Coping Mechanism and Factors Contributing to Food Insecurity among Urban Poor in Moradabad, India

Nazim Ali [1] **and Simki Kumari** [2]

[1] Department of Geography, Zakia Afaque Islamia, College, Siwan (Affiliated to Jai Prakash University), Bihar, India
[2] Department of Geography, Zakia Afaque Islamia, College, Siwan (Affiliated to Jai Prakash University), Bihar, India

ARTICLE INFO

ABSTRACT

Objectives: The goal of the current study is to analyze the urban poor's food insecurity and coping mechanisms.

Methodology: As a result, both primary and secondary data are used to support the current research. A well-structured questionnaire was used in a field survey to gather the primary data. The secondary sources include studies, journals, business publications, and published literature. For the current study, FGD has also been conducted to gather further details. The data collecting method has been stratified random sampling. A sophisticated statistical method was used to determine the sampling size for the current investigation (i.e., the Yamane formula, 1967). Furthermore, 396 houses have been chosen based on the sampling size calculation in order to conduct in-person interviews to gather responses. Simple descriptive statistics, such as frequency, percentage, and mean, as well as the coping strategy index (CSI) and FGT food insecurity index have all been employed in the study of the data.

Results: As a result, households experience food insecurity 77.35% of the time, with a depth and severity of food insecurity of 21.45% and 9.42%, respectively. Additionally, food-insecure households consume an average of 1222.93 kcal per day, with a maximum and minimum intake of 1948.15 kcal and 497.70 kcal, respectively.

Conclusion: Furthermore, the findings show that the top five coping strategies used by the households to combat food insecurity and food shortages were reliance on less preferred or less expensive foods, reduction in meal frequency and size per day, food purchases made on credit, and food obtained from family and friends.

1. INTRODUCTION

Food security is a state in which all people always have physical, social, and economic access to safe, sufficient, and nutritious food for living an active and healthy life (World Food Summit, 1996), and/or the option to purchase foods that are socially acceptable is guaranteed (Shakeel, 2021). Globally, agriculture production and food trade play a significant role in the FS idea. Global food production and commerce are major focuses of food policy at the international level, but effective state policy-making must also consider individual and household food security (Maxwell, 1996; 2008). Additionally, food risk, food sustainability, and food vulnerability are all included in the idea of food security (Farison et al. 2011). Food security, in the perspective of Serageldin and Persley (2000), is a complicated issue that encompasses not only production but also access, output but also process, technology but also policy, not just national but also household, rural but also urban, and not just

[1] **Corresponding author:** Nazim Ali, **Email:** nazimamu.geography@gmail.com, **Tell:** +918439514106

the amount but also content. Additionally, there are other indicators of FS, such as sociodemographic and economic data, nutritional information, dietary diversity, and food intake (Hoddinott & Yohannes, 2002; Swindale & Bilinsky, 2006; Shakeel & Shazli, 2020; Bhuyan et al. 2020). Additionally, a key indicator for capturing the dimensions of food insecurity is the household coping mechanisms for the problem (Shariff & Khor, 2008; Deaton & Dreze, 2009; Smith, 2015; Shakeel & Shazli, 2020).

The primary goal of the UNMDGs is to reduce food insecurity in order to ensure FS among households (UNDP, 2000). Despite a huge increase in agricultural production from 2004–2006 to 2017–19, India is ranked second in the world in terms of the number of people who are malnourished and undernourished (FAO et al. 2020). According to estimates, the percentage of households in India that experienced moderate or severe food insecurity was estimated to be around 28% in 2014–16 while rising to almost 32% in 2017-19. Families experiencing food insecurity have become more prevalent, rising from 426.5 million in 2014-16 to 488.6 million in 2017–19. Nearly 22% of

Indian households are estimated to be struggling with food insecurity (FAO et al. 2020). Since food insecurity and hunger are largely a "managed process" in developing and underdeveloped countries, where "people are not passive victims of sudden events but are active participants in responding to the risks they face in their lives," food insecurity is a concern and a significant issue, particularly for these countries (Hashmi and Shakeel, 2012; Shakeel 2018a) (Radimer et al. 1992). Food, both in terms of quantity and quality, is crucial for preserving and fostering sociopolitical stability as well as guaranteeing interpersonal peace. However, due to the high unemployment rate, subpar housing conditions, and provision of subpar services, including education, health, and security, governments are unable to provide basic services to the urban poor or those who live in informal settlements such as slum dwellers, houseless, etc. (Fotso et al., 2008; Datt, et al., 2016; Sani & Kemaw, 2017; Maitra, 2017; Shakeel and Hashmi, 2019; Hashmi and Shakeel, 2012). On the other hand, as shown in Figure 1, there may be a number of reasons why households have poor nutritional status and low food consumption.
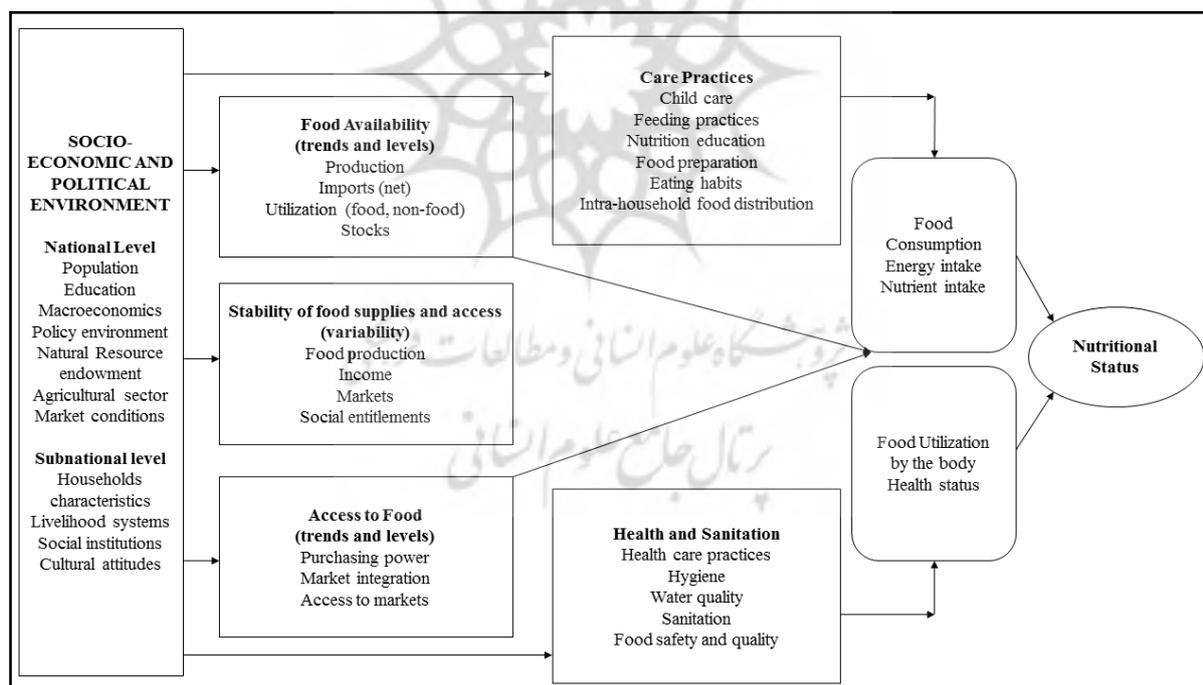
Fig 1. Flow chart of the conceptual framework of possible causes of low food consumption and poor nutrition among the Urban Poor Source: (FAO, 2020)

1.1. A study of the literature

Food Insecurity (FI) is a term that, in general, comes from the underdeveloped countries. About three-fourths of the population came from rural parts of developing nations, with two-thirds coming from Bangladesh, China, Ethiopia, India, Indonesia, Pakistan, and other places (Sani & Kemaw, 2017). Therefore, households use a variety of coping

mechanisms to reduce the risk and impact of HFI. Numerous studies have been conducted to date at the international level to understand the knowledge of families affected by FI (Webb et al. 2006; Idrisa et al., 2008; Pérez-Escamilla et al., 2012; Hadley & Crooks, 2012; Frongillo & Nanama, 2012; Kirkland et al., 2016; Mardiharini et al., 2005; Shimelis & Bogale, 2007; Gundersen, 2008; Motbainor et al. (2016). The

literature on coping mechanisms used by low-income families in India, particularly those living in informal settlements like urban slums, homeless persons, etc., is quite scarce. Gopichanadran et al. (2010), Mukhopadhyay et al. (2010), Mukhopadhyay & Biswas (2011), UHRC (2012), FAO (2015), FAO et al. (2012), Gupta et al. (2013), 2014, Wright & Gupta (2015), Maitra (2017), Coleman-Jensen et al. (2014), Coleman-Jensen (2014), and Coleman-Jensen People in rural India modify their food consumption habits, dietary diversity, income-generating activities, seasonal migration, and asset sales, according to several research (Bushamuka et al., 2005; Mishra, 2007; Banik, 2009; Thorne-Lyman et al., 2010; Keatinge et al., 2011; Khush et al., 2012; Shakeel & Shazli, 2020).

