

DOI <https://doi.org/10.30525/2592-8813-2022-4-6>

URBAN FARMING AS A TOOL OF FOOD SECURITY IN FRONT-LINE KHARKIV: GLOBAL PROBLEMS FROM MICROSOCIOLOGICAL PERSPECTIVE

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Abstract. The article is devoted to the problem that belongs to the interdisciplinary topic's social measurements of food security. Ukrainian sociology missing somehow notable bodies of works in these thematic planes. That is why the article is a statement of the problem and has an orienting character. The task of the authors is to problematize sociological means relevant to the frontline city transformation of food practices. The article aimed to characterize the sociological potential of the military factor of the global food crisis through the prism of challenges to food security in Ukrainian frontline city. It represents the results of the original reconnaissance case study, which the authors did in Kharkiv from May to August 2022 as part of the project FUSILLI (a Food and natural resources project, funded by the European Union's Horizon 2020 Research and Innovation Program under Grant Agreement No.101000717).

Based on the received results the authors formulated assumptions about the main directions of transformation of food practices of the residents of a large city, in which underway combat actions. The authors also offered methods and directions of possible sociological research that allow verifying this assumption.

Key words: food security, urban farming, case study, microsociology, the frontline city.

Introduction. Combat actions in the Ukraine territory at the end of February sharp worsened the world food situation. Prospects have become real and tangible rapid growth of the already inflated world food prices. Stop Ukrainian export after the start of the war conflict has led to Index food FAO1 prices (FPI), which keeps track of world prices for the most food sold in the world goods, in March reached the highest level since registration began in 1990.

Russia's Invasion of Ukraine – the last point in the incremental global food crisis. Global demand after pandemics, extreme weather terms, abbreviation reserves food, high energy prices, bottleneck places in supply chains, and export restrictions and taxes create a burden on the food market for two years. The recent coincidence of all these factors against the backdrop of the Russian invasion of Ukraine is unprecedented and caused a sharp rise in food prices around the world. Mainly such a situation is typical for developing countries. In the most extreme cases, food inflation grew by hundreds of points. For example, in Lebanon, which is heavily dependent on imported food (including greater parts of wheat from Ukraine), since 2020 index of prices increased more than 3000 percent points. In many developing countries, products food is one of the major categories in general index consumer prices, which economists used to calculate the general cost of people's lives. Growth in prices for basic product power has already called protests in countries around the world including Argentina,

¹More about the methodology FOI calculation can be found in the report https://www.fao.org/fileadmin/templates/world-food/Reports_and_docs/FO-Expanded-SF.pdf (accessed 30 October 2022).

Indonesia and Greece. In Iran, protesters took to the streets after prices for basic products from flour grew by 300%²

Analysis of recent research and publications. Prospects for the world food crisis update need references to analyze food security on global and local levels. The theme of food and environmental security today is extremely important for both domestic and foreign scientific communities. The majority of works contain an analysis of national food situations. In particular, A. Shevchenko (Shevchenko, 2021) reveals evolution ensures ecological and food security in strategies for national security in Ukraine since independence. E. M. Starychenko (Starychenko, 2018) under food security understands such conditions of economics, social and environmental spheres of countries, when secured food independence of the state, and guaranteed physical, social and economic availability of food products for everyone. This researcher highlights the place of food security in the system of national security, which subordinates economic, social and environmental security. Thanks to this E. M. Starychenko expands the range of indicators of food security, not only in the economic but also in social and environmental spheres. A. Skydan, V. Grynyshyn in their scientific developments (Skydan; Hrynyshyn, 2020) deepened existing and developed new theoretical and methodological, practical provisions and recommendations for the formation of systems of food security in Ukraine. These authors carried out a monitoring and analytical evaluation of the level of food security in Ukraine and calculated the risks of losing food security through a developed methodical toolkit. L. Verkhovod in his works analyzes the relationship between the economy and war (Verkhovod, 2020). Scientist emphasizes that armed conflict became part being contemporary Ukraine and called for changes in all areas of the life of society. That is why becomes the relevant scientific discourse regarding nature today's wars and their features. Armed conflicts were so entangled in public life that entail reformatting the economy both locally and globally.

One of the ways to overcome the food deficit is the development of urban agriculture. Urban farms and gardens can increase food security for people in cities, reduce the cost of supplying and distributing food produced in rural areas, boost the local economy, and reduce urban unemployment through job creation and social inclusion. Urban farming – the cultivation of agricultural products in line cities – arose in response to the fast-growing need for food in the population and the inability of traditional agriculture to fully satisfy these needs. Amid explosive development technologies and modern developments in this sphere, the pandemic does ideas of innovative urban farming especially popular. However, this trend may become one of the major factors that ensure the existence and development of humanity. At the same time, more and more people in developed countries, and not only, require environmentally clean products. Urban farms called create unique and high-quality urban environments, and help gets rid of problems in production the of organic products and their implementation, minimizing logistics costs. City farms have some advantages over traditional agriculture:

- allow getting more harvest with less area;
- safe for the environment;
- produce a minimum amount of non-recyclable waste;
- save aquatic resources;
- eliminate the need for transportation products;
- socially and economically beneficial³.

