The Effects of Urban Productive Safety Net Program on Household Food Security Status in Gulele Sub-city, Addis Ababa

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Abstract

The central purpose of this study was to examine the effects of the productive safety net program (PSNP) on the food security status of urban households in Gulele sub-city, Addis Ababa, Ethiopia. Data were gathered from 271 households, key informants, and focus group discussants. Analytical techniques used include descriptive statistics, the Household Food Insecurity Access Scale (HFIAS), and the Ordinary logit model. The HFIAS results showed that about 2% of study households were food secure, 26% were mildly food insecure, 49% were moderately food insecure and 23% were severely food insecure. The ordered logit model result also indicates that the age of household head, family size, saving, and consumption of durable goods has a negative effect on food security. The study concludes that even though the urban productive safety net program (UPSNP) has positive effects on the food security status of beneficiaries, it has no significant effects on asset accumulation and livelihoods. Hence, government needs to give more emphasis on creating job opportunities, family planning, and adjusting the amount of cash transfer for participants based on their current living conditions to ensure food security. These activities would help poor households to generate more income and purchase more food for their families.

Keywords: Food insecurity, rights-based approach, social protection, urban productive safety net, Gullele Sub-city

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1. Introduction

Ethiopia is a country where most of the population is poor and the level of experiences of poverty at individual and household levels is significantly high. According to the World Food Program (WFP), over 13 million people in Ethiopia required emergency food assistance in 2021, and the figure rose to 20.1 million in 2023 (WFP, 2023). Additionally, about 60% of Ethiopians are chronically food insecure, a proportion that escalates to more than 15% during drought years (Endalew et al., 2016). The definition of food insecurity is the lack of consistent access to adequate, safe, and nutritious food required for a healthy and productive life (WFP, 2014; FAO et al., 2023).

Furthermore, food insecurity is closely linked with poverty and vulnerability, as stated by Sileshi et al. (2019). To address poverty and food insecurity, many developing countries, including Ethiopia, have recognized the paramount importance of Social Protection (SP) measures in preventing individuals from falling into poverty, according to FAO (2015). This is because SP not only reduces poverty temporarily but also enables growth by allowing poor households to create and protect their assets, as noted by Robert et al. (2003). However, policymakers need to understand the root causes and level of food security to design and implement more effective SP policies and programs for the poor, which can improve food security. Safety nets can enhance access to quality food, food production, productive assets ownership, sanitation, and healthcare, leading to improved food security and diet diversity, as observed by Bezawit et al. (2020).

The government of Ethiopia has launched the PSNP in 2005 to reduce poverty and food insecurity in the country (FDRE, 2005). PSNP is part of the national social protection program that focuses on the provision of cash or in-kind transfers to the poor as a means of reducing poverty and economic and social vulnerability (FAO, 2015; Bezawit et al., 2020). It was originally designed to benefit 5 million chronically food-insecure people in rural parts of the country. The implementation of PSNP in Ethiopia, therefore, witnessed an enhanced food security strategy through saving life and asset protection through the predictable transfers though gaps in achievement between the regions and beneficiaries have been realized. Furthermore, the program has

had some positive impacts in terms of improving the life of affected people and helping asset building.

Previous studies conducted in different parts of Ethiopia investigated the positive impacts of PSNP in reducing poverty and increasing household food security (e.g. Andersson et al., 2011; Debela and Holden, 2014; Yitagesu, 2014; Gebresilassie, 2014; Zoellick, 2014; Mohamed, 2017; Diriba et al., 2017; Misgana, 2018). PSNP prevents beneficiaries from selling productive assets (Zoellick, 2014; Saifur, 2016) and hence, contributes to improving food consumption (Akter, 2013 Mutuku, 2014). It also contributes to stable access to food (Diribaet al., 2017; Misgana, 2018) and availability of food particularly during the lean season (Maier, 2014). Similarly, Debela and Holden (2014) indicated the positive effect of PSNP on children by providing short-term nutritional benefits. In addition, Knippenberg and Hoddinott (2016) found that cash transfers through PSNP reduce vulnerability to drought by 57%. However, households participating in this program often fail to improve their savings and accumulate assets (Beshir, 2011; Mamo, 2011; Gilligan et al., 2009; Sabates and Devereux, 2010). Similarly, Hayalu (2014) indicated that PSNP develops a sense of dependency syndrome among beneficiary households. Moreover, the amount of income transferred and inflation affect beneficiaries' food access stability (Misgana, 2018).

Moreover, as part of the initiative to tackle the problem in urban areas, in 2016/17 the government in collaboration with the World Bank launched the UPSNP with the objectives to reduce urban poverty and vulnerability of the urban poor living below the poverty line. UPSNP was also aimed to help urban poor food insecure households to improve nutritional status and address the underlying causes of food insecurity by providing them with food and cash. This has been achieved through the provision of cash transfers, financial and technical support to access livelihood opportunities, building the capacity of institutions to effectively deliver this support, and developing core systems for the delivery of safety nets and complementary livelihood services (MoUDH PIM, 2016).