Food coping strategies (FCS) have an easy-to-understand definition. It refers to households that are food insecure, do not have enough food for a livelihood, or are unable to meet their food needs. These households are waiting for circumstances to change in order for them to change their situation, engage in activities to obtain food, change their eating habits, and engage in activities to obtain food (Maxwell, 1996; Eisinger, 1996; Bickel et al., 2000; Heijmens, 2001; Radimer, 2002; Kruger et al., 2008). Severe FI is caused by all of these social, cultural, economic, and environmental issues, which forces households to employ various problem-solving techniques (Maxwell & Cladwell, 2008). During times of food scarcity or instability, households may resort to repeated diets, selling household possessions, consuming less-preferred or less-expensive items, reducing meal size and frequency per day, and other tactics (Gundersen, 2008; Gundersen and Ziliak 2014; Gupta et al. 2015). On the other side, the main non-food-based options used by households for alleviating food scarcity include postponing special holidays, selling items like agricultural equipment and milking cows, migrating, begging, etc., (Quaye, 2008; Amendah et al., 2014; Berlie, 2015; Shakeel & Shazli, 2020). The three distinct categories of household coping behavior identified by Cutler (1986) are as follows. The first adaptive strategy is the sale of livestock. Others include labor migration, self-employment, and credit utilization. Household asset sales are the second factor, followed by the movement of people (Browning & Lusardi, 1996; Snel & Staring, 2001; Dercon, 2002; Edward et al., 2006; Hillbruner & Egan, 2008; Lekprichakul, 2009; Kyaw, 2009; Cervantes-Godoy et al., 2013; Shakeel & Shazli, 2020). Additionally, the socioeconomic situations of those who are from the lower and more backward classes are poor; they lack access to a variety of key household resources and services, which either directly or indirectly contributes to household food insecurity.

Households are prepared to adopt a variety of FCS to resolve this issue. Families with high incomes employed tactics including making use of newer employment, businesses, and technologies. At the same time, disadvantaged households relied mostly on temporary employment and migration for work to nearby locations (Chhetri & Maharjan, 2006). According to Sani and Kemaw's (2019) research, almost half of the selected households were found to be food insecure, and they were using a variety of coping mechanisms, the top three of which were reducing meal sizes, cutting back on daily meal frequency, and working as a day laborer. According to Mota et al. (2019), the proportion of food-insecure households is at its highest among the entire sample of households. In general, these households were unable to meet their food needs in terms of both quantity and quality with the income from agriculture and other activities. Additionally, Olabiyi and Mcintyre (2014) discovered that households with a high family size, renters, single parents, poor education levels, and those who smoke or engage in problem gambling are more likely to experience financial instability. According to Nigatu's (2011) analysis, homes with moderate to severe FI account for around 54% of all the examined households. The homes' greatest and minimal coping mechanisms amid a severe food scarcity were, respectively, a reduction in the quantity and frequency of meals and emigration of the population. According to Farzana et al. (2017), households typically make compromises regarding their food and money, use various coping mechanisms to deal with their FI, and experience mild to severe FI.

1.2. The Objective of the Study

- Examine the dietary diversity of the urban poor in Moradabad City of India.
- Analyze the coping mechanisms used by the urban poor.
- Identify the levels of food insecurity among the urban poor.
- Suggest some corrective actions to end food insecurity among the urban poor.

2. METHODOLOGY

2.1. Study Area

Northern Uttar Pradesh, between 28°48 and 28°52' North latitude and 78°45 and 78°48' East longitude, is where Moradabad is situated (Fig. 2). The majority of the year is warm and sub-humid in the city. It is a municipality, a city, and a commissionaire in the Indian state of Uttar Pradesh's Moradabad district. The city of Moradabad is divided into roughly 340 mohallas and 70 wards on an administrative level. It has a surface area of 75 square kilometers (Nagar Nigam

Moradabad, 2011). Due to the presence of numerous small, medium, and large-scale industries like those producing brassware, leather, bone and horn carving, clothing, carpet, paper and pulp, pharmaceutical and chemical products, printing, menthol oil, cement, building materials, agricultural instruments, animal feed, and coal bricks, it is also known as "Brass City" or "Peetal Nagri" and is one of the oldest industrial townships in North India. In the state of Uttar Pradesh, it is one of the biggest and most populated cities. Due to urbanisation and industrialization, the city's population is growing. The city had a population of 75,082 in 1901, and 887,871 people called it home in 2011. Many social, economic, political, and environmental issues arise in cities as a result of forced migration from rural to urban areas as well as from urban to urban areas. Rural areas provided the great majority of migratory labourers. They moved from the cities' surrounding areas in quest of better and more stable work. However, in the cities, many individuals spend their lives in leased homes, slums, and a small percentage in open spaces. This is because they are too poor, illiterate, and ignorant to find regular or fixed-jobs. They run tea stalls, operate bicycle rickshaws, and work as sporadic labourers. These workers' daily pay is variable and typically based on the number of hours worked; they are not fixed. These workers are willing to sell their labour for pitiful rates, which are less than the government's fixed wages for unorganised labourers, due to the irregularity of work in the cities. These people deal with a variety of social, economic, political, and environmental issues on a daily basis in cities since they are among the most vulnerable or impoverished segments in society. These individuals experience food insecurity as a result of all these variables, or they are unable to meet their nutritional needs and are willing to use alternative coping mechanisms. Based on evidence from other studies, it is determined that these migrants' overall quality of life or living standards, particularly those who are from rural areas, are very pitiful because their homes lack basic amenities and facilities like access to clean drinking water, electricity, good housing conditions, etc. (Ali & Ahmed, 2018; Ali et al., 2020).
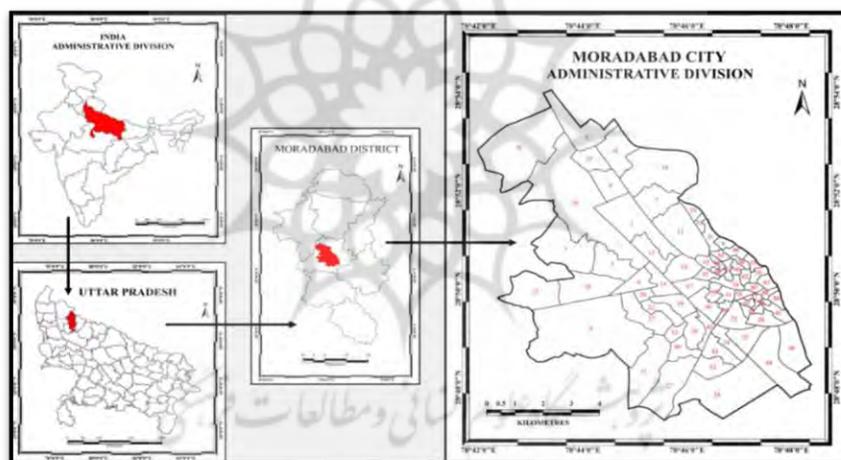
Fig 2. Location Map of the Moradabad City of India.

2.2. Research Design and Sample Size

The current study is based on primary sources of information gathered through thorough household field surveys using the planned approach. In Moradabad city, the field survey was conducted in the months of October, November, and December of 2022. Two individuals were chosen from each location to participate in focused group talks (FGDs). For FGDs, individuals in the age groups of 35 to 55 and over 55 were chosen based on the validity of the data gathered in the study region. People in these age groups are more knowledgeable and experienced when it comes to nutritional diversity. A home within each of the identified districts/wards was chosen for the sample survey after first conducting three pilot surveys to determine areas of concentration of urban poor in all of the city's wards. In order to gather the necessary data on the socio-demographic and economic aspects of the home, food consumption patterns, dietary diversity within the household, and coping mechanisms used to combat the FI, a thorough cross-sectional questionnaire was created. The Yamane formula (Eq. 1) has been applied to determine the sample size of homes (Yamane 1967).

$$n = \frac{N}{1+N(e)^2} \qquad (1)$$

$$n = \frac{4550}{1 + 4550(0.05)^2} = 395.65$$

Where e = maximum variability or margin of error = 5%, N = total estimated household heads, and n = sample size (standard value of 0.05).

There were 4,550 estimated poor households in Moradabad City's 70 wards, of which 396 were randomly chosen for data collection. These households included houseless people and slum dwellers as well as daily wage migrants and non-migrants living in their own homes and in rented homes with their families.

2.3. Data set and methods of data collection

A thorough questionnaire was utilised to gather information on sociodemographic traits, economic conditions, nutritional status or intake of various food items, meal patterns, and various coping mechanisms employed by households in response to FI. Hindi or Urdu, the regional tongue of the study area, was used to ask the questions, and the results were afterward translated into English due to the respondents' inability to grasp English. The 11 coping mechanisms were modified from Maxwell's CSI recommendations. A household has been experiencing a food shortage due to the requirement to choose one coping method at a time (Muche & Esubalew 2015; Abduselam 2017; Drysdale et al., 2019; Shakeel & Shazli, 2020). Additionally, households were asked to recall their three days' worth of food consumption over the previous 24 hours. According to multiple studies, low-income households frequently ate the same things to save money and were unable to maintain balanced meals (Schwabe & Drimie, 2009; Labadarios et al., 2011; Faber & Drimie 2016; Shakeel & Shazli, 2020).

2.4. Techniques for Data Analysis

Frequency and percentage were used as simple descriptive statistics to analyse, quantify, and characterise the data gathered about the urban poor. The FGT food insecurity index was developed to calculate the degree of food insecurity in a family. The household coping strategy index (CSI), on the other hand, was employed to analyse the various coping mechanisms used by sampled households during times of food scarcity.

