
ASSESSING THE LEVEL OF HOUSEHOLD FOOD DEMAND PROTECTION BASED ON INCOME

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Abstract. *The goal of this study is to establish the level of food demand protection in Ukrainian households depending on the level of their income, taking into account the impact of other factors and their relationship with the level of food consumption.*

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The survey methodology is based on a sample survey of 8,168 households in Ukraine. This thematic module survey was conducted during a quarterly interview in January 2017 using a special questionnaire. The research was conducted in the context of the following categories of households: place of residence; quantitative composition; number of children; number of adults; availability and number of working persons; on amount of per capita equivalent disposable income; and region.

The results of the study showed that all of the identified factors have a significant impact on the level of food demand protection in Ukrainian households. It was found that the level of food consumption is influenced by, in addition to income, established traditions, the number of adults, status of employment, and the presence of children in the family. At the regional level, specialization and logistics are important factors in food demand protection. In general, a fairly high level of public awareness of the importance of food demand protection was established.

Consideration of the identified factors while forming policy and developing the mechanisms of food demand protection will contribute to the achievement of SDGs 1 and 2.

Keywords: *food security, household, the level of income, analysis.*

JEL Codes: *P25, P46, Q18*

1. Introduction

The key Sustainable Development Goals involve overcoming poverty and ending hunger. Achieving the SDGs involves the fulfilment of all 17 goals, which are considered to be interrelated and complementary. However, for Ukraine as well as for the vast majority of post-socialist (Kotykova & Albeshchenko, 2017) and developing countries, it is impossible to achieve the other SDGs without fulfilling the first and second goals.

A solution to the issue of household food demand protection requires the exploration of various factors.

Kirkpatrick and Tarasuk (2010) raise questions regarding the extent to which neighbourhood-level interventions to improve factors such as food access or social cohesion can mitigate problems of food insecurity that are rooted in resource constraints. Their results reinforce the importance of household-level characteristics, and highlight the need for interventions to address the financial constraints that underlie problems of food insecurity.

An important factor in the level of food demand protection in households is the physical availability of food. This thesis is confirmed, in particular, by the results of the study by Onumah et al. (2020), which indicate that poor households Ghana, which, due to their geographical location, have the opportunity to consume fish, prefer small and cheap pelagic fish. Additionally, it was demonstrated that marital status, religion, occupation, proximity to local market, and city of residence have a positive and significant influence on fish expenditure. Meanwhile, level of income, seasonality of fish, and the interaction of religion and seasonality of fish demonstrated a negative and significant influence.

Satapathy, Nayak, and Mahakud (2020), via sample surveys of households in three states in India, found that the combined substitution and income effects of the food subsidy policy improved the overall welfare of households, presented through the subjective measures of food consumption behaviour, income transfer, and educational achievements. The bargaining effect of the food subsidy programme was reflected in enhanced social status and the empowerment of women. The food security programme seemed to augment the food consumption of the beneficiaries, as observed from the food consumption score.

The results of studies by Oduniyi and Tekana (2020) showed that with more farming experience the probability of household food security decreased. An increase in household size by one member also decreased the probability of a household achieving food security. Similarly, an increase in the age of the head of the household decreased the probability of being food-secure in the study area. These results also revealed that over half of the farming households were food-secure, while the female-headed households were more food-secure, proportionately, compared to male-headed households.

Ma et al. (2016) examined the association of both perceived and geographic neighbourhood food access with food-security status among households with children. The researchers established that caregivers with children who experienced hunger perceived that they had less access to healthy affordable food in their community, even though grocery stores were present. Approaches to improve perceived access to healthy affordable food should be considered as part of the overall approach to improving food security and eliminating child hunger.

In contrast to the results of the research by Ma et al. (2016), Miller (2016) drew another conclusion. In the work "Accessibility of Summer Meals and the Food Insecurity of Low-Income Households with Children", the author investigated whether the geographical accessibility of summer meal program sites (a proxy for program participation) was associated with food insecurity for low-income households. As a result, the author deduced the inference that geographic accessibility was not associated with food insecurity. However, geographic accessibility was associated with a significantly lower probability of very low food security in the full sample, and among households with younger children and those living in less urban areas.

Kirkpatrick and Tarasuk (2003) produced more predictable conclusions. Their research compared food expenditure patterns between low-income households and higher-income households in the Canadian population, and examined the relationship between food expenditure patterns and the presence or absence of housing payments among low-income households. Their outcomes confirmed that among Canadian households, access to milk products and fruits and vegetables may be constrained in the context of low incomes. This study highlights the need for greater attention to be directed towards the affordability of nutritious foods for low-income groups.

A similar conclusion was reached by Korir, Rizov, and Ruto (2020) on the impact of food costs and price elasticity on the level of food security in households in Kenya. The results of their estimation showed positive expenditure elasticities, close to unity, while all compensated and uncompensated own-price elasticities were negative and smaller in

magnitude. This suggests that rising relative food costs have led to the deterioration of the food-security situation in Kenya, and the most severely affected households seem to be those that rely on informal markets and reside in rural areas.

An even greater challenge was faced by low-income households during the coronavirus (COVID-19) pandemic. According to the research results of Kansime et al. (2021), in two East African countries – Kenya and Uganda – more than two-thirds of respondents experienced income shocks due to the COVID-19 crisis. Results from profit regressions show that income-poor households and those dependent on labour income were more vulnerable to income shock, and had poorer food consumption during the COVID-19 pandemic compared to other categories of respondents. As such, they were more likely to employ food-based coping strategies compared to those pursuing alternative livelihoods, who generally relied on savings.

In countries with a higher income per capita, food security studies are shifting towards another dimension. Such social determinants as education, geography, and time are considered to be important factors. Venn et al. (2018) highlighted that household income seems to be the most important correlate with food expenditure patterns once other socioeconomic status (SES) indicators are controlled for. Time constraints appear to explain some, but not all, of the adjusted SES gradients in food expenditure. Comparing home food consumption categories (processed and unprocessed foods) with foods purchased away from home (takeaway and restaurant foods) shows that wealthier, more highly educated, and less disadvantaged households spend relatively less of their total food budget on processed and unprocessed foods prepared at home, and more on foods purchased away from home at restaurants.

To meet some of the UN's seventeen Sustainable Development Goals by 2030, there is a need for more effective policy to reduce food insecurity in low-income and lower-middle-income countries (LMIC). Measuring progress towards these goals requires reliable indicators of food security in these countries (Russell et al. 2018). Taking into consideration the low purchasing power of Ukrainians (Babych & Kovalenko, 2018), food demand protection should be considered only in the context of overcoming poverty. This study shall establish how significant this impact is, and in what categories of households.