However, the contributions of UPSNP to household food security have received little attention (Ganta, 2011; Bethelhem, 2014; Hermela, 2015;

Knippenberg and Hoddinott, 2016; Diriba et al., 2017; Abduselam, 2017; Misgana, 2018; Wondim, 2018). This study was aimed to fill a knowledge gap by investigating the effects of the UPSNP on improving household food security in the Gulele sub-city, Addis Ababa.

1.1. Theoretical and conceptual frameworks

This study considered the Basic Needs and Right-Based approach as these are more relevant to understanding social protection programs in general. The basic needs theory was formulated by the International Labor Organization (ILO) in 1976, to incorporate the non-economic dimensions of development (Dmitrieva, 2019). It emphasizes the importance of satisfying people's basic needs rather than focusing on the economic growth of a country or an individual capability to buy food income and food price information. Within the human needs approach, there is a tendency to consider food as a primary element in food security. It pays attention to short-term food security and tells whether households have enough food to feed all members of the household at a given time (Burchi and De Muro, 2016). Thus, it gives an insight into bringing the poor above the poverty line. As the poor get out of poverty, the aggregate demand level increases, the supply of basic goods and services increases, and individuals participate in the process (Degefa, 2008). Maslow (1957) stated that the need to alleviate hunger and thirst is among the basic needs and is essential for human life.

The basic needs approach refers to the availability approach and the ability to adequately satisfy food consumption always needs for a healthy life (Pawlak and Kołodziejczak, 2020). That is why the linkage is considered between the prevalence of undernourishment as a measure of food insecurity and both agricultural potential and performance. In the late 1990s, the United Nations Development Program (UNDP) began to raise awareness about the rights-based approach viewpoint to development. As stated in Sepulveda and Nyst (2012), poverty and discrimination are inherently linked, each being a cause and consequence of the other which makes poverty a major human rights issue. People living in poverty experience discrimination because they are poor. According to this approach, the focus of poverty alleviation efforts is fundamentally shifted from a charity or needs-based approach, towards a

concentration on rights and entitlements, which in turn give rise to obligations on the part of the State to ensure that all individuals can enjoy access to a minimum essential level of economic, social and cultural rights, including an adequate standard of living, equally and without discrimination.

The rights-based approach emphasizes the legally mandated human right that every person has to access social security and protection (Devereux and Sabates Wheeler, 2004). In this approach, there is a symbiotic relationship between human rights to food and social protection (Elizabeth and Deirdre, 2012). The United Nations Commission for Human Rights (UNCHR) stated social protection plays a fundamental role in addressing the needs of people living in extreme poverty, tackling inequality, and realizing human rights. It can enable the transfer of resources to those living in extreme poverty and allow beneficiaries to generate income, protect their assets, and accumulate human capital. Social protection programs have the potential to contribute to the realization of several economic, social, and cultural rights, such as the right to an adequate standard of living including the right to adequate food, clothing, and housing as well as the right to education and health (Sepúlveda and Nyst, 2012).

Food security has been a development and equity concern for many decades. As Sen pointed out, starvation is the characteristic of people not having enough food to eat, not the characteristic of there being enough food to eat (Sen, 1981). The definition that is still most widely used was coined at the 1996 World Food Summit. It states that "food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (FAO, 2006). On the other hand, food insecurity is defined as the inability or difficulty of all people to always obtain nutritious and adequate food. It generates a vicious spiral of impoverishment and becomes a challenge to sustainable development if it is not relieved and endured over time (IFAD, 2014). It also is a situation that exists when all people lack access to enough safe and nutritious food required for normal growth and development and active and healthy life (WFP, 2014). Even if some nations in South Asia and Sub-Saharan Africa have had success in

reducing hunger and poverty, the overall prevalence of hunger and poverty has been slowly declining.

The conceptual framework is integrated into the theoretical framework by giving specific concepts, theories, and models that are supported by the underlying theoretical framework. The theoretical framework is elaborated and clarified by the conceptual framework, making it more concrete and actionable. The conceptual framework is built based on the right-based approach. As shown in Figure 1, the conceptual framework for understanding the factors that influence food security among households. It focuses on three main categories of factors:

Demographic factors such as the sex of the HHHs, age, marital status, and family size can all have a substantial impact on household food security. Food insecurity may be higher in women-headed households due to gender disparities in access to resources and opportunities. Due to declining health and fewer income-generating options, older HHHs may experience difficulties. Access to shared resources and support networks can be determined by marital status, while family size might affect a household's capacity to meet its nutritional demands. Understanding these demographic factors is crucial for policymakers and academics to develop interventions and programs that target the vulnerabilities and demands of various family types, allowing fair access to sufficient and healthy food.

Socioeconomic factors such as the dependent ratio, education level, HHH health status, HHH annual income, consumer spending, and durable goods consumption can all have a major impact on household food security. These variables can affect households' access to financial resources, employment opportunities, nutrition knowledge and awareness, and ability to allocate resources to food expenditure. Policymakers and researchers must comprehend the significance of these socioeconomic determinants to design interventions and policies that address the core causes of food insecurity while also promoting equitable access to adequate and nutritious food.