2.5. Ascertaining dietary status

To determine the dietary status of a household, a collection of questions regarding meals prepared for a given time, usually 24 hours or one day, are asked to migrant labourer households. In order to determine calorie intake/head/day, the 24-HDR (hours dietary recall) approach has been employed (Savy et al., 2005; Ma et al., 2009; Beyene & Muche, 2010; Zemedu & Mesfin, 2014; Gemechu et al. 2016; Shakeel, 2018a; 2018b; 2018c; Shakeel & Shazli, 2020). According to FAO (2015), the 24-HDR approach is the most appropriate one for determining a household's nutritional status. In order to determine the dietary status and food consumption patterns at the household level, the 24-HDR approach was employed in this study.

2.6. On the FGT Food Insecurity Index

The headcount ratio, depth, and severity of food insecurity (FI) at the household level were calculated in the current study using the Foster, Greer, and Thorbecke food insecurity measure (FGT-Food Insecurity Index). Due to its widespread acceptance for the examination of household poverty, this model has already been used to estimate poverty (Foster & Shorrocks, 1991; 1988). While IFPRI has also utilised the FGT model to calculate household FI (Feleke, A. & Bogale, 2009; Girma and Girma, 2012; Gebre, 2012; Ergando and Belete, 2016; Muche et al. 2014; Sani and Kemaw, 2019). The headcount ratio, depth, and severity are the first three indicators of household FI that are calculated using the FGT-food insecurity index. As a result, the food insecurity index from Foster et al. (1984) is provided as (Eq. 2).

$$\text{FGT}(\alpha) = \frac{1}{n}\sum_{i=1}^{q}\left(\frac{c-y_i}{c}\right)^{\alpha} \qquad (2)$$

Where $\text{FGT}(\alpha)$ is FGT- Food Insecurity Index, n express as the frequency of sampled households; y_i is the calculated calorie intake of the ith household; c denotes the cut off between FS and FI; q is the frequency of food-insecure households (FIH); even α is attached weight to the severity of FI.

Concerning the analysis of this index, when α is equal to 0, then the equation reduces to FGT (0) = q/n, i.e., the headcount ratio, and calculates the share of the food insecure households among the sampled households. When giving equal weight to the severity of FI among all FIH is equal to presuming that $\alpha = 1$. Adding a numerator gives the gap of households FI and dividing this by c reveals this number as a percentage. Besides, giving weight to the severity amongst most FIH is equal to supposing that $\alpha > 1$. Therefore, $\alpha = 2$ is the most common approach in households FI. Hence, FGT (0) measures headcount ratio, FGT (1) is represented to the depth of FI among the households, and FGT (2) is the severity of FI in the sampled households.

2.7. Coping Strategy Index (CSI)

Researchers discovered that the calculation of CSI during a time of household food scarcity depends heavily on three factors, including a list of coping behaviours, frequency, and weight of severity (Kruger et al., 2008; Tefera & Tefera, 2014; Farzana et al., 2017; Murakami, 2017; Sarkar & Sarkar, 2017; Saaka et al., 2017; Cordero-Ahiman et al., 2018; Grobler, 2018; Tsegaye et al., 2018; Tsegayet al., 2018; Tsegayet al., 2018; Sani & Kemaw, 2019; Ansah et al.,

2020). To quantify the level of food security, the frequency and weight of severity have been utilised (Abdallah et al., 2013; Tefera & Tefera, 2014; Drysdale et al., 2019; Sani & Kemaw, 2019; Shakeel & Shazli, 2020). To better comprehend respondents' views on food security, a list of coping mechanisms has

been added to the current work. Different coping mechanisms are then selected by households during times of food scarcity. A graphical illustration of the methodology applied in this study is provided in Figure 3.
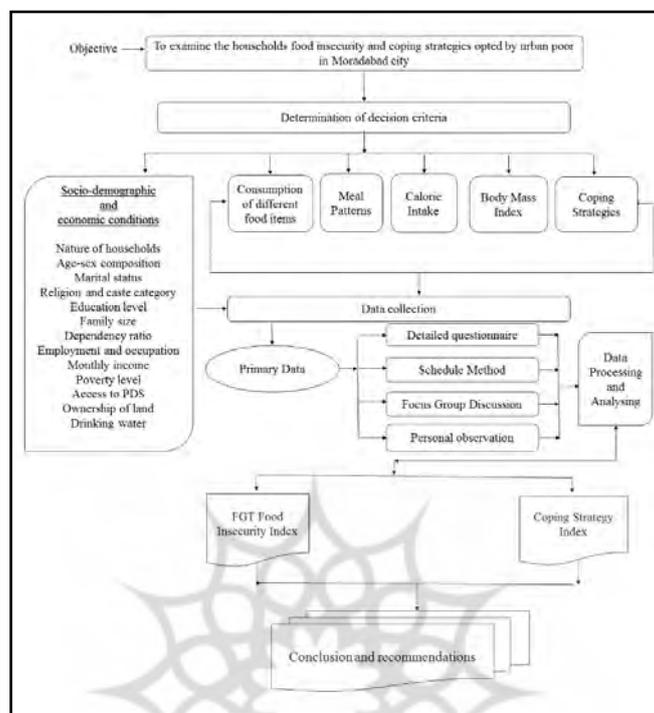
Fig 3. Flow chart showing the details of the methodology applied in the present study

3. RESULTS AND DISCUSSION

3.1. Socioeconomic and demographic features of urban poor

Table 1 lists the socio-demographic and economic traits of the examined households. Of the entire sample households (N = 396), the majority (60.10%) were settlers, while the remaining 39.90% were residents of Moradabad, India. Because the research area is recognized for its brass industries, which employ trained, semi-skilled, and unskilled people, it is discovered that three-fifths of them relocated from other native places in quest of jobs. According to a sex-based examination of the data, the majority of respondents (72.73%) were male. The age range of the household was 21 to 75 years, with more than half (50.76%) falling into the 30 to 40-year age range and only 4.55% falling into the under-30-year category. Married homes made up 79.29% of all households, followed by widowers (9.34%), widows (4.80%), single/never married households (3.79%), and divorced/separated households (2.78%). Approximately 65% of the families belonged to the Hindu religion, and the remaining 35.35% were Muslim. A majority (56.57%) of the sampled households were from other backward classes, while

28.57% belonged to SCs, 11.87% to the general group, and 3.03% came from STs. The study area had a relatively low level of educational attainment, with nearly 56% of household heads being illiterate, 21.21% of households having completed primary school, 11.36% having completed middle school, 6.82% having completed high school, 3.54% having completed senior secondary school, and only 1.26% having completed higher education. The average family size in the sampled houses was 5.65 individuals. A medium-sized family (5-8 individuals) made up approximately 52% of homes, while a small-sized family (5) made up around 35% of households (1-4 family members). Additionally, these households have a somewhat high dependence ratio (DR). In these households, the total dependency ratio (TDR) was 81.53%, while the TDR for children and seniors, respectively, was 75.77% and 6.26%. Families with a high degree of dependency are more susceptible to food instability or scarcity, according to several research. Nearly 69% of people were discovered to be unemployed. Approximately 57% of households in the research region rely on casual labour, while 15.14% conduct domestic work, followed by industries (11.55%), business (2.59%), agriculture and dairy farm-related activities (11.75%), and others (2.19%).

Others included jobs like those performed by rickshaw pullers, ironsmiths, stone cutters, and potters.

Migration is the cause of a higher percentage of households (56.77%) using casual labour.

Table 1. Moradabad: socio-demographic and economic conditions of peasantry households

S. No.	Variable	Frequency	Per cent
A	*Nature of Household*		
1	Native	158	39.90
2	Settler	238	60.10
B	*Sex of Head of Household*		
1	Male	288	72.73
2	Female	108	27.27
C	*Age of Head of Household*		
1	less than 30	18	4.55
2	30-40	201	50.76
3	40-50	119	30.05
4	Above 50	58	14.65
D	*Marital Status*		
1	Married	314	79.29
2	Single/never married	15	3.79
3	Divorce/separated	11	2.78
4	Widow	19	4.80
5	Widower	37	9.34
E	*Religion*		
1	Hindu	256	64.65
2	Muslim	140	35.35
F	*Caste*		
1	General	47	11.87
2	OBCs	224	56.57
3	SCs	113	28.54
4	STs	12	3.03
G	*Education Level of Head of Household*		
1	Uneducated	221	55.81
2	Primary Level (up to 5 School level)	84	21.21
3	Middle School (6-8 School level)	45	11.36
4	High School (9-10 School level)	27	6.82
5	Senior Secondary (11-12 School level)	14	3.54
6	Higher Education	5	1.26
H	*Size of the Family*		
1	Small size (1 to 4 person)	137	34.60
2	Medium Size (5 to 8 person)	207	52.27
3	Large Size (Above 8 person)	52	13.13
4	Average Size of Family	5.65	
I	*Dependency Ratio*		
1	Total Dependency	81.53	
2	Juvenile Dependency	75.27	
3	Senile Dependency	6.26	
J	*Employment status of Households*		
1	Employed	502	22.46
2	Unemployed	1533	68.59
K	*Occupation/main source of livelihood*		
1	Agriculture/dairy farming related works	59	11.75
2	Casual Labour	285	56.77