2. Methodology

The sample survey included 8,168 households whose living conditions were surveyed by the government statistics agency in 2016 (TURIL only; State Statistics Service of Ukraine, 2017a). This thematic module survey was conducted during a quarterly interview in January 2017 using a special questionnaire.

The first questionnaire block concerned the household's self-perception of its annual income in terms of sufficiency in order to make savings and meet basic needs, including to provide adequate nutrition.

The second block of questions was designed to determine the levels of disability in individual household groups due to lack of funds (consensus deprivation). To this end, data were obtained on the following:

- frequency of eating hot meals;
- cases of starvation during the last year (separately among adults and children) and the number of days of inability to provide any food;
- the ability of households with children to provide children with fruit, juice, school meals, and treats at least once a week.

In addition, households were asked to indicate their primary intention regarding the direction of channelling additional funds if they were to significantly increase their income.

The survey was conducted by expert interviewers who were employed full-time by territorial bodies of national statistics. The survey materials were processed centrally by the Department of Household Surveys of the State Statistics Service, together with the Department of Household Living Surveys of the Main Directorate of Regional Statistics.

These studies are consistent with:

1. “Methods Used to Assess Household Food Insecurity” (FAO/WFP, 2009):
 - diet diversity and food frequency;
 - a coping strategies index;
 - a household economy rapid appraisal;
 - a food poverty (purchasing power) approach.
2. “Monitoring of Food Security at the Regional Level” (Kotykova, Babych, & Semenchuk, 2019).

3. Results

3.1. The distribution of households based on self-perception of income and economic expectations for the next 12 months depending on place of residence

In Ukraine, there is a significant differentiation of incomes between urban and rural residents, which is reflected in the nutrition indicators of the economic accessibility of these categories. According to the poll in Table 1, residents of small towns are in the worst condition in this regard. This situation is explained by the fact that this group of the population overwhelmingly live in multi-storey houses without their own land plots, but, unlike urban residents, have average salaries as residents of villages. Therefore, rural residents have advantages in the physical availability of food, as most of it is grown individually and sold in local or urban markets. Meanwhile residents of large cities, compared with residents of small cities, have the advantage of affordability of food due to their higher incomes and the level of competition between a large number of food sellers. Residents of small towns are deprived of the benefits experienced by both rural residents and residents of large cities.

Table 1. The distribution of households based on self-perception of income and economic expectations for the next 12 months depending on place of residence

Indicator	All house- holds	including living in			
		in urban areas			in rural areas
		in big cities	in small cities	total	
Number of households, thousand	15033.4	5897.9	4211.5	10109.4	4924.0
<i>Distribution of households by self-assessment of their income over the last year, %:</i>					
• consistently denied themselves basic necessities other than food	44.0	43.1	45.9	44.3	43.3
• failed to provide sufficient nutrition	4.1	3.3	4.1	3.7	5.0
• could not provide children with:					
a) fruit or juice	0.7	0.3	0.7	0.5	1.1
b) food or money for meals at school	0.2	0.0	0.2	0.1	0.4
c) treats at least once a week	0.2	0.3	0.0	0.2	0.3
Number of households whose income level during the last year did not allow them to provide even sufficient food, thousand	611.9	196.4	171.6	368.0	243.9
<i>Number of the above who reported that:</i>					
• they had the opportunity to eat hot meals, %:					
a) daily	85.6	87.0	83.6	85.5	85.8
b) almost every day	13.5	12.0	15.0	13.4	13.6
c) sometimes	0.9	1.0	1.4	1.1	0.6
• there had been cases in the last year when one of the household members did not eat at all during the day, thousand.	3.2	0.3	-	0.3	2.9
including starving, %					
a) 1 day	9.1	100.0	-	100.0	-
b) 2–3 days	90.9	-	-	-	100.0
c) 4–5 days	-	-	-	-	-
d) more than 5 days	-	-	-	-	-
Of the total households, the share of those who reported that, with a significant increase in income, they would primarily spend the extra money on food	26.1	22.5	30.9	26.0	26.4

Source: own data processing of the State Statistics Service of Ukraine (2017b)

The situation regarding the provision of food for children is somewhat different: the worst rates were observed in the category of rural residents. The issue here lies in the realm of psychology and the culture of nutrition: rural residents are more appre-

ciative of proteins – i.e., dairy products, meat, and meat products. Therefore, if food is scarce, they will prefer milk over fruit. The issue of “they could not give children food or money for meals at school” should be explained – there are no extended day groups in rural schools, except for the first three years of school in which children are provided lunch free of charge. School normally finishes by 2 pm, so children eat at home where parents can control what and how much the child has to eat, while outside the home the money parents give children for lunch can be (and most often is) used for completely different purposes. That is, it should be understood that the questionnaire response of “could not give children food or money for meals at school” was interpreted in this way by urban residents, but for rural residents, a positive answer to this may have meant something else – for example, “did not give money because they thought it was inappropriate”.

Equally, the culture of consumption of sweets in cities and villages is different: this point is of little importance to residents of large cities, as most – especially young – families consider the use of sweets (sweets are classified in Ukraine as “treats”) by children to constitute a bad habit, and restrict it in every way. For rural residents, however, eating sweets is traditionally considered an expression of love and care. Thus, for residents of the countryside, this item really means “they could not give the children treats at least once a week” because they could not afford to buy them, whereas for residents of large cities this is because they do not consider it necessary to buy them.

Although this level of food demand protection is not considered critical by households, 22.5% of residents of large cities, 26.4% of rural residents, and 30.9% of residents of small cities reported that with a significant increase in income they would channel additional funds especially towards food.

3.2. The distribution of households based on the self-perception of income and economic expectations for the next 12 months depending on their quantitative composition

The distribution of households depending on their size (Table 2) shows the highest level of food demand protection for households with a population of 3, and the lowest level for households with a population of 1. This result is quite natural, since a three-member household is most often a family of two adults (a working parent and a second parent) and one child. One-person households are most often elderly people whose only income is a pension.