Institutional and policy factors such as monthly cash transfers from productive safety net programmes, access to credit and savings, training

opportunities, and social network participation can all have a substantial impact on household food security. These factors have the potential to improve household purchasing power, coping strategies, knowledge, and skills, as well as access to resources and support systems. Policymakers and academics must recognize the significance of these determinants and develop interventions and policies that increase their accessibility and effectiveness in enhancing household food security.

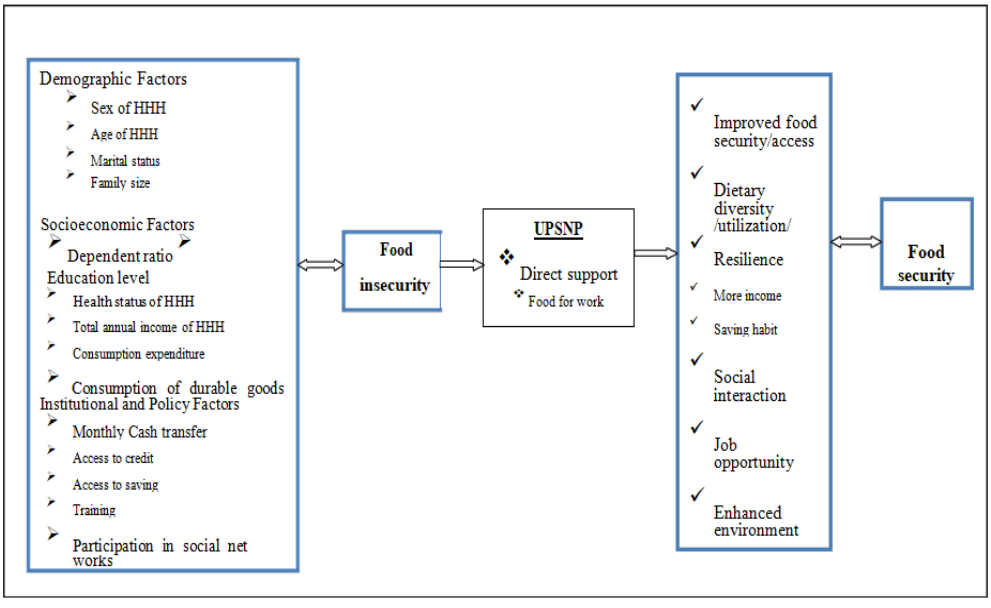

Figure 1: Conceptual framework of the study
Source: Authors own construction based on literature reviewed

UPSNP has been implemented to reduce urban food insecurity and improve their livelihoods through food security, nutrition, and resistance to shocks. As shown in Figure 1, UPSNP has two components: public works transfers (food/cash-for-work) and direct support for non-able-bodied beneficiaries (i.e. chronically ill, disabled, or elderly). This program affects household food security in the following ways: it improves household access to food security and dietary diversity /utilization/ by helping beneficiaries generate more money, more job opportunities, a better saving culture, and a more resilient and protected environment. As a result, the expected effect of participating in UPSNP is improved household food security.

2. Methods

2.1. Study site description

The study was conducted in the Gulele sub-city of Addis Ababa, Ethiopia (Figure 2). Addis Ababa is the capital city of Ethiopia, located at 9º03'N latitude and 38º75' E longitude coordinates. The projected population of Addis Ababa was 3.9 million in 2023 (CSA, 2024) and the city is divided into eleven sub-cities named Arada, Addis Ketema, Yeka, Kirkos, Lideta, Kolfe, Akaki Kaliti, Nifas Silk Lafto, Gulele, Bole and Lemi Kura. Under each sub-city, there are Woredas and Ketenas (the lowest units of administration). The city is simultaneously experiencing high rates of economic growth and urbanization having 23.2% of the urban population of Ethiopia in 2023. Gulele sub-city covers 3,119.09 hectares (31.19 sq. km2) of land which is 6 percent of the total land area of the city. This makes Gulele the sixth largest sub-city in Addis Ababa.

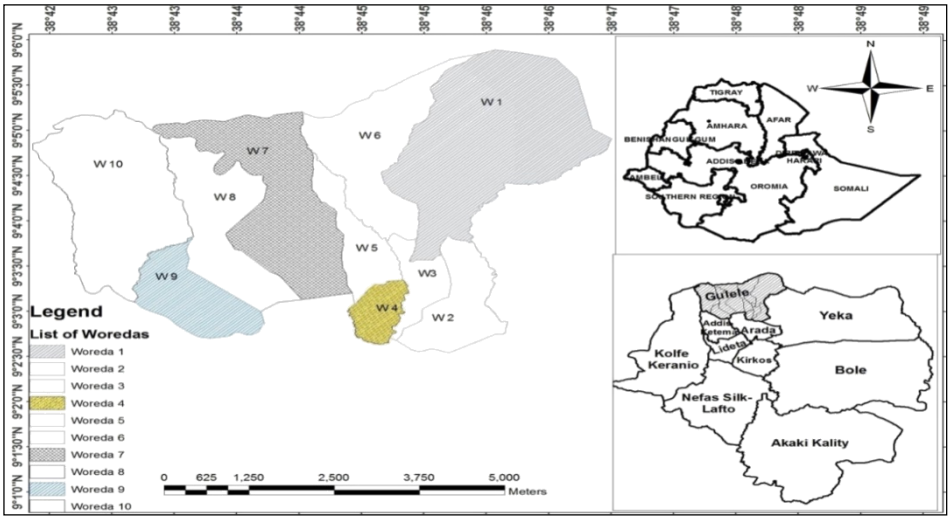

Figure 2: Location of Gulale sub-city in Addis Ababa city

Source: http://www.addisababa.gov.et/fi/web/guest/Gulele sub-city Retrieved at 6:20 pm June 1, 2020.