An analysis of recent studies that directly relate to urban farming shows that some attention is paid to this problem by architects and engineers who develop fundamentally new agricultural technologies and agro-industrial enterprises. Koshlatyi A. B., Kariuk A. M., Mishchenko R. A. take into account experience designing and building multi-story buildings in urban farming, the so-called «vertical farms» (mainly poultry, livestock, and greenhouses) (Koshlatyi; Kariuk; Mishchenko, 2018).

² The war in Ukraine is fueling a global food crisis. Available at : <https://graphics.reuters.com/UKRAINE-CRISIS/FOOD/zjvqkgomjvx/> (accessed thirty October 2022).

³ City farming. Available at: <http://www.lighting.philips.ua/products/horti-culture/city-farming> (accessed 30 October 2022).

Scientists do almost not study the social aspects of this type of management, as well as small individual farms in large cities.

The main text. In the introductory part, we noted a significant problem: in 2021, 36 of the 55 countries in the food crisis were dependent on exports from Ukraine at the level of ten percent of their total wheat imports. Moreover, some countries imported wheat exclusively from Ukraine. According to the Ministry of Agrarian Policy and Food of Ukraine, grain exports are, as a rule, six million tons per month. In 2022, only 322,000 tons were exported in March, 970,000 tons in April, 1.2 million tons in May, and just over one million tons in June. According to the State Statistics Service of Ukraine, as of January 1, 2022, the total storage capacity was 75 million tons. Given the capacity in areas with active hostilities, only 60.9 million tons of storage tanks were available⁴. According to the Ministry of Agrarian Policy and Food of Ukraine, as of June 2, 2022, 14.2 million hectares were sown with spring crops, which is 19.4 percent less than last year.

Approximately 25 percent of enterprises that produce crop products do not have the necessary plant protection products. Households and commercial producers do not have enough fuel to run motor vehicles and agricultural production.

Lack of fuel may affect winter crops in July/August. Prices for inputs for agricultural production are skyrocketing; prices for seeds, plant protection products, fertilizers and fuels rose by an average of 40-45 percent. In future seasons, it may not be profitable for producers to harvest standing crops⁵.

In addition, the invasion halted work in Ukraine's once bustling Black Sea ports and emptied the fields. Russia's export opportunities were also limited. These two countries account for a quarter of world wheat exports and one-fifth of barley and corn exports, as well as more than half of sunflower oil exports. Of these, about one-eighth of all calories consumed in the world comes from.

It is important to note that food prices are rising amid and due to other significant difficulties in the global economy. Inflation is on the rise; the pandemic continues to hamper supply chains. At the same time, climate change threatens production in many agricultural regions of the world due to the increase in the number of droughts, floods, heat waves and forest fires.

In addition to disrupting the production and supply of food (mainly from Ukraine), the war is also hurting global food production, affecting the production of fertilizers, which are already more expensive due to rising energy prices. Russia and Ukraine are the largest producers of potash fertilizers for crops; because of the war, their prices skyrocketed.

Due to these factors, food prices are likely to remain elevated next year as yields decline if fertilizer use is reduced and food production becomes more expensive.

In March, Ukraine banned the export of many kinds of cereal, cereals and other products to avoid food shortages. In particular, it is forbidden to export (subject to the said declarative licensing) wheat and a mixture of wheat and rye (meslin), corn, chicken meat and eggs, and sunflower oil. The Ministry of Agrarian Policy of Ukraine assures that there will be enough food for this year. But the situation for consumers of Ukrainian products abroad is rapidly deteriorating. In addition, intra-Ukrainian prospects are not clear against the background of the fuel and fertilizer crisis, as well as the partial mining of crop areas. Thus, in addition to the loss of export potential, there is a real threat to Ukraine's food security.

In 2022, Ukraine lost 25% of seed areas. Despite losses, this year's crop pattern is generally capable of meeting local consumption. But this is explained by the fact that even before the start of the war, Ukrainian farmers managed to prepare relatively well for the sowing campaign: by the time of the invasion, about 70% of the necessary mineral fertilizers had already been delivered to Ukraine, and the necessary fuel reserves had been made. The further development of agriculture greatly depends on events at the front and the duration of the war.

⁴ Ukraine: FAO steps up efforts to preserve the new crop and ensure export the most important grain crops. FAO/ Victoria Mykhalchuk 05/07/2022. URL: <http://www.fao.org>.

⁵ Ibid.

The agriculture of the eastern regions of Ukraine, in particular, the Kharkiv region (a significant part of it until recently was occupied), is experiencing particular difficulties. The sowing campaign in some areas either started with a significant delay or did not start at all. The reduction of the land fund is the first difficulty faced by farmers. Part of the sown area was mined; demolition work is still ongoing. This means that even after de-occupation, part of the fields in eastern Ukraine will be unsuitable for agricultural work for some time. This means that the part of winter crops that could be sown in these territories will also decrease.