Table 2. The distribution of households based on the self-perception of income and economic expectations for the next 12 months depending on their quantitative composition

Indicator	All house- holds	number of people				
		one	two	three	four	five or more
Number of households, thousand	15033.4	2956.0	4855.6	4043.3	2185.2	993.3
<i>Distribution of households by self-assessment of their income over the last year, %:</i>						
• consistently denied themselves basic necessities other than food	44.0	54.9	44.6	37.5	40.4	42.4
• failed to provide sufficient nutrition	4.1	6.2	3.8	2.4	3.8	6.6
• could not provide children with:						
a) fruit or juice	0.7	-	0.1	0.3	1.4	5.3
b) food or money for meals at school	0.2	-	0.0	0.0	0.7	1.2
c) treats at least once a week	0.2	-	0.0	0.2	0.6	0.9
Number of households whose income level during the last year did not allow them to provide even sufficient food, thousand	611.9	183.8	184.0	96.3	82.2	65.6
<i>Number of the above who reported that:</i>						
• they had the opportunity to eat hot meals, %:						
a) daily	85.6	72.7	87.5	87.8	96.1	100.0
b) almost every day	13.5	24.2	12.5	12.2	3.9	-
c) sometimes	0.9	3.1	-	-	-	-
• there had been cases in the last year when one of the household members did not eat at all during the day, thousand.	3.2	3.2	-	-	-	-
<i>including starving, %</i>						
a) 1 day	9.1	9.1	-	-	-	-
b) 2–3 days	90.9	90.9	-	-	-	-
c) 4–5 days	-	-	-	-	-	-
d) more than 5 days	-	-	-	-	-	-
Of the total households, the share of those who reported that, with a significant increase in income, they would primarily spend the extra money on food	26.1	36.3	29.9	18.9	20.2	19.8

Source: own data processing of the State Statistics Service of Ukraine (2017b)

The low level of food supply in this category is confirmed by the low rates of the ability to eat hot meals and the number of people who did not eat at all for 1–3 days. In the

category of one-person households, 64.2% of respondents would have spent increased income on medical treatment and 36.3% on food, which exceeds the share of persons who failed to provide a sufficient level of nutrition by almost 6 times. Similarly, in other categories of households the share of respondents who reported that with a significant increase in income they would spend extra money on, above all, food, significantly outweighed the proportion of households who could not provide enough food. In particular: in households of 2 people, almost by 8 times; in households of 3 people, almost by 8 times; in households of 4 people, by 5 times; and in households of 5 people or more, by 3 times. Such results indicate a sufficiently high level of citizens' awareness of the importance of food demand protection.

3.3. The distribution of households based on self-perception of income and economic expectations for the next 12 months depending on number of children

Large discrepancies were observed between groups of households depending on their size in terms of providing children with fruit, food at school, and treats. The best data for these indicators were recorded in households with 5 or more people, and the worst in households with 2 people. As such, a direct correlation was observed between the increase in the values of these indicators and the increase in the number of persons per household. Since the indicators studied are related to child nutrition, it could be assumed that the increase of these indicators is influenced by an increase in the number of children, but this hypothesis has not been confirmed. The worst data for the indicators of providing children with fruit, food at school, and treats were found in the group of households with two children; in the group of households with one or three children, they were insignificant; and in groups of 4 or 5 or more children, there were no such problems at all (Table 3).

Thus, it is logical to assume that it is not the number of children, but the number of adults in the family that affects the level of ability to provide children with fruit, food at school, and treats.

Table 3. *The distribution of households based on self-perception of income and economic expectations for the next 12 months depending on number of children*

Indicator	All households with children	number of children				
		one	two	three	four	five or more
Number of households, thousand	5744.1	4362.5	1230.2	134.9	10.9	5.6
<i>Distribution of households by self-assessment of their income over the last year, %:</i>						
• consistently denied themselves basic necessities other than food	40.1	39.7	40.3	49.2	44.5	29.8
• failed to provide sufficient nutrition	3.2	2.3	6.1	7.2	-	-
• could not provide children with:						
a) fruit or juice	1.7	0.8	5.1	1.4	-	-
b) food or money for meals at school	0.5	0.2	1.7	0.3	-	-
c) treats at least once a week	0.6	0.4	1.0	0.2	-	-
Number of households whose income level during the last year did not allow them to provide even sufficient food, thousand	184.6	101.2	73.7	9.7	-	-
<i>Number of the above who reported that:</i>						
• they had the opportunity to eat hot meals, %:						
a) daily	96.7	97.2	95.6	100.0	-	-
b) almost every day	3.3	2.8	4.4	-	-	-
c) sometimes	-	-	-	-	-	-
• there had been cases in the last year when one of the household members did not eat at all during the day, thousand.	-	-	-	-	-	-
Of the total households, the share of those who reported that, with a significant increase in income, they would primarily spend the extra money on food	19.0	18.0	20.4	36.1	36.4	11.1

Source: own data processing of the State Statistics Service of Ukraine (2017b)

3.4. The distribution of households based on self-perception of income and economic expectations for the next 12 months depending on number of adults

Indeed, the poorest rates of providing children with fruit, food at school, and treats were found in households where the number of adults was 3 or more (Table 4). This category also displayed the smallest share of households that consistently denied themselves basic necessities other than food, and it was in this category that the smallest share of households reported that with a significant increase in income they would spend additional money primarily on food. Recognizing that the responsibility for making nutritional decisions lies with adults and not children, we can state that in this category of

households (those with children and with three or more adults) adults have their own problems and preferences that they pose or are forced to put above the problem of providing food for children. With regard to the first thesis, these are most likely disadvantaged families where one parent (or both) does not work, and instead uses alcohol or drugs.

Table 4. *The distribution of households based on self-perception of income and economic expectations for the next 12 months depending on number of adults*

Indicator	All households with children	number of adults		
		one	two	three or more
Number of households, thousand.	5744.1	414.3	3404.7	1925.1
<i>Distribution of households by self-assessment of their income over the last year, %:</i>				
• consistently denied themselves basic necessities other than food	40.1	55.0	39.3	38.2
• failed to provide sufficient nutrition	3.2	4.5	1.7	5.6
• could not provide children with:				
a) fruit or juice	1.7	1.4	0.7	3.6
b) food or money for meals at school	0.5	0.3	0.3	1.0
c) treats at least once a week	0.6	0.3	0.4	1.0
Number of households whose income level during the last year did not allow them to provide even sufficient food, thousand	184.6	18.7	57.3	108.6
<i>Number of the above who reported that:</i>				
• they had the opportunity to eat hot meals, %:				
a) daily	96.7	100.0	89.5	100.0
b) almost every day	3.3	-	10.5	-
c) sometimes	-	-	-	-
• there had been cases in the last year when one of the household members did not eat at all during the day, thousand.	-	-	-	-
Of the total households, the share of those who reported that, with a significant increase in income, they would primarily spend the extra money on food	19.0	24.0	18.7	18.3

Source: own data processing of the State Statistics Service of Ukraine (2017b)

3.5. The distribution of households whose composition includes children who do not have one or both parents based on self-perception of income, economic expectations for the next 12 months, and number of children

The above thesis is confirmed by the data in Tables 5 and 6. In particular: the share of households that consist of children who do not have one or both parents who consistently denied themselves basic necessities other than food for the category of respondents with

3 children or more was 80.6% (Table 5), and only 46.0% for households with 3 adults or more (Table 6).

In addition, of the total number of households, the share of those who reported that with a significant increase in income they would spend additional money primarily on food was 48.7% for households with 3 children or more and only 23.7% for households with 3 adults or more.