This study employed a cross-sectional research design because it is appropriate to study different units (e.g., households, ketena), woredas, sub-

cities, and cities) at a given point in time. In other words, the study analyzing whether a certain variable is associated with another comprises a diagnostic research study. A mixed approach or both qualitative and quantitative was used to collect data from both primary and secondary sources to produce a comprehensive analysis of the study. Mixed approach was utilized to maintain the reliability and validity of information through data triangulation (Yin, 2014).

Multi-stage sampling technique was used to select study households. In the first stage, Gulele sub-city was purposively selected. It is one of a densely populated area, which could impose pressure on the food security status of households. The rapid growth of the urban population both natural and through migration put heavy pressure on public utilities like housing, sanitation, transport, water, electricity, health, and education in the selected sub-city. At the second stage, four woredas from the Gulele sub-city, namely: Woreda 1, Woreda 4, Woreda 7, and Woreda 9 were purposively selected on the intensity of UPSNP implementation. In the third stage, ten Ketenas from the selected four woredas were randomly selected for this study. This is because populations are relatively similar in socio-economic and geographical locations. Then, a stratified random sampling technique was employed to stratify people living in the selected Ketenas into two strata, namely UPSNP participants and non-participants. Finally, 214 participant households (151 Public Workers and 63 Direct Supporters) were selected from the first stratum, and 57 non-participant households were selected from the next stratum. The total number of the population, as well as the number of participants and non-participants, were obtained from the selected Woredas. The sample size for the study was determined by using Cochran's (1977) formula.

$$n = \frac{pqz^2}{d^2}$$

Where,

n = Sample size required.

p =The estimated proportion of UPSNP participants attribute that is present in the population (expected prevalence of participant households)

$q = 1 - p$ (P is the estimated proportion of participants an attribute that is present in the population)
$Z =$ Z- Score (critical value associated with the appropriately chosen level of confidence)
$u =$ The desired level of precision or marginal error

To estimate the sample size, the expected prevalence for Addis Ababa is not known for there were limited similar studies carried out. Hence, we assumed p=5 (maximum expected prevalence) and the desired level of precision of 5% with a 95% level of confidence the Z value equals 1.96. The sample size is estimated following Misgana (2018). Misgana estimated that the actual number of beneficiaries may be between 15% - 20% percent and calculated the sample size with a precision of 5 percent.

$$\frac{0.2*0.8(1.96)^2}{0.05^2} = 246$$

Adding 10% contingency for the expected non-response rate, the final sample size of beneficiary households for the household survey is:

$$C = N * 0.10$$

Where,
N= the expected non-response rate
C= the contingency for the non-response rate

$$n = 246 + 10\%(25) = 246 + 25 = 271$$

The following formula was used to determine the sample size of each stratum in the ten Ketanas.

$$Pi = ni/N$$

Where,
Pi= proportion of population included in stratum I,
ni= the number of elements
N= the total number of the population
Pi= 271/1895 = 0.143

Thus, household surveys were conducted with 271 households using questionnaires. In addition, different documents or reports, plans, and

publications of various government departments and NGOs working in the area were reviewed and used as secondary data.

The data collected were managed and analyzed using computer software called Statistical Packages for Social Science (SPSS 24) and 'STATA Version 14'. The study used both descriptive statistics and econometric techniques for analyzing the quantitative data. The descriptive statistical tools are very important to have a clear picture of the households included in the sample. In this study, the Household Food Insecurity Access Scale (HFIAS) was applied to measure the food security status of study households. HFIAS provides information on food insecurity (access) at the household level (Coates et al., 2009). The HFIAS method was used to assess the prevalence of household food insecurity among the study households. It categorizes households into four levels of household food insecurity: food secure, mildly food insecure, moderately food insecure, and severely food insecure. Then, the econometric technique ordered logistic regression model, was used to examine the linkage between the household food security status and UPSNP. The model also helped to describe the effects of UPSNP on the food security status of beneficiaries. The study further hypothesized the association between household factors and UPSNP as follows:

$H1_i$= There is no association between urban household explanatory variables and productive safety net on their food security.

$H1_o$= There is an association between urban household explanatory variables and productive safety net on their food security.

3. Results and Discussions

3.1. Demographic and socioeconomic characteristics of study households

Out of the total households sampled, 58.7% were headed by females and 41.3% were headed by males. Among the households that participated in the UPSNP, the majority (57.9%) were headed by females, while 42.1% were headed by males. In terms of health status, 45.7% of household heads had

health problems, while 55.3% did not. For UPSNP participants, 52.8% of households had health problems, while 47.2% did not. Access to training was reported by 67.2% of respondent households, while 32.8% did not participate in any training activities. Among UPSNP participants, 71.5% had access to training, compared to only 50.9% of non-participants. Regarding access to credit services, only 16% of respondent households had access to credit, while the majority (84%) did not (Table 1).

