted, 6.7 percent were wasted and 5.7 were overweight. Furthermore, according to the Ministry of Women and Child Development report, GOI (2020 - 21), approximately 9.2 lakh children in India fall in the category of "Severe Acute Malnutrition-SAM" category.

Health is the basic requirement to maintain long-term productivity, therefore, diet nutrition, an important pillar of food security, has become an issue of discussion among policymakers and researchers. Good health is a sign of productive human capital in a country, thus indicating

economic growth and reduced level of hunger, poverty, and healthcare spending. Investment in good health is a precondition of sustainable national development. But the global efforts to end hunger and poverty and maintain minimum dietary diversity standards seem insufficient. The basic cause behind food insecurity is food unavailability, poor access to food, lack of awareness of food ingredients, nutritional requirements, hygiene, and sanitation. Agrifood systems must be transformed to ensure safe and nutritious food for all sustainably and inclusively.

## 2. Literature Survey

Food security is a multifaceted concept. It does not only include the availability of food items but also mandates adequate nutrition for all (FAO, 2002). Many national and international reports concluded that incidence of diseases and undernutrition exist regardless of concerned household food security status (Chinnakali et al., 2014; Gopichandran et al., 2010; Mukhopadhyay et al., 2010; Agarwal et al., 2009). Hygiene practices and nutritional outcomes are vastly interconnected through a 'sanitation - nutrition nexus' (UNICEF, 2018). Consumption of nutritious food while maintaining adequate hygienic procedures of production and consumption are equally important to maintain good health (Gillespie & Kadiyala, 2012) as food safety and food security are inextricably connected (Mahapatra & Mahanti, 2018; Choithani, 2016). Food gets contaminated due to the improper handling of food while its preparation and consumption (Thompson & Darwish, 2019). Globally, one in every ten people fall ill due to the consumption of contaminated food (WHO, 2020). Moreover, the consumption of unsafe food creates a vicious cycle of disease and malnutrition that majorly affects infants and young children (UNICEF, 2019). The prevalence of diseases borne by the consumption of unhealthy food is higher in low-income and middle-income countries (Jaffee et al., 2019). Food insecurity results in poor health and disease burden; it

extends poverty and triggers educational deficiency thereby causing poor productivity and low income, as a result, it leaves little hope for terminating the endless cycle of malnutrition (Pillay & Kumar, 2018).

### Problem Definition

The present paper describes the status of food and nutritional insecurity among the households of Uttar Pradesh, India. It also throws light on the level of awareness regarding health, nutrition, and hygiene.

### 3. Materials and Methods

**The study area:** Uttar Pradesh is one of the most prosperous, developed, and agriculturally rich regions of India (Sebby, 2010). Moreover, being the most populated state of India (Census 2011), it plays a vital role in the overall food availability for the nation. A vast population of Uttar Pradesh relies on the agricultural sector for their livelihood. Therefore, Uttar Pradesh has been taken purposively for the study.

**Sources of data:** The primary information was collected through the survey method with the help of need - based self - designed questionnaires/schedules.

**Sampling procedure and sample size:** To conduct a comprehensive study, Uttar Pradesh has been divided into two zones – Eastern Uttar Pradesh and Western Uttar Pradesh. Two administrative divisions - Gorakhpur Administrative Division and Agra Administrative Division have been selected randomly from Eastern Uttar Pradesh and Western Uttar Pradesh, respectively. From each Administrative Division, two districts were randomly selected viz. Agra district and Mathura district from the Agra Administrative Division and Gorakhpur district and Deoria district from the Gorakhpur Administrative Division. Considering the gap between the rural and urban households, the samples have been taken from both, separately, on a random basis. The sample size determination was based on the finite population correction factor, and a sample of 400 households was drawn randomly according to the proportion of the size of the stratum.

**Data Analysis:** The Household Food Insecurity Access Scale (HFIAS) is used to estimate the prevalence of food insecurity among households. The scale is a set of nine occurrence questions for a recall period of the past 30 days. It describes the behaviour and attitude of households towards the situation of food inaccessibility as faced by them (Hamilton et al., 1997). The cut - off points on the scale enabled a categorical classification of whether the households are food secure or food insecure. The HFIAS module yields information regarding food insecurity (access) on the four types of indicators, viz.