Table 5. *The distribution of households whose composition includes children who do not have one or both parents based on self-perception of income, economic expectations for the next 12 months, and number of children*

Indicator	Households that include children who do not have one or both parents	number of children		
		one	two	three or more
Number of households, thousand.	1056.7	871.9	162.6	22.2
<i>Distribution of households by self-assessment of their income over the last year, %:</i>				
• consistently denied themselves basic necessities other than food	48.9	48.7	46.0	80.6
• failed to provide sufficient nutrition	3.7	3.6	3.6	7.7
• could not provide children with:				
a) fruit or juice	1.1	0.9	1.8	6.8
b) food or money for meals at school	0.5	0.4	0.6	0.5
c) treats at least once a week	0.5	0.5	0.5	0.5
Number of households whose income level during the last year did not allow them to provide even sufficient food, thousand	39.1	31.6	5.7	1.8
<i>Number of the above who reported that:</i>				
they had the opportunity to eat hot meals, %:				
daily	92.8	91.1	100.0	100.0
almost every day	7.2	8.9	-	-
sometimes	-	-	-	-
there had been cases in the last year when one of the household members did not eat at all during the day, thousand.	-	-	-	-
Of the total households, the share of those who reported that, with a significant increase in income, they would primarily spend the extra money on food	20.3	20.5	15.6	48.7

Source: own data processing of the State Statistics Service of Ukraine (2017b)

This position is quite obvious – adults, compared to children, can receive income from many sources (salary, pension, scholarship, etc.), while children do not have this

opportunity. Therefore, the overall budget of these families varies greatly, but the nutritional requirements for families with children are higher.

3.6. The distribution of households whose composition includes children who do not have one or both parents based on self-perception of income, economic expectations for the next 12 months, and number of adult persons in their composition

The unexpected result of a household survey of children without one or both parents and with 2 adults in the household (Table 6), with only 34.1% saying they were able to eat hot meals almost every day, is questionable.

At the same time, this was the category of household where the lowest share failed to provide sufficient nutrition (1.9%).

Table 6. *The distribution of households whose composition includes children who do not have one or both parents based on self-perception of income, economic expectations for the next 12 months, and number of adult persons in their composition*

Indicator	Households that include children who do not have one or both parents	number of adults		
		one	two	three or more
Number of households, thousand.	1056.7	307.2	430.8	318.7
<i>Distribution of households by self-assessment of their income over the last year, %:</i>				
• consistently denied themselves basic necessities other than food	48.9	55.5	46.5	46.0
• failed to provide sufficient nutrition	3.7	4.6	1.9	5.3
• could not provide children with:				
a) fruit or juice	1.1	1.8	0.6	1.2
b) food or money for meals at school	0.5	0.3	-	1.2
c) treats at least once a week	0.5	0.5	0.4	0.8
Number of households whose income level during the last year did not allow them to provide even sufficient food, thousand	39.1	14.0	8.3	16.8
<i>Number of the above who reported that:</i>				
• they had the opportunity to eat hot meals, %:				
a) daily	92.8	100.0	65.9	100.0
b) almost every day	7.2	-	34.1	-
c) sometimes	-	-	-	-
• there had been cases in the last year when one of the household members did not eat at all during the day, thousand.	-	-	-	-
Of the total households, the share of those who reported that, with a significant increase in income, they would primarily spend the extra money on food	20.3	20.2	17.9	23.7

Source: own data processing of the State Statistics Service of Ukraine (2017b)

3.7. The distribution of households without children based on self-perception of income and economic expectations for the next 12 months depending on household composition

According to the data, the level of food demand protection in households without children is even lower (Figure 1).

However, in households without children, there was significant fluctuation of indicators depending on the number of persons in the household and the availability of working-age and non-working age persons. It is only logical that the level of food demand protection in households that include working-age persons is higher than households where there are non-working age persons present (Table 7).

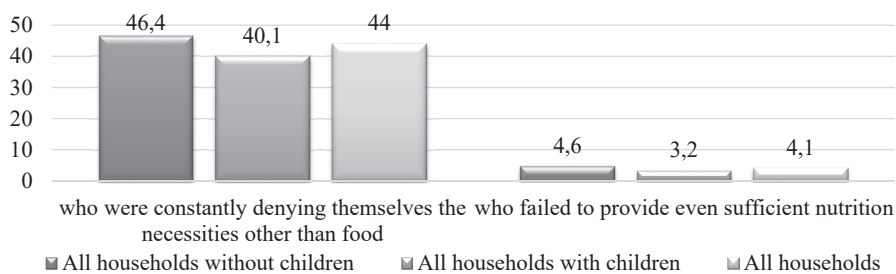


Figure 1. The distribution of households based on self-perception of income and economic expectations for the next 12 months depending on their composition

Source: own data processing of the State Statistics Service of Ukraine (2017b)

Table 7. The distribution of households without children based on self-perception of income and economic expectations for the next 12 months depending on household composition

Indicator	All households without children	Households with one person		Households with two or more persons		
		of working age	of a non-working age	all of a working age	working and non-working ages	all of a non-working age
Number of households, thousand.	9289.3	1171.2	1784.8	2728.8	1902.0	1702.5
Distribution of households by self-assessment of their income over the last year, %:						
consistently denied themselves basic necessities other than food	46.4	49.4	58.4	36.5	44.6	49.3
failed to provide sufficient nutrition	4.6	5.5	6.7	3.1	5.0	3.8

Indicator	All households without children	Households with one person		Households with two or more persons		
		of working age	of a non-working age	all of a working age	working and non-working ages	all of a non-working age
Number of households whose income level during the last year did not allow them to provide even sufficient food, thousand	427.3	65.0	118.8	83.8	94.5	65.2
Number of the above who reported that they had the opportunity to eat hot meals, %:						
daily	80.8	54.6	82.6	92.1	77.1	94.3
almost every day	17.9	37.3	17.0	7.9	22.9	5.7
sometimes	1.3	8.1	0.4	-	-	-
there had been cases in the last year when one of the household members did not eat at all during the day, thousand.	3.2	3.2	-	-	-	-
including starving, %						
1 day	9.1	9.1	-	-	-	-
2–3 days	90.9	90.9	-	-	-	-
4–5 days	-	-	-	-	-	-
more than 5 days	-	-	-	-	-	-
Of the total households, the share of those who reported that, with a significant increase in income, they would primarily spend the extra money on food	30.6	24.8	43.8	21.0	29.0	37.8

Source: own data processing of the State Statistics Service of Ukraine (2017b)

It is noteworthy that in households of two or more persons, all indicators of food demand protection far exceed the values of single-person households, even in the category of “all of a non-working age”.