The results of access to training also indicate that about 67.2% of respondent households had access to training, whereas 32.8% of the respondents did not participate in any training activities. Among the UPSNP, 71.5% of them had access to training, whereas only about 50.9% of non-participants had access to training. The chi-square test result also revealed that there is a significant difference at a 1% level between UPSNP participants and non-participants relating to access to training access. UPSNP training programs can provide households with entrepreneurship, life skills (communication, problem-solving, decision-making, and critical thinking), business plan preparation, and bookkeeping knowledge and skills. After completing the program, households may be able to diversify their revenue sources and engage in money-generating activities. Furthermore, training can increase financial literacy, allowing households to make informed decisions about income management, budgeting, and food-related investments (FAO, 2016 & 2018).

Table 1. Demographic and socioeconomic characteristics of study households (Dummy variables)

Variables		**Participant (N=214)**		**Non-participant (N=57)**		**Total value (N=271)**		**Chi^2 - value (probability)**
		N	**%**	**N**	**%**	**N**	**%**	
Sex of household head	Male	90	42.1	22	38.6	112	41.3	0.637
	Female	124	57.9	35	61.4	159	58.7	
Health status of household head	Yes	113	52.8	11	19.3	124	45.7	0.000***
	No	101	47.2	46	80.7	147	55.3	
Credit access	Yes	37	17.3	6	10.5	43	16	0.214
	No	177	82.7	51	89.5	228	84	

Saving access	Yes	132	62	36	60.4	168	62	0.838
	No	81	38	22	39.6	103	38	
Training access	Yes	153	71.5	29	50.9	182	67.2	0.003***
	No	61	28.5	28	49.1	89	32.8	
Participation on social net work	Yes	145	67.6	35	61.5	180	66.5	0.367
	No	69	32.4	22	38.5	91	33.5	

*Note: *** show significance at 1%*
Source: Field surveys, 2020

The chi-square result indicated that there is a significant variation between participants and non-participants at a 1% significant level (Table 1). This result might be because the health status of the household head is a criterion for inclusion in UPSNP, and hence increases the household decision to participate in the program. The result implies that female-headed households were more food insecure and hence participated in UPSNP than male-headed households. The result is in line with the findings of Girma (2012). He found out that the food security status of the female-headed household was worse, compared to the male counterparts. This might be due to males being to some extent more engaged in income-generating activities than females.

As indicated in Table 2, the average grade completed for the UPSNP participant was 2.75 grades, while it was 4.09 for the non-participant households. The mean value of the dependency ratio for UPSNP participants and non-participants was found to be 1.99 and 1.31, respectively. On the other hand, the average cash transferred for UPSNP for participants per annum was found to be 624.43 birr. Cash transfer from UPSNP was found to have a significant effect on household participation to improve the livelihood of beneficiaries. However, the average annual income for UPSNP participants was lower (15877.48 Birr) as compared to the non-participants (61957.05 Birr). Concerning the average annual expenditure for UPSNP participants was 1271.59 while it was 4148.48 for non-participants. Finally, the mean consumption of durable goods of the program participants was 977.80, while the non-participant respondent consumed 7910.53.

Table 2. Demographic and socioeconomic characteristics of study household's continuous variables

Variables	Participant (N=214)		Non-participant (N=57)		T-value	P-value
	Mean	Std. Dev	Mean	Std. Dev		
Age	50.25	17.33	41.42	18.02	-0.5	0.087
Family size	4.21	1.79	3.89	1.68	-1.2	0.815
Education (grade completed)	2.75	1.29	4.03	1.70	6.2	0.000
Dependency ratio	1.99	1.23	1.31	1.18	-3.7	0.001
Cash transfer	628.43	235.47	-	-	-15.2	0.000
Total annual income	15877.48	11207.2	61957.05	56834.6	11.1	0.000
Consumption of durable Goods	977.80	619.98	7910.53	8617.93	11.7	0.000

Source: Field survey, 2020

3.2. Food security status of study households as measured by HFIAS.

The HFIAS results presented in Table 3 show that only 2.2% of study households were food secure, implying that about 98% of the study households were food insecure. However, there were no food-secure UPSNP participants. Concerning the prevalence of food insecurity among the participants, the study found that most households (49.08%) were moderately food insecure, while 26.20% of them were mildly food insecure and 22.51% were severely food insecure. About 53% of participant's households were moderately food insecure and 28% of them were severely food insecure. Few of them (20%) were mildly food insecure.