S. No.	Variable	Frequency	Per cent
3	Domestic Workers	76	15.14
3	Industry	58	11.55
4	Business	13	2.59
5	Others	11	2.19
L	*Income of Households (in Rs/month)*		
1	Below 2500	57	11.35
2	2500-3000	147	29.28
3	3000-3500	140	27.89
4	3500-4000	78	15.54
5	4500-5000	45	8.96
6	Above 5000	35	6.97
M	*Level of Poverty*		
1	BPL Households (Below poverty line)	302	76.26
2	APL Households (Above poverty line)	94	23.74
N	*Access to Public Distribution system*		
1	Yellow card (APL)	132	33.33
2	White card (BPL)	97	24.49
3	Pink card (Antyodaya)	54	13.64
4	No card (without PDS Facility)	113	28.54
O	*BMI of household head (Kg/m^2)*		
1	CED (18.50 and below)	139	35.10
2	Normal (18.50 -24.99)	209	52.78
3	Over weight (25.00-29.99)	37	9.34
4	Obese (30.00 and above)	11	2.78
P	*Ownership of House*		
1	Own House	187	47.22
2	Rented House	119	30.05
3	Slum Dwellers	76	19.19
4	Houseless	14	3.54
Q	*Drinking-Water*		
1	Public handpump	286	72.22
2	Private handpump	34	8.59
3	Public taps	55	13.89
4	Private Taps	21	5.30

Source: (Calculation is based on a primary source of data by author, 2022)

Immigrants from earlier generations frequently use the study area as an attraction. Unskilled or semi-skilled labourers only have jobs because there are numerous small, medium, and large-scale businesses. Regarding the total monthly income from all sources, almost 41% of the households relied on incomes of less than 3000 RS, followed by 43.43% of the houses with incomes of less than 4000 RS, and just 6.97% of the households with incomes of more than 5000 RS. The Rangarajan committee found that 23.74% of households were above the poverty line, while 76.26% of households were living below it. Three-quarters (33.33%) of the houses in the city had yellow cards, while 24.49% had white cards and 13.64% had Antodaya cards. Additionally, 28.54% of the families had no cards at all or were living without any cards. Additionally, 35.10% of households experience chronic energy shortages due to the severity of food insecurity (CED). In addition, roughly 47.22 percent of families who lived in rental housing, slum regions, or without a home expressed fear regarding home ownership. On the other hand, the majority (72.22%) of families obtain their drinking water from public hand pumps.

3.2. Consumption of different food groups

The Indian Council of Medical Research (2011) recommends 420 g/cu for grains, 40 g/cu for pulses, 125 g/cu for vegetables, 150 g/cu for milk, 25 g/cu for meat, 30 g/cu for sugar, and 40 g/cu for fat and oil as the minimum recommended dietary allowances (RDA) for various food categories. Additionally, a number of research have found a positive correlation between rising socioeconomic position and households' good food security (FS) and a diversifying diet (Kennedy et

al., 2011; Shakeel & Shazli, 2020). The distribution of the various foods that households eat is shown in Figure 4. In the research area, roughly 69.0% of families are consuming pulses below the RDA, whereas 46.02% and 69.15% of homes are consuming cereals below the RDA. The statistics make it quite evident that individuals have switched from consuming pulses to grains, such as wheat, rice, and

others (Shakeel & Shazli, 2020). Pulses are not distributed to these individuals through Moradabad's targeted public distribution system (TPDS). The consumption of vegetables in about two-fifths (20.48%) of the sampled households is below the RDA. While milk, meat, sugar, fat, and oil consumption was below the RDA in 52.28%, 17.59%, 11.08%, and 10.60% of households, respectively.
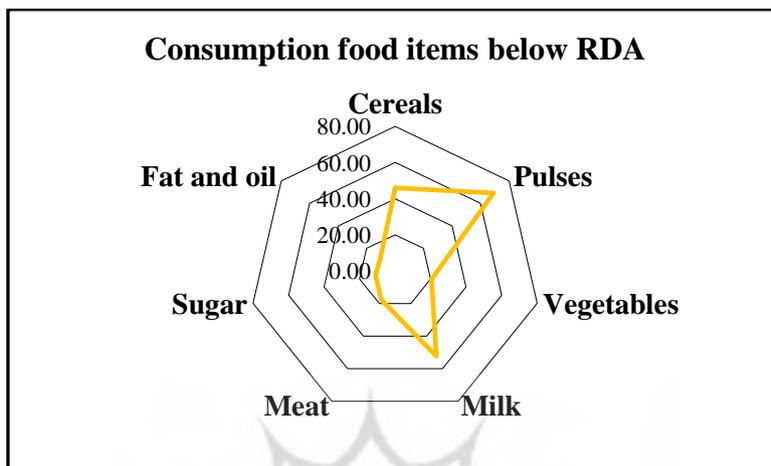
Fig 4. Moradabad: Urban Poors are consuming different Food items below RDA, 2022.

3.3. Food preferences and urban poor

One of the key factors in determining a person's or a household's level of food security is their eating habits. The percentage distribution of meal patterns used by low-income households in Moradabad is shown in Figure 5. It has been noted that 72.04% of households report having brunch between 10:00 and 11:00 am, or a meal typically eaten late in the morning and before lunch. These marginalized or vulnerable groups of society don't prefer to eat breakfast because they

typically rely on daily wage work or petty labour and don't have enough money to eat three meals a day due to poverty, unemployment, low income, and other factors. These people typically live their entire lives in the research area. As a result, they favour brunch straight. Only 19.04% of households have been observed to eat lunch. A large percentage of households eat dinner. It is stated to be 74.46%. This is due to the fact that most of these people obtain their nighttime food needs from charitable organizations.
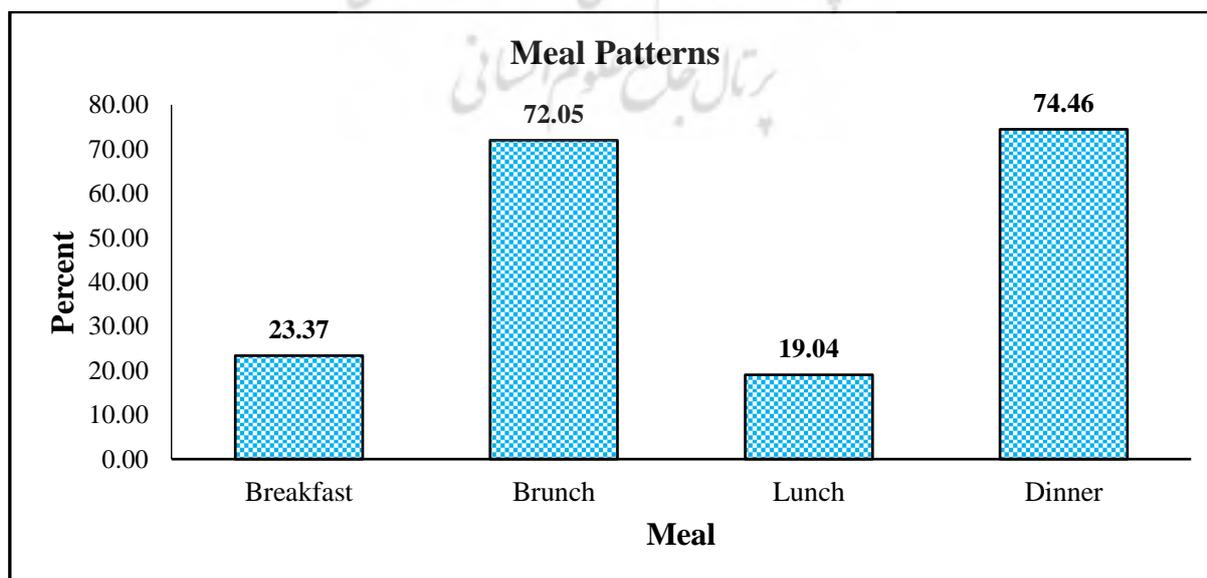
Fig. 5. Moradabad: Urban Poor's meal patterns, 2022.

3.4. Caloric Intake and urban poor

The quantity of energy that is consumed by food and beverages is referred to as caloric intake. It is regarded as a significant factor in determining the degree of household food insecurity (HFI) (Sen, 2005; Patnaik, 2004; 2007; Mittal, 2007; Deaton & Dreze, 2009; Smith, 2015; Bhuyan et al., 2020). As a result, data on how much of various food items were consumed over the course of 24 HDR by the tested homes. Data is collected, converted to calories (kilocalories), and split by the size of the families, which is determined by dividing the energy by the frequency of days. As a result, the total energy consumed by households is converted into calories and compared to the RCI (2100 kcal for an adult). The following equation (Eq. 3) has been employed by several scholar homes to calculate the per-head calorie intake of households (Sen, 2005; Mittal, 2007; Ray, 2008; Bhuyan et al., 2020).

$$C_i = \frac{1}{N_i}\left(\sum_{j=1}^{m} R_j X_{ji}\right) \qquad (3)$$

Where, C_i is a calorie intake of ith households, N_i refers to the size of the households, R_j denotes per unit calorie of jth items of food, and X_{ji} is the amount of jth food items for i^{th} sampled household.

According to the findings, the sampled households' mean daily calorie intake was 1822.92 kcal/head, which is less than the minimum recommended caloric intake per person for an active and healthy lifestyle. In the study area, the household's daily calorie intake ranges from higher to lower, or 3148.19 kcal/head/day and 497.70 kcal/head/day, respectively (see Table 2).