- Household Food Insecurity Access - related conditions
- Household Food Insecurity Access - related domains
- Household Food Insecurity Access scale score
- Household Food Insecurity Access prevalence

#### List of Indicators (Household Food Insecurity Access Scale)

A - Worry about food

- B - Unable to eat preferred food items
- C - Eat just a few kinds of food
- D - Eat food that they don't want to eat
- E - Eat a smaller meal
- F - Eat fewer meals in a day
- G - No food of any kind in the household
- H - Go to sleep with a hungry stomach
- I - A whole day and night are spent without eating

A four - point Likert scale has been used to know the respondents' level of awareness and precautions taken regarding food nutrition and hygiene in their daily life. (1 - Never, 2 - sometimes, 3 - often, 4 - ever)

#### For testing propositions:

For the testing of the premise, The Kruskal Wallis H test is used. It is a non - parametric statistical tool that is used to test whether the medians of two or more populations are significantly different from each other or not.

### 4. Results

**The status of food and nutritional insecurity:** Table 1 shows the household food insecurity access - related conditions based on HFIAS. It demonstrates the percentage of households that responded affirmatively to each of the nine - occurrence questions, regarding the conditions of insecurity (access) and then the frequency of their respective experiences. Multiple responses were recorded for each of the indicators. Many of the households of eastern rural Uttar Pradesh experienced very critical access - related conditions of food insecurity whereas the condition of households of western urban Uttar Pradesh is relatively better among all four areas.

Household Food Insecurity Access - related domains depicted in **Table 2** reflect the pervasiveness of households' engagement in one or more of the actions illustrated in each of the three domains of HFIAS, which are - anxiety and uncertainty, insufficient quality, and insufficient food intake and its physical consequences. The condition of households of eastern rural Uttar Pradesh was critical among all four areas of Uttar Pradesh in each of the three domains, while households of western urban Uttar Pradesh were comparatively better among all, and the majority of the households in this region can get food in sufficient quantity, at least.

**Table 3** represents the Household Food Insecurity Access scale score. The score ranges from 0 to 27, depending upon the frequency of nine occurrence questions. The higher the score, a household is more likely to experience food insecurity (access) and vice versa. The computed household food insecurity access scale score and ranks based on the score are exhibited in the table. The households of eastern rural Uttar Pradesh scored maximum and were ranked first among all. Importantly, its score (17.44) is more than the overall score of Uttar Pradesh (12.31).

Household Food Insecurity Access prevalence is shown in **Table 4**. This indicator represents a categorical assessment of households and thus, it classifies them into four levels of household food insecurity (access): food secure, mild food

insecure, moderately food insecure, and severely food insecure. Most households of eastern rural Uttar Pradesh were severely food insecure, while many households of both eastern urban Uttar Pradesh and western rural Uttar Pradesh were moderately food insecure. More than 60 percent of households are food secure in western urban Uttar Pradesh.

*The status of nutrition and hygiene awareness:* The effective inclusion and management of food nutrition is a key to good health and sustained well - being. Nutritional welfare is achieved when people have access to a clean and safe environment with adequate caregiving practices that lead to effective food utilization and increase the likelihood of staying healthy in the future times also. The food consumed by an individual must contain specific nutrients that are essential to prevent various diseases and for creating a positive impact on health and cognitive development. Therefore, one must stay aware of the food ingredients and should follow safe food preparation and consumption practices for attaining healthy dietary outcomes. **Table 5** presents the level of awareness of households regarding nutrition and hygiene. The four - point Likert scale was used to quantify the level of awareness. Consuming fresh food, washing hands before and after food consumption, using clean utensils, and drinking clean water are vital routines

that help in avoiding several diseases. Households of western urban Uttar Pradesh were found significantly aware of nutrition and hygiene issues, whereas households of eastern rural Uttar Pradesh were least conscious. Broadly, it can be seen that households of eastern Uttar Pradesh are relatively less conscious than households of western Uttar Pradesh.

The Kruskal - Wallis H test was used to test the hypothesis. The results depicted in **Table 6** indicate that there is enough statistical evidence to conclude a significant difference between the level of awareness regarding nutrition and health, and hygiene and sanitation among the households of all four areas of Uttar Pradesh. Therefore, we reject the null hypothesis.

**Table 7** depicts the pairwise comparison of the four areas of Uttar Pradesh and estimates the significance value (p) of six possible pairs of the sample. The adjusted significance values of highlighted regions are significantly less than the p - value, i. e., 0.05. Therefore, these are the dominant pairs across the matrix because of which the proposed null hypothesis was rejected. Five dominant pairs that substantially steered more arguments regarding nutrition and health awareness than their counterparts were identified.