This result can be explained by two factors:

1. More efficient allocation of income to fixed costs, which do not depend on the number of household members (rent, utilities, internet, etc.);
2. The mutual support of household members, which has a positive effect on a person’s psychological state. As a result, during the survey, single people were more pessimistic about their estimates and projections, and family people, on the contrary, were more optimistic.

3.8. The distribution of households based on self-perception of income and economic expectations for the next 12 months depending on availability and number of working persons in their composition

It is quite obvious that food demand protection rises in households with more workers (Table 8).

Table 8. The distribution of households based on self-perception of income and economic expectations for the next 12 months depending on availability and number of working persons in their composition

Indicator	All households that include working people	number of working people			All households with no working people
		one	two	three or more	
Number of households, thousand.	10627.1	5069.4	4632.5	925.2	4406.3
<i>Distribution of households by self-assessment of their income over the last year, %:</i>					
• consistently denied themselves basic necessities other than food	39.5	46.1	33.7	32.2	54.8
• failed to provide sufficient nutrition	3.0	3.4	2.3	3.9	6.7
• could not provide children with:					
a) fruit or juice	0.8	0.7	0.7	2.2	0.2
b) food or money for meals at school	0.3	0.2	0.1	1.2	0.0
c) treats at least once a week	0.3	0.3	0.3	-	0.1
Number of households whose income level during the last year did not allow them to provide even sufficient food, thousand	318.4	174.7	107.4	36.3	293.5
<i>Number of the above who reported that:</i>					
• they had the opportunity to eat hot meals, %:					
a) daily	88.5	79.7	98.9	100.0	82.4
b) almost every day	9.9	17.3	1.1	-	17.4
c) sometimes	1.6	3.0	-	-	0.2
• there had been cases in the last year when one of the household members did not eat at all during the day, thousand.	1.6	1.6	-	-	1.6
<i>including starving, %</i>					
a) 1 day	18.1	18.1	-	-	-
b) 2-3 days	81.9	81.9	-	-	100.0
c) 4-5 days	-	-	-	-	-
d) more than 5 days	-	-	-	-	-
Of the total households, the share of those who reported that, with a significant increase in income, they would primarily spend the extra money on food	20.1	23.6	17.4	14.6	40.7

Source: own data processing of the State Statistics Service of Ukraine (2017b)

It should be noted that households with 3 or more employed persons and households with no working persons, respectively, have the lowest (32.2%) and highest (54.8%) values of the indicator of “consistently denied themselves basic necessities other than food” among all study groups, except for the household category which includes children without one or both parents and 3 or more children (Table 9).

Table 9. *The distribution of households based on self-perception of income and economic expectations for the next 12 months depending on their composition for the indicator “consistently denied themselves basic necessities other than food”*

Households with 5 or more children	29.8
Households with 3 or more working people	32.2
Households with 2 working people	33.7
Households without children with 2 or more people of working age	36.5
Households with 3 people	37.5
Households with children and 3 or more adults	38.2
Households with children and 2 adults	39.3
Households with 1 child	39.7
Households with 2 children	40.3
Households with 4 people	40.4
Households with 5 people or more	42.4
Households living in large cities	43.1
Households living in rural areas	43.3
Households with 4 children	44.5
Households with 2 people	44.6
Households without children with 2 or more people of both working and non-working ages	44.6
Households living in small towns	45.9
Households that include 2 children without one or both parents	46.0
Households with 3 or more adults that include children who do not have one or both parents	46.0
Households with 1 working person	46.1
Households that have children without one or both parents, with 2 adults	46.5
Households with 1 child who does not have one or both parents	48.7
Households with 3 children	49.2
Households without children with 2 or more persons of non-working age	49.3
Households without children with 1 person of working age	49.4
Households with 1 person	54.9
Households with children and adults	55.0
Households with 1 child and 1 adult where the child does not have one or both parents	55.5
Households without children with 1 person of non-working age	58.4
Households that have children who do not have one or both parents with 3 or more children	80.6

Source: own data processing of the State Statistics Service of Ukraine (2017b)

3.9. The distribution of households based on self-perception of income and economic expectations for the next 12 months depending on size of per capita equivalent disposable income

According to official data in Ukraine, food costs are 53.6% of total expenditure for urban households and 47.5% for rural households. Of course, under such conditions, the economic availability of food depends directly on the level of income of the population. The data in Table 10 indicates a direct dependence of household food demand on income level. It should be noted that even in the category with the highest income, 1 in 4 households have consistently denied themselves basic necessities other than food.

Table 10. The distribution of households based on self-perception of income and economic expectations for the next 12 months depending on size of per capita equivalent disposable income

Indicator	All households	per capita equivalent disposable income per month, dollar										
		< 18.79	18.79-32.88	32.89-46.96	46.97-61.05	61.06-75.14	75.15-89.23	89.24-103.32	103.33-117.41	117.42-131.50	131.51-145.59	> 145.60
Share of households in the group, %	100.0	0.0	0.2	1.5	4.4	10.9	15.2	15.9	13.4	10.2	8.2	20.1
<i>Distribution of households by self-assessment of their income over the last year, %:</i>												
• consistently denied themselves basic necessities other than food	44.0	67.5	65.1	57.8	57.4	59.1	51.3	49.2	46.0	39.5	38.5	25.0
• failed to provide sufficient nutrition	4.1	32.5	32.4	15.7	7.5	5.6	4.3	5.3	4.0	2.6	1.4	2.0
• could not provide children with:												
a) fruit or juice	16.0	100.0	-	56.2	15.7	11.1	14.5	7.0	19.7	2.0	-	33.3
b) food or money for meals at school	4.7	100.0	-	7.3	0.2	6.6	2.0	2.5	4.4	1.0	-	17.7
c) treats at least once a week	5.3	100.0	-	31.7	12.4	4.1	8.4	-	3.1	1.0	-	-
Number of households whose income level during the last year did not allow them to provide even sufficient food, thousand	611.9	0.2	12.1	35.6	49.2	92.1	97.2	126.9	80.1	40.1	17.4	61.0
<i>Number of the above who reported that:</i>												
• they had the opportunity to eat hot meals, %:												
a) daily	85.6	100.0	44.5	72.3	76.5	72.7	88.8	84.7	96.9	100.0	95.6	97.8
b) almost every day	13.5	-	53.1	26.3	22.5	24.2	9.5	15.3	3.1	-	4.4	2.2
c) sometimes	0.9	-	2.4	1.4	1.0	3.1	1.7	-	-	-	-	-

Indicator	All households	per capita equivalent disposable income per month, dollar										
		< 18.79	18.79-32.88	32.89-46.96	46.97-61.05	61.06-75.14	75.15-89.23	89.24-103.32	103.33-117.41	117.42-131.50	131.51-145.59	> 145.60
• there had been cases in the last year when one of the household members did not eat at all during the day, thousand.	3.2	-	1.6	1.6	-	-	-	-	-	-	-	-
<i>including starving, %</i>												
a) 1 day	9.1	-	18.1	-	-	-	-	-	-	-	-	-
b) 2-3 days	90.9	-	81.9	100.0	-	-	-	-	-	-	-	-
c) 4-5 days	-	-	-	-	-	-	-	-	-	-	-	-
d) more than 5 days	-	-	-	-	-	-	-	-	-	-	-	-
Of the total households, the share of those who reported that, with a significant increase in income, they would primarily spend the extra money on food	26.1	100.0	86.3	49.2	35.9	37.5	30.7	25.5	29.1	22.0	20.5	14.9

Source: own data processing of the State Statistics Service of Ukraine (2017b)

At the same time, roughly 1 in 3 of the poorest households failed to provide sufficient nutrition, and all households in this category, in case of a significant increase in income, would divert additional funds primarily to food.