Table 3. Food security status of study household heads

Food security status	Participant (N=214)		Non-participant (N=57)		Total (N=271)	
	N	%	N	%	N	%
Food Secure (FS)	0	0	6	10.53	6	2.21

Mildly Food Insecure (MFI)	42	19.63	29	50.88	71	26.20
Moderately Food Insecure (MoFI)	113	52.80	20	35.09	133	49.08
Severely Food Insecure (SFI)	59	27.57	2	3.51	61	22.51
Totally	214	100	57	100	271	100

Source: Field Survey, 2020

3.3. Household food security as perceived by study households.

This sub-section describes the root causes of household food insecurity in the study area as perceived by the study households. Figure 3 presents food insecurity as the core problem of in this study area. The immediate causes of the core problem were identified as food market instability, shortage of cash income, the rising price of food and non-food commodities, unemployment, increased cost of production, transportation, and other living necessities, persistent chronic poverty, family size, and others. The immediate effects of the core problem are increased poverty, increased mortality rate, increased conflicts and displacement, food scarcity in households, decline in life expectancy, and losses of assets (Figure 3).

3.3.1. Low employment opportunity

The study's results indicate that food insecurity is prevalent and closely linked to low incomes, unemployment, or unstable employment. A significant proportion of households (21%) identified limited job opportunities as a primary cause of food insecurity in the study region. The failure of people to gain employment arose from insufficient availability of jobs and demand for their products and services, lack of skills, and inability to work due to old age or illness (Yared, 2010). Unemployment in urban Ethiopia is relatively high among the educated young population status. For example, most young adults who have completed 12 years of schooling but have not taken their studies further are unemployed. To some extent, this situation might reflect the fact that only the relatively well-educated consider themselves unemployed. Underemployment, caused by the increased casualization of labor, is also widespread. For many, unstable casual work paid daily is all that is available.

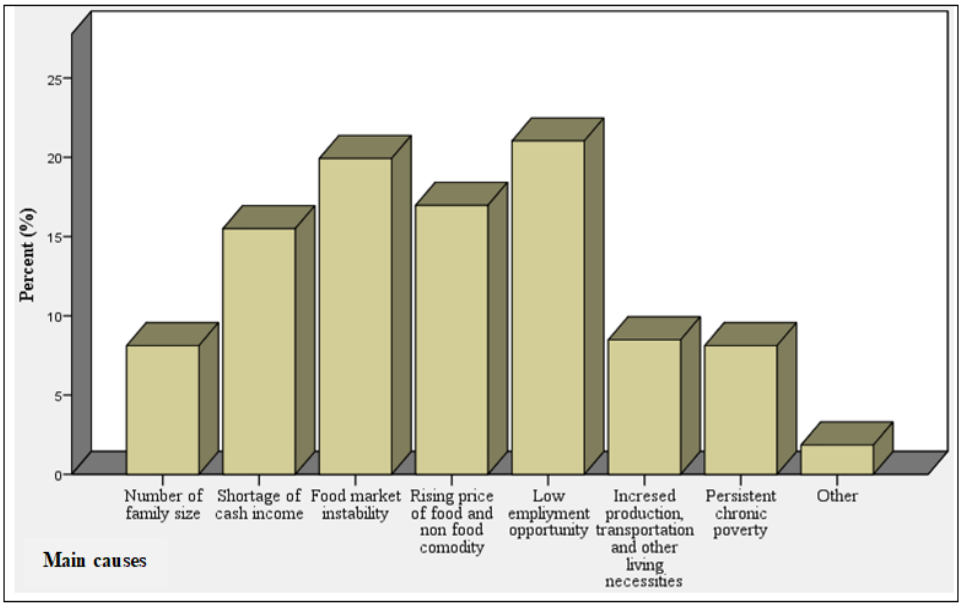

Figure 3. Causes of food insecurity in the study area
Source: Field surveys, 2020

3.3.2. Food market instability

The urban marketing system for agriculture products is not well developed to promote the growth of industrialization; and boost employment opportunities; and linkage with the rural areas is improving but still at an infant stage due to the slowly expanding infrastructure and services (FAO, 2017). The results of this study show that 20% of respondents perceived that food market instability is the main cause of food insecurity in the study area. This might be due to urban areas being mostly dependent on the food market to purchase their food, lack of monitoring& and policy support, and inflation. As explained by Farrington (2002), finance is a critical factor that ensures food security in urban areas. Thus, more than production, urban people 's income status determines their level of food access.

3.3.3. The rising price of food and non-food commodities

About 15% of study households perceived the rising process of food and non-food commodities are the main causes of food insecurity in the study area. On average, only 65% of households were able to purchase about 10 to 25 kilograms of teff and/or other cereals such as maize per month. The unusual

food prices have affected the entire household in the city. According to MoFED (2013), the global food price crisis which affected most countries, including Ethiopia has led to increases in inflation. Urban areas are also severely affected by price hikes that arise from production falls due to drought and other natural solidarity in the face of scarcity (Yared, 2010). This was also confirmed by focus group discussants.

The FGDs had shown the rising price of food and non-food commodities as follows:

> *'…The price of 100 kg teff has increased by twofold since mid-2018, reaching an average of 4,500 Birr in mid-2020. Food prices have also increased by two to threefold in this year. The main reasons for these price increases include internal displacement, artificial price increases due to opportunistic traders and farmers, increased commodity prices from the source, high food demand, fuel price increases, and a shortage of foreign currencies….' (FGD 01, May 02, 2020, Addis Ababa).*

3.3.4. Shortage of cash income

About 15.5% of respondents perceived that a shortage of cash income was the main reason for food insecurity in the study area. This implies that cash transferred from UPSNP was limited and this situation was worsened among the direct support beneficiaries who were receiving 215 ETB per month. They are kept supported by neighbors rather than by the program alone. The qualitative result is in line with the descriptive statistics presented in Table 2. More than half of them have an estimated monthly income range of 1000-2000 ETB from different livelihood activities.