Table 2. Moradabad: peasantry households' calorie intake (Kcal/head/day)

Variable	Food Secure (n = 78)			Food insecure (n = 318)			All (n = 396)		
	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean
Calorie intake (kcal/head/day)	2105.67	3148.14	2626.91	497.70	1948.15	1222.93	497.70	3148.14	1822.92

Source: (Calculation is based on a field survey by author, 2022)

3.5. Body Mass Index (BMI) of urban poor

Body mass index (BMI) is a crucial factor in determining how secure a household's food supply is. Therefore, the BMI of adults and children in the research region was calculated using the following equation (Eq. 4), separately for males and females.

$$BMI = \frac{W}{H^2} \qquad (4)$$

Where w is the weight of a person (in kg), and H refers to the height person in meters square. The BMI of sampled city households is shown in Figure 6. The percentage of adults in the household who have chronic energy deficiency (CED) is 37.02%. According to the study, CED affects females 41.70% more frequently than males (33.84%), respectively. Typically, males dine in front of women in homes; women only consume whatever leftover food from a man's meal, regardless of how much there is. Apart from that, a man always eats when he goes out. CED affects 58.75% of the children. In the research area, there are 59.75% more male children than female children (42.30%). Adults who are overweight or obese make up 5.26% and 0.54% of the population, respectively. Additionally, adult males are more likely than adult females to be overweight or obese. In adult males, it is measured at 5.49% and 0.61%, whereas in adult females, it is 4.93% and 0.45%.
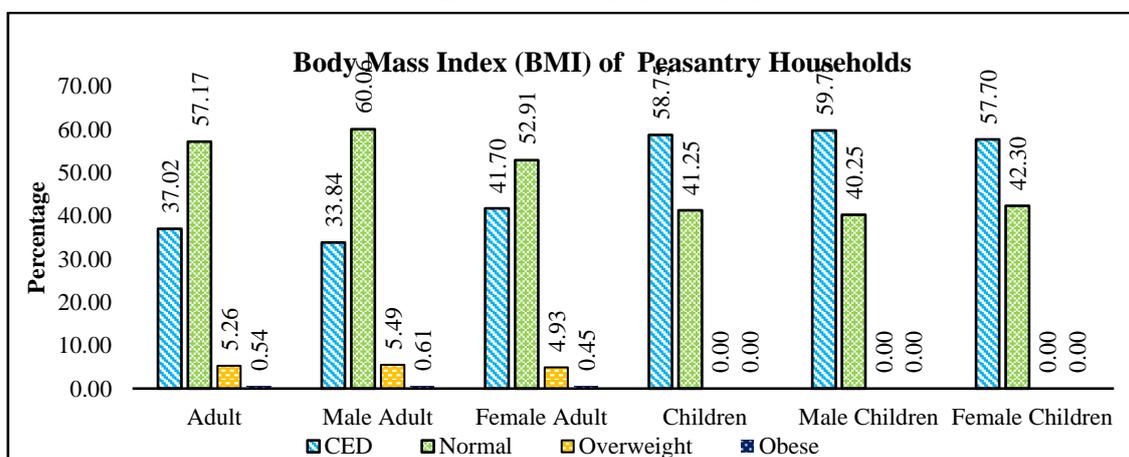
Fig. 6. Moradabad city: Body Mass Index (BMI) of Urban Poor's, 2022.

3.6. The extent of food insecurity and urban poor

In the study area, there are more food-insecure households (FIH) than there are food-secure households. At 77.35% and 22.65%, respectively, it is noted. Since migrant households make up the bulk of the selected households, they typically reside in rural areas. To find better jobs, many moved closer to the cities. However, the employment options for migrant workers are quite poor in urban areas, and these people are willing to labour for very little pay per hour. In order to make ends meet, migrant workers, families living in rented housing, residents of slums, and those who are homeless typically engage in menial labour such as rag picking, cycle rickshaw pulling, beggaring, scavenging, street vending, working at the labour market, being a maid, or working in roadside tea shops or hotels. Because of this, they are unable to meet their basic needs, such as having a healthy diet, and are forced to develop various coping mechanisms. The proportion of slightly and severely FIH is 16.87% and 38.31%, respectively, while the share of moderately FIH is 22.17%. (See Figure 7).
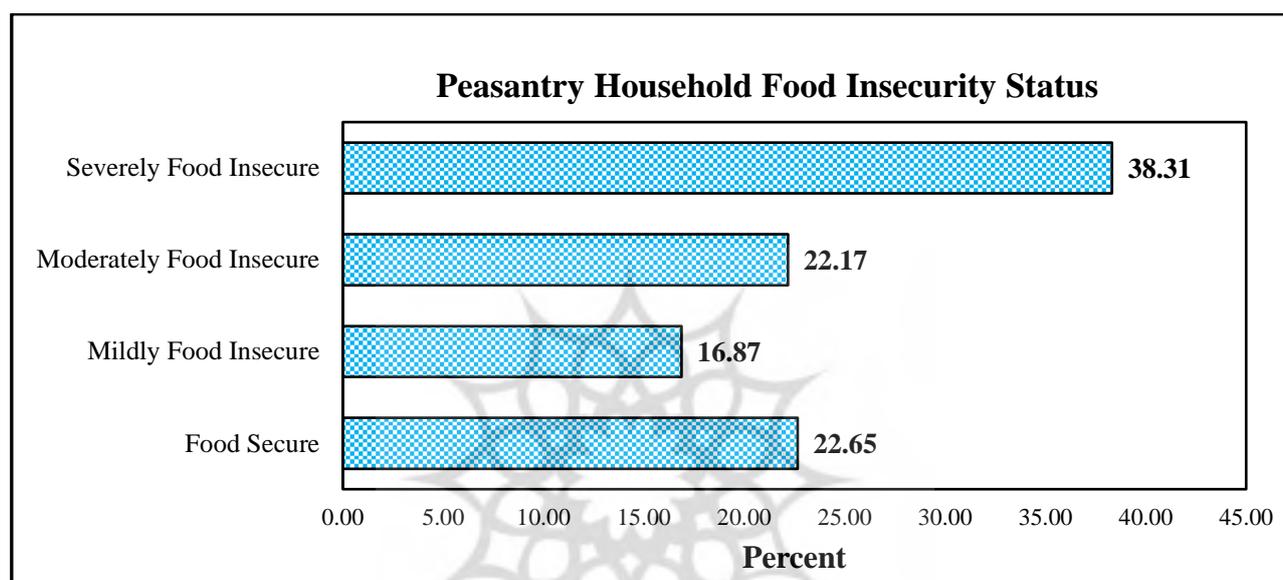
Fig. 7. Moradabad: Urban Poor's food insecurity status according to the household's dietary status, 2022.

The FGT Food Insecurity Model is additionally utilised to assess the degree of FI (i.e., headcount ratio, depth, and severity) among the sampled households. The results show that the headcount ratio (= 0) is 77.35%, indicating that the majority of sampled households actually experience food insecurity and are unable to obtain the recommended daily caloric intake (RCI) for survival. The study also shows that the depth of FI (= 1) is 21.45%, which means that each household with food insecurity needs 21.45% of the recommended daily intake (RCI) of food to solve the issue. Additionally, in the study area, 9.42% of households had FI that was severe (= 2) in some way (see Table 3).

Table 3. Moradabad: calculation of peasantry households' extent of food insecurity

FGT measures	Per cent
Headcount ratio [a] ($\alpha = 0$)	77.35
Depth of food insecurity [b] ($\alpha = 1$)	21.45
Severity of food insecurity [b] ($\alpha = 2$)	9.42

Source: (Calculation is based on a field survey by the author, 2022)
where α indicates estimation from the total sample (396) and b shows a measure from food insecure (318) households

3.7. Coping strategies of the urban poor

Because they live day to day owing to low daily wages and irregular labour, it has been discovered that the most common coping strategy (CS) used by sampled households is "decrease the frequency of meals," which is recorded at 94.19% (see Table 4). According to several research, relying on less expensive and less desired items is the most popular CS among households experiencing food insecurity (Dore et al., 2003; Kempson et al., 2003; Norhasmah et al., 2010; Mabuza et al., 2016; Shakeel & Shazli, 2020). Because the tested households are poor, vulnerable, or

impoverished members of society who go about their everyday lives without enough money to buy more expensive foods like meat, fish, fruits, or milk, they rely on less expensive and less favoured items at a ratio of 92.17%. The "reduction in the size of meals" is recorded at 91%, followed by skipping a meal (72.47%), moving for a job (67.68%), buying food on credit (65.40%), borrowing food and money from family, friends, and other people (61.36%), restricting consumption for adults to allow more for children (59.34%), feeding working people at the expense of

non-working (48.74%), doing menial or degrading jobs (35.61%), and pulling kids out of school (2 However, when HFI among the urban poor worsens and reducing the size and frequency of daily meals is unable to alleviate the problem of starvation and hunger, the household is forced to borrow money from friends, family, and others who have access to enough food or grains or buy grains on credit from the sellers (Studdert et al., 2001; Mardiharini, 2004; Agbola, 2008; Shariff & Khor, 2008; Norhasmah et al., 2010; Tefera & Tefera, 2014; Shakeel & Shazli, 2020).

Table 4. Distribution of coping strategies opted by peasantry households during food insecurity or shortage (n = 396).

S. No.	List of coping strategies	Frequency	%
1.	Reduce the daily frequency of meal	373	94.19
2.	Rely on less expensive and less preferred foods	365	92.17
3.	Reduction in size of meals	361	91.16
4.	Skip consumption of food for a day	287	72.47
5.	Individual migration for job	268	67.68
6.	Purchase food on credit	259	65.40
7.	Borrow food and cash from relatives, friends, and others	243	61.36
8.	Limit consumption for adults to allow more for kids	235	59.34
9.	Feed working people at the cost of non-working	193	48.74
10.	Engaging in degrading jobs	141	35.61
11.	Drawing children from school	93	23.48

Source: (Calculation is based on a primary survey by author, 2022)
Note: Multiple responses existed hence column tallies in 396 and 100% respectively.