**Table 1:** Household Food Insecurity Access - related conditions (in percent)

Indicators	Eastern Uttar Pradesh				Western Uttar Pradesh				Uttar Pradesh (Overall)	
	Rural		Urban		Rural		Urban		Yes	Often
	Yes	Often	Yes	Often	Yes	Often	Yes	Often		
A	99.42	91.18	81.25	53.85	83.62	61.86	45.68	35.14	82.50	60.50
B	94.74	70.37	75.00	50.00	75.86	55.68	39.51	34.38	76.50	46.50
C	84.80	60.00	68.75	45.45	75.00	45.45	34.57	17.86	70.50	35.50
D	79.53	57.35	59.38	42.11	65.52	43.42	17.28	14.29	61.25	30.25
E	72.51	55.65	46.88	33.33	51.72	41.67	13.58	18.18	52.50	25.25
F	69.01	50.85	43.75	28.57	43.97	41.18	8.64	14.29	47.50	21.50
G	64.33	43.64	37.50	25.00	37.93	38.64	4.94	00.00	42.50	17.00
H	62.57	39.25	34.38	18.18	35.34	31.71	2.47	00.00	40.25	14.25
I	61.40	34.29	31.25	10.00	33.62	20.51	2.47	00.00	39.00	11.25

Source: Survey

**Table 2:** Household Food Insecurity Access - related domains (in percent)

Domains	Indicator	Eastern Uttar Pradesh		Western Uttar Pradesh		Uttar Pradesh (Overall)
		Rural	Urban	Rural	Urban	
Anxiety	A	91.18	53.85	61.86	35.14	60.50
Insufficient Quality	B	70.37	50.00	55.68	34.38	46.50
	C	60.00	45.45	45.45	17.86	35.50
	D	57.35	42.11	43.42	14.29	30.25
	E	55.65	33.33	41.67	18.18	25.25
Insufficient food intake and its physical consequence	F	50.85	28.57	41.18	14.29	21.50
	G	43.64	25.00	38.64	00.00	17.00
	H	39.25	18.18	31.71	00.00	14.25
	I	34.29	10.00	20.51	00.00	11.25

Source: Survey

**Table 3:** Household Food Insecurity Access scale score

Rank	Area of Uttar Pradesh	Score
First	Eastern Rural	17.44
Second	Western Rural	11.23
Third	Eastern Urban	10.50
Fourth	Western Urban	04.30
<b>Uttar Pradesh (Overall)</b>		<b>12.31</b>

Source: Survey

**Table 4:** Household Food Insecurity Access Prevalence (in percent)

Categories	Eastern Uttar Pradesh		Western Uttar Pradesh		Uttar Pradesh (Overall)
	Rural	Urban	Rural	Urban	
Food secure	5.26	15.63	23.28	61.73	23.50
Mildly food insecure	20.47	28.13	25.00	19.75	22.25
Moderately food insecure	17.54	31.25	34.48	08.64	15.50
Severely food insecure	56.73	25.00	17.24	09.88	38.75

Source: Survey

**Table 5:** Nutrition and hygiene awareness

Components		Mean Scores				
		Eastern Uttar Pradesh		Western Uttar Pradesh		Uttar Pradesh (Overall)
		Rural	Urban	Rural	Urban	
Nutrition and Health	Nutrition of food	1.11	1.38	1.54	3.12	1.66
	Ingredients of food	1.15	1.25	1.78	3.21	1.76
Hygiene and Sanitation	Clean and safe mode of preparation of food	1.06	2.25	2.26	3.25	1.95
	Clean and safe mode of consumption of food	1.98	2.06	2.62	3.51	2.48
	Clean and safe drinking water	1.74	1.88	2.62	3.63	2.39
	Overall cleanliness and hygiene in the surroundings	1.79	1.81	2.47	3.83	2.40

Source: Survey

**Table 6:** Hypotheses analysis regarding nutrition and hygiene awareness

HYPOTHESES TEST SUMMARY					
Null Hypotheses (H <sub>0</sub> )	Test	Kruskal - Wallis H Value	Df	Asymp. Sig.	Decision
There is no significant difference between the level of awareness regarding Nutrition and Health among households of various regions of Uttar Pradesh.	Kruskal - Wallis H Test	228.317 <sup>a</sup>	3	0.000	Reject the null hypothesis.
There is no significant difference between the level of awareness regarding Hygiene and Sanitation among households of various regions of Uttar Pradesh.	Kruskal - Wallis H Test	172.503 <sup>a</sup>	3	0.000	Reject the null hypothesis.