3.3.5. Increased cost of production, transportation, and other living necessities

About 8.5.% of the respondents perceived that the rising price of row material or production cost and the crude oil prices in international markets continually raised over the last one and half years. Likewise, fuel price increases continuously were also mentioned by FGD discussants as a major cause for increasing/expensive transport costs that had complicated the food price increases. Since 2016 in Addis Ababa, a liter of Benzine costs Birr 16.6, diesel costs Birr 14.16 per litter and kerosene costs Birr 12.43 now raise to 21.53,

18.75, and 16 Birr with limited availability of fuel and transportation costs. Despite high prices, certain goods shortages, and the uncertainties caused by recent production and transportation strikers in Addis Ababa. The fuel price adjustments were perceived to be low compared to trends in international markets due to of lack of foreign currency in the country.

3.3.6. Number of family size

About 8.1% of the study households perceived that the number of family size causes food insecurity. In the study area, there is a tendency to avoid differences in food allocation among family members apart from the special consideration given to children large number of respondents perceived that family members ate the same types and amount of food, often from the same plate. This is especially the case among the poorest families where the food that could be offered is too small to be divided among family members. Moreover, a poor woman from a female-headed household (37) key informant with large family size (children) said,

> *'I have five children, the oldest is 16 years old. I lost my husband two years ago. My life with them is difficult due to their lack of understanding and resentment. The children often complain about not having enough food, and I work as a daily laborer, but the wage is not enough to feed my family. I struggle to provide food for my family. As a result, I rely on support from relatives…' (Interview 02 beneficiary, March 6, 2020, Addis Ababa).*

3.4. The effect of UPSNP on food security: The result of ordered logit regression analysis

This study performed all relevant model diagnosis tests, such as the model specification test for overall model fit (goodness of fit), the multi-collinearity problem, and the link test or model specification error test. To determine the effects of UPSNP on household food security, the explanatory factors were evaluated for multicollinearity or relationship with the dependent variables. As a rule of thumb, (a variable with 1 VIF that is not correlated between 1-5 moderately and greater than 5 that is highly correlated) (Education, 2010) from this respect as the mean of VIF was 2.40 has medium collinearity each variable. The model revealed that there were no significant issues with multi-collinearity because the tolerance across explanatory variables was larger than 24%.

Table 4. Diagnostic test result for regression models

Tests	Test name	Factors of participation
estat gof	Pearson>chi2	1
Link test	hat	0.00
	Hatsq	0.42
VIF	Multi-collinearity	2.40

Source: Own competition result using STATA 14

Gujarati (2004) states that the model test was carried out before conducting the logistic regression, and the model specification error test (link test) was conducted after the regression. If the hatsq p-value is not significant, we reject the null hypothesis and validate that our model is properly defined. The p-value for the variable effects of UPSNP on the food security of households is 0.42 and this indicates that the value is not significant, and we fail to reject the null hypothesis and accept that there is no model specification error.

The ordered logit model was used to analyze the effects of the urban productive safety net program on of food security status of sample urban households. The regression results indicate that almost all variables included in the model are significantly associated with the food security status of the study households (Table 4). However, the regression coefficients indicate that the monthly cash transfer from the UPSNP program and consummation of durable goods have no association with the food security status. This might be because limited cash was transferred to the UPSNP beneficiaries and consequently consumed their durable goods to cope up with the food shortage.

3.4.1. Age of the household head

The ordered logit regression model results demonstrate that, at the 1% significance level, the age of the household head has a statistically significant positive connection with family food security. The marginal effect illustrates that when the household's age grows by one year while all other factors remain constant, the chance of being food secure and mildly food insecure falls (becomes less likely in two categories) by 1% and 5%, respectively. This

is because as the age of moderate and severely food insecure households increases, so does their potential to engage in UPSNP. Furthermore, according to the coefficient of variation, membership in UPSNP raises the likelihood of being food secure by 31%.