4. CONCLUSION

The lack of food and poverty are currently the most pervasive and ongoing issues that the vast majority of peasantry people in India are dealing with. Many studies have been proposed to stop the problem of FI from occurring, which is essential to raising the living standards or quality of life for these people. They must be supported by the facts on the ground, which provide meaningful effort on HFI for connected entities, in order to be a part of the improvement programme for the effective welfare of these individuals. Therefore, the present work has attempted to analyse the appraisal of HFI along with its drivers and essential methods to cope with the food shortage in Moradabad, India. Moreover, the findings showed that the majority of households consumed cereals, pulses, vegetables, milk, meat, sugar, fat, and oil below the recommended dietary allowance (RDA), which further leads to insufficient diversity in diet. The data on the patterns of meals among the households shows that approximately three-fourths of the households do not eat breakfast but rather have brunch in the morning

around 10:00 am and 11:00 am because these households spend their lives along with their family on a daily basis in the research area. Generally, they don't have enough money to acquire the necessary amount of meals for three times. On the other hand, individuals get up early (6:30 am) to find work in Moradabad's daily labour markets. Because of this, individuals forego breakfast in favour of brunch, which is eaten before lunch. The findings also show that FI has a negative impact on people's dietary diversification. Additionally, there are significant differences between households with and without food insecurity in terms of per capita calorie intake. More than one-third of homes, according to data on BMI, have CED, which is more common in women than in men because women typically eat after men at home and are dependent on the leftover food. Apart from that, males go out to eat something sometimes. The study also indicated that the share of food-insecure households is bigger than food-secure households in the study area. According to the FGT, Food Insecurity Index, there is a 77.35% depth, incidence, or rate of HFI, and the tested families

needed 21.35% more food to solve the HFI issue. In addition, the study discovered that households made compromises in their food consumption in order to deal with the difficulties brought on by the city's food scarcity. Households are more likely to choose various coping mechanisms as HFI grows more severe. Additionally, the instruments showed respectable levels of internal homogeneity and dependability when gauging household FI. The study's findings will be vital in the ongoing development of stronger food security (FS) policies and food security support programmes (FSSP) at the local, national, and possibly global levels.

DECLARATIONS

REFERENCES

Abafita, J. & Kim, K. (2014). Determinants of Household Food Security in Rural Ethiopia: An Empirical Analysis. Journal of Rural Development, 37(2), 29-175. https://econpapers.repec.org/scripts/redir.pf?u=http%3A%2F%2Fageconsearch.umn.edu%2Frecord%2F196613%2Ffiles%2F37-2-determinants.pdf;h=repec:ags:jordng:196613

Abduselam, A. (2017). Food Security Situation in Ethiopia: A Review Study. International Journal of Health Economics and Policy, 2(3), 86-96. https://doi.org/10.11648/j.hep.20170203.11

Agarwal, S., Sethi, V., Gupta, P., Jha, M., Agnihotri, A. & Nord, M. (2009). Experiential Household Food Insecurity in an Urban Slum of North India. Food Security, 1, 239-250.

Agbola, P.O. (2008). Analysis of Food Insecurity Coping Strategies among Farming Households in Osun Area of Southwestern Nigeria. Journal of Agriculture, Forestry and the Social Sciences, 6 (2).

Ali, N. & Ahmed, N. (2018). A Geographical Account of Street Vendors of Moradabad City of India. American International Journal of Research in Humanities, Arts and Social Sciences, 24(1), 1-7.

Ali, N., Shahnawaz, S. K., & Alam, Z. (2020). Educational Attainment and Health of Labour market Workers in Moradabad city of Uttar Pradesh, India: A Comparative Analysis. Academic Leadership-Online Journal, 21(9), 115-133.

Amendah, D.D., Buigut, S. & Mohamed, S. (2014). Coping Strategies among Urban Poor: Evidence from Nairobi, Kenya. PLoS One, 9(1), e83428. https://doi.org/10.1371/journal.pone.0083428

Anderson, S. A. (Ed.). (1990). Core Indicators of Nutritional State for Difficult to Sample Populations. The Journal of Nutrition, 120(11), 1555-1600.

Ansah, I.G.K., Gardeborek, C. &Ihle, R. (2020). Shock Interactions, Coping Strategy Choices and Household Food Security. Climate and Development, 1-13. https://doi.org/10.1080/17565529.2020.1785832

Aquiar, M. & Hurst, E. (2005). Consumption versus Expenditure. Journal of Political Economy, 113(5), 919-948.

Aschalew, F. &Bogale, A. (2009). Determinants and Dimensions of Household Food Insecurity in Dire Dawa Town, Ethiopia. East African Journal of Sciences, 3(2), 134-141.

Banik, D. (2008). Starvation and India's Democracy. London and New York: Routledge.

Berlie, A.B. (2015). Coping Strategies and Household Food Security in Drought-Prone Areas in Ethiopia: The Case of Lay Gayint District. Ghana Journal of Development Studies, 2(1), 1-18.

Betebo, B., Ejajo, T., Alemseged, F., & Massa, D. (2017). Household food insecurity and its association with nutritional status of children 6–59 months of age in east Badawacho District, south Ethiopia. Journal of environmental and public health, 2017.

Beyene, F. Muche, M. (2010). Determinants of Food Security among Rural Households of Central Ethiopia: An Empirical Analysis. Quarterly Journal of International Agriculture, 49(4), 299-318.

Bhuyan, B. Sahoo, B.K. & Saur, D. (2020E). Food Insecurity Dynamics in India: A Synthetic Panel Approach. Social Sciences and Humanities Open, 2(1), 1-14.https://doi.org/10.1016/j.ssaho.2020.100029

Bickel, G., Nord, M., Price, C., Hamilton, W. & Cook, J. (2000). Guide to Measuring Household Food Security. US Department of Agriculture, Food and Nutrition Service.

Birara, E., Muche, M. & Tadesse, S. (2015). Assessment of Food Security Situation in Ethiopia. World Journal of Dairy and Food Science, 10(1), 7-43. https://scialert.net/abstract/?doi=ajar.2015.55.68

Browning, M., & Lusardi, A. (1996). Household Saving: Micro Theories and Micro Facts. Journal of Economic Literature, 34(4), 1797-1855.

Bushamuka, V. N., de Pee, S., Talukder, A., Kiess, L., Panagides, D., Taher, A., & Bloem, M. (2005). Impact of a homestead gardening program on household food security and empowerment of women in Bangladesh. Food and nutrition bulletin, 26(1), 17-25. https://doi.org/10.1177/156482650502600102

Campbell, C. (1991). Food Insecurity: A Nutritional Outcome or a Predictor Variable? Journal of Nutrition, 121, 408-415. https://doi.org/10.1093/jn/121.3.408

Cervantes-Godoy, D., Kimura, S., & Anton, J. (2013). Smallholder Risk Management in Developing Countries. OECD Food, Agriculture and Fisheries Papers, 61.

Chhetri, A. K. & Maharjan, K. L. (2006). Food Insecurity and Coping Strategies in Rural Areas of Nepal. Journal of International Development and Cooperation, 12(2), 25-45.

Coleman-Jensen, A., Gregory, C., & Singh, A. (2014). Household food security in the United States in 2013. USDA-ERS Economic Research Report, (173).

Coleman-Jensen, A., Rabbitt, M. P., Gregory, C. A., & Singh, A. (2018). Household food security in the United States in 2017 (no. ERR-256). U.S. Department of Agriculture, Economic Research Service. http://www.ers.usda.gov/publications/pub-details/?pubid=90022.

Cordero-Ahiman, O., Santellano-Estrada, E. & Garrido, A., (2018). Food Access and Coping Strategies Adopted by Households to Fight Hunger among Indigenous Communities of Sierra Tarahumara in Mexico. Sustainability, 10(473), 1-14. http://dx.doi.org/10.3390/su10020473

Cutler, P. (1986). The Response to Drought of Beja Famine Refugees in Sudan. Disasters, 10(3), 81-188.

Deaton, A., & Drèze, J. (2009). Food and Nutrition in India: facts and Interpretations. Economic and Political Weekly, 42-65.

Dercon, S. (2002). Income Risk, Coping Strategies, and Safety Nets. Discussion Papers, World Institute for Development Economics (UNU-WIDER) 2002/22.

Dore, A. R., Adair, L. S., & Popkin, B. M. (2003). Low-Income Russian Families Adopt Effective Behavioral Strategies to Maintain Dietary Stability in Times of Economic Crisis. The Journal of Nutrition, 133(11), 3469-3475. https://doi.org/10.1093/jn/133.11.3469

Dore, A.R., Adair, L.S. & Popkin, B.M. (2003). Low-Income Russian Families adopt Effective Behavior Strategies to Maintain Dietary Stability in Times of Economic Crisis. Journal of Nutrition, 133, 3469-3475.

Edward, A. F. & Siméon, N. (2006). Development and Validation of an Experience-Based Measure of Household Food Insecurity within and across Seasons in Northern Burkina Faso. The Journal of Nutrition, 136(5), 1409S-419S. https://doi.org/10.1093/jn/136.5.1409S

Endale, W., Mengesha, Z.B., Atinafu, A. & Adane, A.A. (2014). Food Insecurity in Farta District, Northwest Ethiopia: A Community Based Cross-Sectional Study. BMC Research Notes 7, 130. https://doi.org/10.1186/1756-0500-7-130

Ergando, H. M., & Belete, D. H. (2016). Analysis of household food insecurity and its covariates in GirarJarso Woreda, Oromia Regional State, Ethiopia. Journal of Economics and Sustainable Development, 7(3), 16-30.