3.10. The distribution of households based on self-perception of income and economic expectations for the next 12 months by region

Objectively, income levels have a significant impact on food demand. However, this statement is truer of poorer people. In other words, a low level of income definitely leads to the impossibility of sufficient food supply. However, a high level of income does not guarantee food demand protection. This conclusion is confirmed by the data in Annex 1.

In particular, whilst the Zakarpattia region was ranked first among 24 districts in terms of income, 57% (the highest value) of households reported that they were not able to provide sufficient nutrition, 11% could not give food or money to children to buy meals at school, and 52% reported that with a significant increase in income, they would spend the extra money primarily on food.

A similar situation was observed in the Ivano-Frankivsk Region, which ranked in 5th place among the 24 districts by income level. Here, 93% of households reported that they continually denied themselves basic necessities other than food, and 48% said that with a significant increase in income, they would spend the extra money primarily on food.

Alternatively, the Kyiv Region, with an average household income 27% lower than that of Zakarpattya, had the best performance in food demand protection among Ukraine's regions. This situation is explained by the specializations and logistics of each region. For example, very little agricultural production (1.6% and 2.3% of the total volume in the country, respectively) originates from the Zakarpattya and Ivano-Frankivsk regions due to their unique climatic conditions. The logistics of food delivery to these regions, especially to Zakarpattya (a mountainous area), is complex and unprofitable – the territory is large and the number of consumers is small. While the Kyiv region produces 6.1% of the country's agricultural output, it has the best logistical conditions for the delivery and storage of food, and has a high population density – hence a great number of potential consumers. The same is also true for the other major cities and tourist centres of the country, such as the Lviv, Odesa, and Kharkiv regions.

For other regions, specialization and logistics also have a significant impact on the level of food demand protection. The more agricultural products produced by the region and the better the level of logistics and food supply and storage, the better – all else being equal – the food demand protection indicators.

Therefore, in addition to income level, specialization and logistics are important factors at the regional level. However, there are other factors of income level that are important to note. The Luhansk and Sumy Regions have the same household income levels, but agricultural output in the Sumy region (4%) is much higher than in the Luhansk region (1.9%). At the same time, the indicators of food demand protection during the self-assessment of households in the Luhansk Region were much better than in the Sumy Region, which does not align with the previous conclusions. This situation is explained by the fact that the level of perceived satisfaction (in particular – regarding the consumption of food) is very different in these two regions: in the Sumy region it is overstated, and in Luhansk region it is understated. Thus, in the Sumy region, almost 90% of respondents considered themselves to be poor, whereas in Luhansk, less than 70% considered themselves to be poor.

It is fair to point out that if we focus on the self-estimation of households of their income level rather than on actual data, we will observe a close correlation between self-estimated food consumption, self-estimated agricultural output, and self-estimated population poverty. A spectacular example is provided by the Zakarpattya and Ivano-Frankivsk regions, which have the lowest self-estimated household poverty rates and the lowest actual agricultural production and, as a result, the worst self-estimated food demand protection.

4. Discussion

When analysing the quality of the estimates of indicators based on sample survey data, information regarding the magnitude of sampling error is critical in correctly interpreting the results and optimizing the design of the sample. The magnitude of this error determines the limits of confidence intervals in the construction of interval estimates of indicators – i.e., the intervals of possible values of indicators according to the sample

survey. The estimation of an indicator for which the magnitude of the sampling error is significant compared to the value of the estimate itself cannot be used in the analysis of the survey results.

The following indicators are most clearly characterized by the quality of the sample survey data: limit sampling error and relative standard sampling error (or CV coefficient).

Relative standard error is often used as an indicator of the suitability of data for analysis. If $RSE \leq 5\%$, then the estimate is considered reliable; if $5\% < RSE \leq 10\%$, then the estimate is suitable for quantitative analysis, but its reliability is not high enough; if $10\% < RSE \leq 25\%$, then the estimate is only suitable for qualitative analysis and should be used with caution (but sometimes data is published for which the RSE reaches 30% and even 40%).

Annexes 1 and 2 present the results of calculations of the marginal sampling error for $p = 0.95$ and the relative standard sampling error for estimating the values of the “number of households whose members consistently denied themselves basic necessities other than food” and “number of households whose members referred to themselves as poor”. The assessment of the indicators and the characteristics of their reliability are calculated for the level of Ukraine (in general, in large and small cities, and in rural areas), economic districts, and regions.

The results show that the estimates obtained are accurate for Ukraine: the relative standard error of the sample is 2.34% for the indicator “number of households whose members consistently denied themselves basic necessities other than food” (Annex 2) and 2.12% for the indicator “number of households whose members referred to themselves as poor” (Annex 3).

The sample error margin for the indicator “number of households whose members consistently denied themselves basic necessities other than food” (Annex 2) for the level of Ukraine was 302.76 thousand households – that is, with 95% probability the value of this indicator in the general population is in the range of 6306.83–6912.35 thousand households. The sample error margin for the indicator “number of households whose members referred to themselves as poor” (Annex 3) for the level of Ukraine was 462.44 thousand households – that is, with 95% probability the value of this indicator in the general population is in the range of 10666.11–11590.99 thousand households.

Data on households in large and small towns and in rural areas at the national level were accurate, and the relative standard error of the sample did not exceed 5%. For the indicator “number of households whose members consistently denied themselves basic necessities other than food”, the minimum value (3.29%) was for small-town households and the maximum value (4.98%) was for rural households. For the indicator “number of households whose members refer to themselves as poor”, the minimum value (2.48%) was for small-town households and the maximum value (4.04%) was for those in large towns.