Table 5. Ordered logit result and marginal effects of PSNP on food security

Variables	Coef.	Std. Err.	Z	P>z	MEdy/ dx FS	ME dy/dx MFIs	MEdy/ dx MoFIs	MEdy/ dx SFIs
Sex	-0.025	0.273	-0.09	.926	0.000**	0.004**	-0.00**	-0.002**
Age	0.031	0.010	3.10	.002	-0.000**	-0.005**	0.002**	0.003**
Family size	-0.634	0.119	-5.34	.000	0.000**	0.112	-0.049*	-0.063
Heath status	0.484	0.296	1.64	.101	-0.000**	-0.085	0.035*	0.049*
Educational level	-0.044	0.121	-0.37	.712	0.000**	0.008**	-0.003**	-0.004**
Dependency ratio	0.272	0.159	1.71	.087	-0.000**	-0.048*	0.021*	0.027*
Credit	0.393	0.373	1.05	.292	-0.000**	-0.064	0.021*	0.044*
Saving	-0.933	0.377	-2.47	.013	0.001**	0.155	-0.052	-0.103
Monthly cash transfer	-0.000	0.000	-9.72	.470	0.000**	0.000**	-0.000**	-0.000***
Consumption of durable goods	-0.000	0.000	-5.17	.000	0.000**	0.000**	-0.000**	-0.000**
Training	0.426	0.393	1.08	.279	-0.000**	-0.078	0.038*	0.040*
Participation in social network	0.418	0.279	1.50	.134	-0.000**	-0.076	0.037*	0.039
/Cut1	-8.836	1.583			-11.939	-5.735		
/Cut2	-2.729	0.902			-4.497	-.961		
/Cut3	0.537	0.894			-1.215	2.288		

Note: **, *show significance at 1% and 5%, respectively and the dy/dx /marginal effects results in household food security categories. FS: Food secured; MFIs: Mildly food insecure; MoFIs: Moderate food insecure and SFIs: and Severely food insecure

***Source**: Field surveys, 2020*

3.4.2. Family size

This variable has a statistically significant and negative effect on household food security at a 1% significant level. The result indicates that household heads who have large family sizes are more likely to be food secure and mildly food insecure and less likely moderately and severely food insecure. Furthermore, the marginal effect indicates that as family size increases by one person, the probability of being food secure and mildly food insecure

increases by 6% and 15.49%, respectively (Table 5). This suggests that food-insecure urban households with high family sizes are more food insecure than food-secure and mildly food-insecure households. Similarly, Mekuanent (2014) observed that the majority of family members were in the inactive age category and had little input into revenue generation rather than consumption, which was negatively associated with household food security. This could be because larger household sizes put more strain on household food security and increase expenditures on non-food things. Muluken (2019) found that household family size has a positive link with household food insecurity status at a 5% significant level. It demonstrates that urban households with high family sizes are more food insecure than those with large family sizes.

3.4.3. Saving access

This variable has a statistically significant and negative influence on the level of food security of households at 5% (P=0.013) as indicated in Table 5. According to the findings, household heads who have access to savings are more likely to be in the food secure and moderately food insecure categories and less likely to be in the moderate and severely food insecure categories. Furthermore, the marginal effect shows that if food-secure and mildly food-insecure households save one Birr more, the probability of being food-secure increases by 0.06% and 15.49%, respectively, while the probability of being moderately or severely food insecure decreases by 5.25% and 10.29. Because more saving access in moderate and severely food insecure households increases the likelihood of food insecurity, and the results are dependent on a total increase in cash income.

3.4.4. Consumption of durable goods

As shown in Table 5, the consumption of durable goods has a statistically significant and negative influence on the degree of food security at 0.1% (P=0.000). The findings suggest that household heads who consume a lot of durable items are less likely to become food-secure in food-secured and moderately food-insecure households, but more likely in moderate and severely food-insecure households. Furthermore, the marginal effect shows that if the proportion of consumption of durable goods increases by one, the food security status of food secure and mildly food insecure households decreases by 0.00% and 0.00%, respectively, while the probability of being

in the moderate and severely food insecure category increases by 0.00% and 0.00% (Figure 5). This suggests that urban moderate and severely food insecure households with high consumption of durable goods are more food secure than food secure and mildly food insecure households.

According to the above arguments, explanatory factors included in this study explain the likelihood of UPSNP beneficiary's household food security status. In this study, the null hypothesis was rejected; there is a significant relationship between the urban household explanatory variables and the effects of UPSNP on food security in the study area.

4. Conclusions and Recommendations

Urban food insecurity is chronic and complex. Understanding this complexity and level of urban food security would help policymakers to design and implement more effective policies and programs for the poor and thereby help to pave the way to improve food security. The purpose of this study was to investigate the effects of UPSNP on improving household food security in the Gulele sub-city of Ethiopia. This study used both descriptive statics and econometric methods to analyze the empirical data. Results of descriptive analysis generally showed that UPSNP participants differ from the non-participants in various demographic, socioeconomic, and institutional-related factors. The result further revealed that participation in PSNP has improved access to saving implying that developing the saving habits of the local community play a vital role in improving the food insecurity of urban poor households. The study concludes that even though the urban productive safety net program has a positive effect on beneficiaries, but not have statistically significant changes in their food security.

The HFIAS result revealed that the majority of UPSNP participants were moderately and severely food insecure indicating the importance of PSNP on the food security of urban poor households. Few of them are food secure and severely food insecure. The qualitative result showed that pre-existing low-income levels and unemployment in combination with high food prices are the main causes of food shortage in the study area. The study recommended that local governments at the sub-city, and Woreda levels should work on activities that would reduce food prices and increase household food stability.

For instance, creating job opportunities and increasing cash transfers to UPSNP beneficiaries would help poor households generate more income and purchase more food for their families.

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Conflict of interest

The authors declare no conflict of interest that could have appeared to influence the work reported in this paper.

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