FAO, WEP & IFAD, (2012). The State of Food Insecurity in the World: Economic Growth is Necessary but not Sufficient to Accelerate Reduction of Hunger and Malnutrition. Food & Agriculture. http://www.fao.org/3/a-i3027e.pdf.

FAO. (2015). The State of Food Insecurity in the World 2015. http://www.fao.org/3/a-i4646e.pdf.

Farison, E.A., Cherfas, J. & Hodgkin, T. (2011). Agricultural Biodiversity is Essential for a Sustainable Improvement in Food and Nutrition Security. Sustainability, 3(1), 238-253. https://doi.org/10.3390/su3010238.

Farzana, F.D., Rahman, A.S., Sultana, S., Raihan, M.J., Haque, M.A., Waid, J.L., Choudhury, N. & Ahmed, T. (2017). Coping strategies related to food insecurity at the household level in Bangladesh. PloS one, 12(4), e0171411 https://doi.org/10.1371/journal.pone.0171411

Farzana, F.D., Rahman, A.S., Sultana, S., Raihan, M.J., Haque, M.A., Waid, J.L., & Chaudhury, N. (2017). Coping strategies related to food insecurity at the household level in Bangladesh. PLoS one 12(4), e0171411. https://doi.org/10.1371/journal.

Feleke, A. &Bogale, A. (2009). Determinants and Dimensions of Household Food Insecurity in Dire Dawa Town, Ethiopia. East African Journal of Sciences, 3(2), 134-141.

Fotso, J.C., Ezeh, A. & Oronje, R. (2008). Provision and use of Maternal Health Services among Urban Poor Women in Kenya: What Do We Know and What

Can We Do? Journal of Urban Health, 85, 428-442. https://doi.org/10.1007/s11524-008-9263-1

Frongillo, E. A., &Nanama, S. (2012). Advances in Developing Country Food Insecurity Measurement, Development and Validation of An Experience-Based Measure of Household Food Insecurity within and across seasons in Northern Burkina Faso. Journal of Nutrition, 136(5), 1409-1419.

Gebre, G. G. (2012). Determinants of food insecurity among households in Addis Ababa city, Ethiopia. Interdisciplinary Description of Complex Systems: INDECS, 10(2), 159-173.

Gemechu, F., Zemedu, L., & Yousuf, J. (2016). Determinants of Farm Household Food Security in HawiGudina district, West Hararghe Zone, Oromia Regional National State, Ethiopia. Journal of Agricultural Extension and Rural Development, 8(2), 12-18.

Girma, G., &Girma, B. (2012). Determinants of food insecurity among households in Addis Ababa City, Ethiopia. International Journal of Research in Commerce, Economics and Management, 2(6), 26-32.

Gittlesohn, J., Mookherji, S. &Pelto, G. (1998). Operationalizing Household Food Security in Nepal. Food Nutr Bull, 19, 210-220.

Gopichandran, V., Claudius, P., Baby, L.S., Felinda, A. & Mohan, V.R. (2010). Household Food Security in Urban Tamil Nadu: A Survey in Vellore. The National Medical Journal of India, 23(5), 278-280.

Grobler, W.C.J. (2018). Coping Strategies and Household Dietary Diversity in a Low Income Neighborhood in South Africa. RAIS Conference Proceedings, 32-38.

Gundersen, C. &Ziliak, J.P. (2014). Childhood Food Insecurity in the US: Trends, Causes, and Policy Options. The Future of Children, 1-19.

Gundersen, C. (2008). Measuring the Extent, Depth, and Severity of Food Insecurity: An Application to American Indians in the USA. Journal of Population Economics, 21(1), 191-215.

Gupta, P., Sing, K. & Sethi, V. (2013). Food Insecurity among the Youth Children (6-35 months) in Urban Slums of Delhi, India. Indian Journal Matern Child Health, 15(4), 1-6.

Gupta, P., Singh, K., Seth, V., Agarwal, S. & Mathur, P. (2015). Coping Strategies Adopted by Households to Prevent Food Insecurity in Urban Slums of Delhi, India. Journal of Food Security, 3(1), 6-10.

Gupta, P., Singh, K., Seth, V., Agarwal, S., & Mathur, P. (2014). Association of Food Insecurity and Malnutrition among Young Children (6–36 months). Indian Journal of Nutrition and Dietetics, 51(3), 293-305.

Hadley, C., & Crooks, D. L. (2012). Coping and the biosocial consequences of food insecurity in the 21st century. American Journal of Physical Anthropology, 149(S55), 72-94.

Hashmi, SNI and Shakeel, A (2012). Spatial pattern of food security in eastern Uttar Pradesh, India. Asia Pacific Journal of Social Science, 5(1), 131-150.

Hillbruner, C. & Egan, R. (2008). Seasonality, Household Food Security, and Nutritional Status in Dinajpur, Bangladesh. Food Nutr Bull, 29, 221-231. https://doi.org/10.1177/156482650802900308

ICMR, (2011). Nutrition Requirement and Recommended Dietary Allowances for Indian. A Report of the Expert Group of the Indian Council of Medical Research. Final draft 2009.

Idrisa, Y.L., Gwary, M.M. & Shehu, H. (2008). Analysis of Food Security Status among Farming Households in Jere Local Government of Borno State, Nigeria. Journal of Tropical Agriculture Food Environment and Extension, 7(3), 199-205.

Kempson, K., Keenan, D.P., Sadani, P.S. & Adler, A. (2003). Maintaining Food Sufficiency: Coping Strategies Identified by Limited-Resource Individuals versus Nutrition Educators. Journal of Nutritional Education Behavior, 35, 179-188.

Kempson, K., Keenan, D.P., Sadani, P.S. & Adler, A. (2003). Maintaining Food Sufficiency: Coping Strategies Identified by Limited-Resources Individuals versus Nutrition Educators. Journal of Nutrition Education and Behavior, 35, 179-88.

Kirkland, T. M., Kemp, R. J., Hunter, L. M., & Twine, W. M. (2013). Toward improved understanding of food security: a methodological examination based in rural South Africa. Food, Culture & Society, 16(1), 65-84.

Kruger, R., Schonfeldt, H. & Owen, J.H. (2008). Food Coping Strategy Index Applied to a Community of Farm Worker Households in South Africa. Food and Nutrition Bulletin, 29(1), 3-14.

Kruger, R., Schonfeldt, H.C. & Owen, J.H. (2008). Food-coping strategy index applied to a community of farm-workers households in South Africa. Food and Nutrition Bulletin, 29(1):1-14.

Kyaw, D. (2009). Rural household's food security status and coping: Strategies to Food Insecurity in Myanmar. Institute of Developing Economies, Japan External Trade Organisation.

Lekprichakul, T. (2009). Ex ante and Ex post Risk Coping Strategies: How do Subsistence Farmers in Southern and Eastern Province of Zambia Cope. Kyoto: Research Institute for Humanity and Nature.

Ma, Y., Olendzki, B. C., Pagoto, S. L., Hurley, T. G., Magner, R. P., Ockene, I. S., ... & Hébert, J. R. (2009). Number of 24-hour diet recalls needed to

estimate energy intake. Annals of Epidemiology, 19(8), 553-559.

Mabuza, M.L., Ortmann, G.F. & Wale, E. (2016). Frequency and Extent of Employing Food Insecurity Coping Strategies among Rural Households: Determinants and Implications for Policy Using Evidence from Swaziland. Food Security, 8, 255-269.

Mardiharini, M. (2005). Family-Coping Strategies in Maintaining Welfare during the Economic Crisis in Indonesia: A Case Studying Rural and Urban Areas in Bogor, West Java, Indonesia. Journal of Agricultural Economics, 23(1), 53-70. http://repository.pertanian.go.id/handle/123456789/250

Maxwell, D., Ahiadeke, C., Levin, C., Armar-Klemesu, M., Zakariah, A. & Lamptey, G.M. (1999). Alternative Food Security Indicators-revisiting the Frequency and Severity of Coping Strategies. Food Policy, 24, 11-429. https://doi.org/10.1016/S0306-9192(99)00051-2

Maxwell, D.G. & Cladwell, R. (2008). The Coping Strategy Index. Field Methods Manuel (2nd ed.). Geneva: Cooperative for Assistance and Relief Everywhere, Inc. (CARE).

Maxwell, S. & Frakenberger, T. (1992). Household Food Security: Concepts, Indicators, Measurements: A Technical Review. UNICEF and IFAD, New York and Rome.

Mishra, S. (2007). Household Livelihood and Coping Mechanism during Drought among Oraon Tribe of Sundargarh District of Orissa. Journal of Social Science, 15(2), 181-186.

Mittal, S (2007). What affects changes in cereal consumption? Economic and Political Weekly, 42(5):444-447.

Mota, A. A., Lachore, S. T., & Handiso, Y. H. (2019). Assessment of Food Insecurity and Its Determinants in the Rural Households in Damot Gale Woreda, Wolaita Zone, Southern Ethiopia. Agriculture & Food Security, 8(1), 11. https://doi.org/10.1186/s40066-019-0254-0

Motbainor, A. Worku, A. &Kumie, A. (2016). Level and Determinants of Food Insecurity in East and West Gojjam Zones of Amhara Region, Ethiopia: A Community Based Comparative Cross-Sectional Study. BMC Public Health, 16, 503.

Muche, M., Endalew, B., & Koricho, T. (2014). Determinants of household food security among Southwest Ethiopia rural households. Food Science and Technology, 2(7), 93-100.