At the regional level, the accuracy of the estimation for the indicator “number of households whose members consistently denied themselves basic necessities other than food” was not satisfactory: in 16 regions, the relative standard error of sampling exceeded

10% – i.e., the obtained estimates can only be used for qualitative analysis. At the level of economic districts, the estimates were fairly accurate: in the range of 5.65–8.61% – i.e., these estimates are suitable for quantitative analysis.

At the regional level, the accuracy of the indicator “number of households who refer to themselves as poor” was satisfactory, and is suitable for quantitative analysis. The relative standard error of sampling exceeded 10% in only three regions: Volyn, Ivano-Frankivsk, and Kirovohrad.

If the relative standard error of the sample is large enough, it becomes necessary to use the estimates of indicators either by economic area, by large cities, or by Ukraine as a whole (depending on the corresponding values of relative standard error). So, for example, when it is necessary to carry out quantitative calculations, it is better to use the percentage ratios established at the level of Ukraine as a whole (in general, in large and small cities, and in rural areas).

5. Conclusions

A significant differentiation of the population’s level of food supply depending upon the distribution of households based on the self-estimation of income and economic expectations for the next 12 months was observed. This depended on: place of residence; quantitative composition; number of children; number of adults; availability and number of working-age persons; amount of per capita equivalent disposable income; region; the presence of children who do not have one or both parents based on number of children; the presence of children who do not have one or both parents based on number of adults; and the presence of children who do not have one or both parents based on household composition.

The obtained results are important for the formulation of food demand protection policies within the framework of SDG1 and SDG2 at the local, regional, and national levels.

These results confirmed the hypothesis, which suggested a decisive impact of income level upon the level of food supply of the vast majority of households. This factor is not always determined directly by the amount of income received, but its impact is clearly traced in specific households which, by their composition, can be classified as socially vulnerable and unprotected. Namely, this includes households: with one person; with children and adults, and that contain children who do not have one or both parents; with one child and with one adult; without children, with one person of non-working age; and with children who do not have one or both parents, with 3 or more children. Therefore, in establishing a food program at the national level, the state has a priority to ensure food access for the following socially vulnerable groups of the population: pensioners; large families; single-parent families with children; and single mothers. This principle is fundamental for the Resolution adopted by the UN General Assembly on 20 December 2018 regarding agriculture development, food security and nutrition:

Reaffirming the right of everyone to have access to safe, sufficient and nutritious food, consistent with the right to adequate food and the fundamental right of everyone to be free from hunger, so as to be able to fully develop and maintain

their physical and mental capacities, and underlining the need to make special efforts to meet nutritional needs, especially of women, children, older persons, indigenous peoples and persons with disabilities, as well as of those living in vulnerable situations (p. 5).

At the same time, it should be remembered that, all else being equal (number of children, incapacity of households, etc.), the level of food demand protection of rural residents (at an objectively lower level of income compared to urban residents) is not always lower than the level of food demand protection of urban residents. The vast majority of rural residents produce their own food, so household income has a much smaller impact on the quantity and quality of consumed products that they do not need to buy. Revenue has an indirect impact only on the assortment of food. Therefore, policy-making on rural food demand protection should focus on providing access to food production resources, disseminating educational programs on sustainable land-use technologies, and empowering women and youth in rural areas. This approach is fundamental to the aforementioned Resolution of the UN General Assembly (2018):

Reiterating the importance of gender equality and the empowerment of women and girls, as well as the recognition and protection of the rights of smallholders, particularly women, reiterating also the importance, inter alia, of empowering rural women, youth, small-scale farmers, family farmers and livestock farmers, fishers and fish workers as critical agents for enhancing agricultural and rural development and food security and for improving nutrition outcomes, and acknowledging their fundamental contribution to the environmental sustainability and the genetic preservation of agricultural systems and to sustaining productivity on often marginal lands (p. 7).

Studies of this issue have allowed for two determinants of food demand protection at the regional level to be identified: specialization and logistics. The natural climatic conditions and the available natural resources of each region create additional opportunities and advantages or, conversely, limit the development of certain agricultural sectors. However, it is very difficult to influence this factor, and its impact should be minimal within the framework of the Sustainable Development Goals. In terms of logistics, the crucial factors are process management and the technologies used. Today, Ukraine does not face the problem of volume of production, but remains troubled by the possibilities of preserving products. "The share of food consumption and food loss and waste accounted as 61.6% for fruits and vegetables, 72.0% for meat and meat products, and 25.4% for milk. The food loss and waste has significant negative social and economic consequences" (Kotykova & Babych, 2019b). "The sum of economic losses in Ukraine in 2016 amounted to about 991.9 million EUR, which is 2.8% of the budget of Ukraine in 2017, and a 2224.5 million EUR unsatisfied income" (Kotykova and Babych 2019a). Therefore, addressing the issue of food demand protection at the regional level will involve minimizing losses at the stages of food production, processing, and storage. This is encapsulated by the UN General Assembly's Resolution (2018) which states that:

by 2050, the world urban population is expected to nearly double, making urbanization one of the most transformative trends of the twenty-first century,

underscoring the growing need to take action to fight hunger and malnutrition among the urban poor through promoting the integration of the food security and nutrition needs of urban residents, in particular the urban poor, in urban and territorial planning, to end hunger and malnutrition, promoting the coordination of sustainable food security and agriculture policies across urban, peri-urban and rural areas to facilitate the production, storage, transport and marketing of food to consumers in adequate and affordable ways, to reduce food losses and to prevent and reuse food waste, and promoting the coordination of food policies with energy, water, health, transport and waste and other policies in urban areas to maximize efficiencies and minimize waste (p. 11).

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Annex 1. The distribution of households by region according to self-perception of income and economic expectations for the next 12 months

Indicator	Region																									
	All households	Vinnitsya	Volyn	Dnipropetrovsk	Donetsk	Zhytomyr	Zakarpattia	Zaporizhzhya	Ivano-Frankivsk	Kyiv	Kirovohrad	Luhansk	Lviv	Mykolayiv	Odesa	Poltava	Rivne	Sumy	Ternopil	Kharkiv	Kherson	Khmelnytskyi	Cherkasy	Chernivtsi	Chernihiv	
Per capita equivalent disposable income per month, dollar	210	207	200	206	181	174	288	199	222	211	194	179	254	206	240	187	195	179	197	194	209	181	164	226	180	
Number of households whose members refer to themselves as poor, %	74.0	86.5	53.8	76.0	83.6	47.8	99.8	90.5	96.4	93.5	18.7	69.7	53.4	98.4	77.1	62.6	65.5	88.0	86.4	83.3	97.1	54.3	91.5	82.7	66.1	
Agricultural production, %	100.0	8.4	2.6	6.0	3.0	3.7	1.6	3.9	2.3	6.1	4.7	1.9	3.6	3.8	4.7	6.8	2.6	4.0	3.3	6.1	4.4	4.9	5.9	1.7	4.1	
Share of households in the group, %	100.0	4.2	2.2	9.1	6.2	3.3	2.4	4.8	3.0	4.4	2.8	2.4	5.5	3.0	5.9	4.0	2.5	3.0	2.4	7.4	2.7	3.2	3.5	2.0	2.9	
<i>Distribution of households by self-assessment of their income over the last year, %:</i>																										
• consistently denied themselves basic necessities other than food	44.0	77.5	34.6	43.0	47.5	24.9	36.7	53.3	92.6	14.7	19.6	29.8	15.2	53.6	39.5	32.7	49.5	72.6	76.8	49.5	56.8	37.8	42.8	33.3	59.4	
• failed to provide sufficient nutrition	4.1	5.8	1.2	2.1	6.4	-	57.4	2.1	3.8	-	-	1.2	0.1	3.4	0.5	0.3	-	12.8	1.9	3.5	14.2	2.9	2.4	0.9	5.0	