Note: <sup>a</sup> The test statistic is adjusted for ties; df - degrees of freedom  
The significance level is 0.050.

**Table 7:** Pairwise comparisons

Nutrition and Health Awareness					
Sample Pairs	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. <sup>a</sup>
ER - EU	- 28.222	20.518	- 1.375	0.169	1.000
ER - WR	- 104.972	12.947	- 8.108	0.000	0.000
ER - WU	- 213.693	14.680	- 14.557	0.000	0.000
EU - WR	- 76.750	21.270	- 3.608	0.000	0.002
EU - WU	- 185.471	22.367	- 8.292	0.000	0.000
WR - WU	- 108.721	15.714	- 6.919	0.000	0.000
Hygiene and Sanitation Consciousness					
ER - EU	- 34.188	20.397	- 1.676	0.094	0.562
ER - WR	- 82.107	12.871	- 6.379	0.000	0.000
ER - WU	- 188.124	14.594	- 12.891	0.000	0.000
EU - WR	- 47.918	21.145	- 2.266	0.023	0.141
EU - WU	- 153.936	22.236	- 6.923	0.000	0.000
WR - WU	- 106.018	15.622	- 6.787	0.000	0.000

Note: Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same  
a Significance values have been adjusted by the Bonferroni correction for multiple tests.  
ER – Eastern Rural; EU – Eastern Urban; WR – Western Rural; WU – Western Urban

## 5. Discussion

Food and nutrition security is a complex issue that is linked not only to the health and development of human beings but also to the sustainable development of the nation therefore, it is directly or indirectly associated with all United Nations

Development Program’s Sustainable Development Goals (NABARD, 2022). Providing food for survival is not the basic idea behind food security. It has been stated in various reports that diseases and undernutrition prevail regardless of household food security status (Chinnakali et al., 2014; Gopichandran et al., 2010; Mukhopadhyay et al., 2010; Agarwal et al., 2009). Hence, it can be concluded that access to the minimum required quantity of food is not sufficient. Quality of food (nutritional outcomes) and hygiene practices are vastly interconnected through a ‘sanitation - nutrition nexus’ (UNICEF, 2018).

It has been recognized in the present study that despite being the largest food grains - producing state of India (Mishra et al., 2013), Uttar Pradesh is far behind in realizing the mission of removing hunger and malnutrition in all its forms by 2030. A significant section of its population is facing the challenges of food insecurity, intense hunger, and malnutrition. The households of eastern rural Uttar Pradesh are found highly food insecure in all four areas of Uttar Pradesh. They also lag concerning nutrition and hygiene awareness. Many of them have experienced critical food challenges in their life. Healthy and nutritious diets are becoming unaffordable, especially for many rural poor. This finding agrees with the studies by others (Little et al., 2020, NABARD, 2022). Further, by grouping various food indicators it was found that people are suffering from anxiety in resolving food issues. They require high attention

from the government and policymakers to overcome their present conditions.

## 6. Conclusion

However, recent food - related policies and interventions have rarely acknowledged food nutrition as a primary goal or concern (UNHCN, 2016). Even the fundamental estimation of household food security at the national level is based on the data from the National Sample Survey that incorporates only consumer food expenditure and national food grain production (Chandrasekhar et al., 2017; Mahajan et al., 2015). Consumption of nutritious food while maintaining adequate hygienic procedures of production and consumption are equally important to maintain good health (Gillespie & Kadiyala, 2012) as food safety and food security are inextricably connected (Mahapatra & Mahanti, 2018; Choithani, 2016). Thus, to resolve the issues related to food security, the government must give attention to the rural poor. The absurdity of the food systems is best illustrated by the rural poor especially small and marginal farmers, who are primarily responsible for making food available to everyone since they cannot find enough to eat.

## 7. Future Scope

The research can be replicated on an extensive data set covering a wider area beyond Uttar Pradesh. Future research can incorporate anthropometric tools to analyze the magnitude of malnutrition and micronutrient deficiencies among each household member. The robust investigation will help to develop gender - specific and age - related explanations of food insecurity and nutritional status. A longitudinal investigation might be helpful to apprehend the impact of intruding variables that are pertinent in pulling out or pushing the households from/to the food insecurity trap. Thus, an empirical study can be conducted to record the different observations of the same variables over a specific period of time.

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