Mukhopadhyay, D. & Biswas, A. (2011). Food Security and Anthropometric Failure among Tribal Children in Bankura, West Bengal. Indian Pediatrics, 48(4), 311-314.

Mukhopadhyay, D. Mukhopadhyay, S. & Biswas, A. (2010). Enduring Starvation in Silent Population: A Study on Prevalence and Factors Contributing to Household Food Security in Tribal Population in Bankura, West Bengal. Indian Journal of Public Health, 54(2), 92.

Murakami, E. (2017). Household Consumption Risk and Coping Strategies in Tajikistan: Evidence from Household Survey. ADBI Working Paper Series, 738.

Nigatu, R. (2011). Small Holder Farmers Coping Strategies to Household Food Insecurity and Hunger in Southern Ethiopia. Ethiopian Journal of Environment Studies and Management, 4(1), 42.

Norhasmah, S., Zalilah, M.S., Mohd Nasir, M.T. Kandiah, M. & Asnarulkhadi, A.S. (2010). Qualitative Study on Coping Strategies among Women from Food Insecurity Households in Selangor and Negeri Sembilan. Malaysian Journal of Nutrition, 16(1), 39-54.

Olabiyi, O.M. & Mcintyre, L. (2014). Determinants of Food Insecurity in Higher-Income Households in Canada. Journal of Hunger and Environmental Nutrition, 9, 433-448. http://dx.doi.org/10.1080/19320248.2014.908450

Patnaik, U. (2004). The Republic of Hunger. Social Scientist, 32(9/10), 9-35.

Patnaik, U. (2007). Neoliberalism and Rural Poverty in India. Economic and Political Weekly, 42(30), 3132-3150.

Patnaik, U. (2010). A Critical Look at Some Propositions on Consumption and Poverty. Economic and Political Weekly, 42(30), 3132-3150.

Pérez-Escamilla, R., &Segall-Corrêa, A. M. (2008). Food insecurity measurement and indicators. Revista de Nutrição, 21, 15s-26s.

Quaye, W. (2008). Food security situation in northern Ghana, coping strategies and related constraints. African Journal of Agricultural Research, 35, 334-342.

Radimer, K. (2002). Measurement of Household Food Security in the USA and Other Industrialised Countries. Public Health Nutrition, 5(6A), 859-864.

Radimer, K. L., Olson, C. M., Greene, J. C., Campbell, C. C., &Habicht, J. P. (1992). Understanding hunger and developing indicators to assess it in women and children. Journal of Nutrition Education, 24(1), 36-44.

Ray, R. (2008). Diversity in calorie sources and undernourishment during rapid economic growth. Economic and Political Weekly, 43(8), 51-57.

Saaka, M., Oladele, J., Larbi, A. & Hoeschle-Zeledon, I. (2017). Household Food Insecurity, Coping Strategies, and Nutritional Status of Pregnant Women in Rural Areas of North Ghana. Food Science and Nutrition, 5, 1154-1162.

Saint Ville, A., Po, J. Y. T., Sen, A., Bui, A., &Melgar-Quiñonez, H. (2019). Food security and the food insecurity experience scale (FIES): ensuring progress by 2030. Food Security, 11, 483-491. https://doi.org/10.1007/s12571-019-00936-9

Sani, S. &Kemaw, B. (2019). Analysis of Households' Food Insecurity and Its Coping Mechanisms in Western Ethiopia. Agricultural Economics, 7(5). https://doi.org/10.1186/s40100-019-0124-x.

Sen, P. (2005). Of Calories and Things: Reflections on Nutritional Norms, Poverty Lines and Consumption Behaviour in India. Economic and Political Weekly, 40(43), 4611-4618. http://www.jstor.org/stable/4417325.

Serageldin, I. and Persley, G. S. (2000). Promethean science, agricultural biotechnology: The environment and the poor. Washington, D.C: Consultative Group on International Agricultural Research.

Sewnet, Y. (2015). Causes and Coping Mechanisms of Food Insecurity in Rural Ethiopia. Agriculture Biological Journal of North America, 6(5), 123-133.

Shakeel A and Hashmi SNI (2019). Population growth and food security in Eastern Uttar Pradesh: a correlative analysis. Journal of Rural Development, 38(1), 172-204.

Shakeel, A. (2012). A regional analysis of food security in Bundelkhand Region (Uttar Pradesh, India), Journal of Geography and Regional Planning, 5(9), 252-262.

Shakeel, A. & Shazli, T. (2020). Coping Strategies and Struggle against Food Insecurity: The Case of District Banda in Bundelkhand Region, India. Geo Journal. https://doi.org/10.1007/s10708-020-10155-x.

Shakeel, A. (2018a). Food security: Theorizing the evolution and involution of the concept. The Arab World Geographer, 21(1), 58-82.

Shakeel, A. (2018b). Recent Trends in the Debate on India's National Food Security Act-2013: A Review. Geography, Environment and Sustainability, 11(2), 108-124.

Shakeel, A. (2018c). Measuring Extent Depth Severity and Levels of food Insecurity in Banda District of Bundelkhand Region. IASSI Quarterly, 37(3&4), 462-481.

Shakeel, A. (2021). Eating Chapattis with Salt and Water: Bundelkhand's Chronic Food Insecurity. Social Change, 51(3), 327-346. doi.org/10.1177/00490857211032936.

Shakeel, A. Shazli, T. Naqvi, HR and Salman, MS. (2021b). Validity of Household Food Insecurity Access Scale in Drylands of Bundelkhand Region: Observations from Banda District, India. IOSR Journal of Humanities and Social Science, 26(9), 22-33. DOI: 10.9790/0837-2609052233.

Shariff, Z.M. & Khor, G.L. (2008). Household food insecurity and coping strategies in a poor rural community in Malaysia. Nutrition Research and Practice, 2 (1): 26-34.https://dx.doi.org/10.4162%2Fnrp.2008.2.1.26.

Shekhar, S. & Shekhar, C. (2017). Household food insecurity and coping strategies in a rural community of West Bengal. Social Science Spectrum, 3(1):16-26.

Shimelis, A. & Bogale, A. (2007). Dimensions of Food Insecurity and Livelihood Strategies among Rural Households in Dire Dawa, Eastern Ethiopia. Tropical Science, 47(2), 73-80.

Smith, L.C. (2015). The Great Indian Calorie Debate: Explaining Rising Undernourishment during India's Rapid Economic Growth. Food Policy, 50, 53-67. https://doi.org/0.1016/j.foodpol.2014.10.011.

Snel, E., & Staring, R. (2001). Poverty, Migration, and Coping Strategies: An Introduction. European Journal of Anthropology, 38, 7-22.

Studdert, L.J., Frongillo, E.A. & Valois, P. (2001). Household Food Insecurity was Prevalent in Java during Indonesia's Economic Crisis. Journal of Nutrition, 131(10), 2685-2691. https://doi.org/10.1093/jn/131.10.2685

Tefera, T. & Tefera, F. (2014). Determinants of Households' Food Security and Coping Strategies for Food Shortfall in Mareko District, Guraghe Zone Southern Ethiopia. Journal of Food Security, 2(3), 92-99.

Thorne-Lyman, A.L., Valpiani, N., Sun, K., Semba, R.D., Klotz, C.L., et al. (2010). Household Dietary Diversity and Food Expenditures are Closely Linked in rural Bangladesh, Increasing the Risk of Malnutrition due to the Financial Crisis. The Journal of nutrition, 140, 182S-188S. https://doi.org/10.3945/jn.109.110809

Tsegaye, A.T., Tariku, A., Worku, A.G., Abebe, S.M., Yitayal, M., Awoke, T., Alemu, K. & Biks, G.A. (2018). Reducing Amount and Frequency of Meal as a Major Coping Strategy for Food Insecurity. Archives of Public Health, 76(56), 1-9. https://doi.org/10.1186/s13690-018-0303-3

United Nations. (1991). Nutrition relevant actions. Nutrition Policy Discussion paper, no. 10. Rome.

Urban Health Resource Center (UHRC) (2011). Coping Strategies and Levels of Child Food Security among Urban Poor Food Insecure Households Living in Urban Slums of Seelampur, Delhi- A Report. New Delhi: Urban Health Resource Center.

Van der Veen, A. &Gebrehiwot, T. (2011). Effect of Policy Interventions on Food Security in Tigray, Northern Ethiopia. Ecology and Society, 16(1). www.jstor.org/stable/26268835

Webb, P., Coates, J., Frongillo, E. A., Rogers, B. L., Swindale, A., &Bilinsky, P. (2006). Measuring household food insecurity: why it's so important and yet so difficult to do. The Journal of Nutrition, 136(5), 1404S-1408S.

Woldeamanuel, S. (2009). Poverty, Food Insecurity and Livelihood Strategies in Rural Gedeo: The Case of Haroressa and Chichu PAs, SNNP. ed. by SveinEge, Harald Aspen, BirhanuTeferra and Shiferaw Bekele, Trondheim: Proceedings of the 16th international conference of Ethiopian studies.

World Bank (1986). Poverty and Hunger: Issues and Options for Food Security in Developing Countries. World Bank, Washington. USA.

Wright, L. & Gupta, P. (2015). Coping Strategies Adopted by Urban Poor to Ameliorate Food Insecurity: Case of United States, Belize and India. Journal of Food Security, 3(2), 40-46.

Zemedu, L. &Mesfin, W. (2014). Smallholders' Vulnerability to Food Insecurity and Coping Strategies: In the Face of Climate Change, East Hararghe, Ethiopia. Journal of Economics and Sustainable Development, 5(24), 86-100.