Indicator	Region																										
	All households	Vinnitsya	Volyn	Dnipropetrovsk	Donetsk	Zhytomyr	Zakarpattia	Zaporizhzhya	Ivano-Frankivsk	Kyiv	Kirovohrad	Luhansk	Lviv	Mykolayiv	Odesa	Poltava	Rivne	Sunny	Ternopil	Kharkiv	Kherson	Khmelnytskyi	Cherkasy	Chernivtsi	Chernihiv		
• could not give children:																											
a) fruit or juice	16.0	22.4	-	27.8	0.5	-	34.7	-	-	-	-	-	-	-	48.9	-	-	7.5	-	-	-	4.3	-	-	-	-	
b) food or money for meals at school	4.7	8.6	-	-	0.3	-	11.0	-	2.4	-	-	-	-	-	48.9	-	-	-	-	-	0.9	-	-	-	-	-	
c) treats at least once a week	5.3	2.2		27.8	0.5	-	5.6	-	-	-	-	6.8	-	-	48.9	-	-	5.9	-	-	3.1	-	-	-	-	-	
Number of households whose income level during the last year did not allow them to provide even sufficient food, thousand	611.9	37.1	4.1	29.1	59.5	-	203.6	14.7	16.9	-	-	4.4	0.6	15.3	4.5	1.9	-	57.4	6.9	38.5	57.9	13.3	12.4	2.8	21.9		
<i>Number of the above who reported that:</i>																											
• they had the opportunity to eat hot meals, %:																											
a) daily	85.6	35.3	35.1	96.6	66.4	-	99.8	68.8	100.0	-	-	70.9	-	81.1	100.0	100.0	-	95.3	68.3	100.0	78.1	48.9	80.6	85.2	95.6		
b) almost every day	13.5	59.7	40.1	3.4	32.8	-	-	31.2	-	-	-	22.4	100.0	18.9	-	-	-	4.7	8.6	-	21.9	51.1	19.4	14.8	4.4		

Indicator	All households whose members have consistently denied themselves basic necessities other than food	LSE, thousands	RSE, %
Ukraine	6609.59	302.76	2.34
Cities (> 100,000 people)	2542.25	200.94	4.03
Cities (< 100,000 people)	1931.52	124.48	3.29
Countryside	2135.82	208.32	4.98
Region			
Vinnitsa	494.20	55.85	5.77
Volyn	116.76	44.44	19.42
Dnipropetrovsk	586.00	151.94	13.23
Donetsk	443.28	74.54	8.58
Zhytomyr	122.06	31.30	13.08
Zakarpattia	130.43	61.18	23.93
Zaporizhzhia	383.66	59.83	7.96
Ivano-Frankivsk	418.39	92.71	11.31
Kyiv	96.37	34.00	18.00
Kirovograd	82.67	36.04	22.24
Luhansk	105.39	14.71	7.12
Lviv	125.01	40.93	16.70
Mykolayiv	239.44	65.01	13.85
Odesa	351.41	74.29	10.79
Poltava	195.56	55.38	14.45
Rivne	186.18	25.34	6.94
Sumy	326.00	44.18	6.91
Ternopil	274.94	52.33	9.71
Kharkiv	552.89	134.69	12.43
Kherson	230.87	47.71	10.54
Khmelnyskiy	182.07	32.93	9.23
Cherkasy	223.67	56.24	12.83
Chernivtsi	102.38	27.74	13.82
Chernihiv	263.37	47.00	9.11
Economic districts			
East	1074.45	152.15	7.22
Donetsk	548.67	75.98	7.06
Dnipro	1052.33	167.23	8.11
Black Sea	821.72	109.64	6.81
Podilsky	951.21	83.32	4.47
Central	696.63	117.61	8.61
Carpathian	776.21	121.58	7.99
Polissia	688.37	76.29	5.65

Source: own data processing of the State Statistics Service of Ukraine (2017b)

Annex 3. The number of households whose members refer to themselves as poor

Indicator	All households whose members refer to themselves as poor	LSE, thousands	RSE, %
Ukraine	11128.55	462.44	2.12
Cities (> 100,000 people)	4072.09	322.75	4.04
Cities (<100 thousand people)	3245.94	157.51	2.48
Countryside	3810.52	227.20	3.04
Region			
Vinnitsa	551.15	55.85	5.17
Volyn	181.28	44.44	12.51
Dnipropetrovsk	1036.51	151.94	7.48
Donetsk	780.18	74.54	4.87
Zhytomyr	234.57	31.30	6.81
Zakarpattia	354.26	61.18	8.81
Zaporizhzhia	650.56	59.83	4.69
Ivano-Frankivsk	435.33	92.71	10.87
Kyiv	611.86	34.00	2.84
Kirovograd	78.82	36.04	23.33
Luhansk	246.46	14.71	3.04
Lviv	439.22	40.93	4.75
Mykolayiv	439.83	65.01	7.54
Odesa	685.89	74.29	5.53
Poltava	374.93	55.38	7.54
Rivne	246.51	25.34	5.24
Sumy	394.65	44.18	5.71
Ternopil	309.15	52.33	8.64
Kharkiv	930.29	134.69	7.39
Kherson	394.71	47.71	6.17
Khmelnyskiy	261.35	32.93	6.43
Cherkasy	478.01	56.24	6.00
Chernivtsi	254.39	27.74	5.56
Chernihiv	293.18	47.00	8.18
Economic districts			
East	1699.87	197.94	5.94
Donetsk	1026.64	76.08	3.78
Dnipro	1765.89	179.47	5.19
Black Sea	1520.43	139.62	4.69
Podilsky	1121.65	90.27	4.11
Central	1555.33	155.37	5.10
Carpathian	1483.20	165.97	5.71
Polissia	955.54	82.31	4.39

Source: own data processing of the State Statistics Service of Ukraine (2017b)