The next problem that farmers face is huge craters after rocket and shell explosions. The field is "contaminated" by fragments and metal, which remains in the ground and oxidizes, which invariably leads to chemical and physical contamination of the soil. After the explosions, the fields shrink. Due to the significant density of soils, moisture penetrates them worse, and besides, winds dry them out a lot. The soil ecosystem is destroyed, and the soil degrades: the organic component is destroyed, and erosion (weathering, drying), and oxidation occurs. Thus, soils lose their fertility.

A separate item is a problem with fuel and fertilizers. Attacks on oil depots and oil refineries, railway junctions also put the sowing campaign in jeopardy. Farmers need a lot of fuel and fuel and lubricants to work their fields. The government and local authorities are working on a solution to this problem, but it takes time and new fuel delivery routes to solve it. Accordingly, this slows down the sowing campaign.

Thus, the current situation allows us to clearly outline the main **problem**. Russia's war against Ukraine has become a factor that has made the global food crisis irreversible. The fragility of the global food distribution system, its dependence on local factors (this war has a global dimension, but undoubtedly remains a local conflict), and the general instability of global mechanisms for maintaining the security of human existence – all this is reflected in the specific problems of food security faced by the inhabitants of Ukrainian frontal zones. Long-studied problems of food security are refracted through a cognitive, but tragic prism: for many decades, Ukrainian cities not only did not know hunger but did not even experience serious, systemic problems with regular food supplies. The factor that deepened the global food crisis did not just put the inhabitants of Ukrainian cities in a difficult situation. He found them completely unprepared for minimal deviations from the usual picture of a sufficient daily supply of varied food and unhindered access to it. This problematic field is open to many scientific disciplines; Sociology in this area is interested not only in the social effects of the macroproblems listed above but also in the difficulties that arise at the microlevel of social relations and processes. It is especially important to trace the social meanings, factors, and consequences of the transformation of food practices. Ukrainian sociology has encountered such a research field for the first time. It is necessary to outline its boundaries and epistemology, as well as social engineering potential. Based on this, the purpose of this article is to characterize the sociological potential of the problem of the military factor of the global food crisis through the prism of food security challenges in the Ukrainian front-line city. The article is a statement of the problem and has an orienting character. We consider the advancement of the hypothesis of sociological research and the indication of the main directions for its verification to be a successful, effective result of our analysis.

We achieve this goal using a case study. Kharkiv, the second in Ukraine after the capital Kyiv in terms of population (more than 1,420,000 people at the beginning of 2022), the center of the largest region in eastern Ukraine, was chosen as an indicative case. For our analysis, it is of particular importance that the Kharkiv region is of great importance for Ukrainian agriculture and provides more than 5% of the gross national product in this industry. Kharkiv itself with an area of 350 sq. km. – is a large industrial center with a high degree of urbanization.

Kharkiv bakeries, meat-packing plants, and dairy plants, which also worked with raw materials that were produced in the Kharkiv region, fully satisfied the needs of the townspeople for priority

food products. Supermarkets of the city, together with agricultural markets in peacetime, ensured an uninterrupted supply of food to residents of all areas of the city.

On February 24, the situation changed dramatically: the Kharkiv region was subjected to intense attacks by the Russian army, and Kharkiv itself found itself in an operational encirclement. A significant part of the Kharkiv region, including agricultural zones, was occupied by Russian troops. The cessation of deliveries of agricultural products from the region to the city, the shutdown of most food industry enterprises, the cessation of the operation of trade networks, the transport collapse, coupled with the constant danger of artillery shelling and rocket and bomb attacks, led to the fact that many northern, eastern and central regions of the city (including densely populated housing estates Saltovka, Alekseevka, Rogan, Vostochny, KhTZ, Novye Doma) were cut off from the food supply. During the hostilities, the situation changed, in areas of the city remote from the front line, the work of enterprises, trade networks and the transport was gradually restored; however, on the northeastern and northwestern outskirts, the situation remained the same.

In these circumstances, the residents of Kharkiv and the city authorities faced a number of problems. First of all, these are the problems of food supply in wartime. The logistics of a large city were disrupted: public transport did not work, all shops remained closed in many districts, and it became dangerous to travel long distances. The supply disruption has led to a shortage of "cheap" products across entire categories, from bread to sausage. At the same time, the effect of false abundance arose due to a drop in demand for delicacies, and after it, symbolic segregation of buyers directly in the trading space. Bread, milk, and cereals acquired critical importance; their scarcity caused panic. At the same time, non-essential items, such as chips and sugary sodas, served as an «anti-stress» (precisely because they were non-essential). There were (and from the point of view of those who found the end of the 80s – the beginning of the 90s of the twentieth century – «returned») the practice of managing the deficit: the establishment of norms for the sale of specific products in one hand, limited access to trading floors. A separate item was the nutritional problems of special groups – the elderly, unable to move; diabetics; allergy sufferers; children on special nutrition.

Certainly, these problems, despite the common root causes, are very diverse. They demanded different solutions and evoked different reactions from both the population and the authorities. For each of the points, separate studies are needed, the boundaries of which cannot be outlined within one article. To achieve our goal, we offer one of the possible cases, which, from our point of view, is very indicative. This is a case of spontaneous urban farming or horticulture, which has acquired special significance for the inhabitants of Kharkiv in the conditions described. Before turning to the case itself, it is necessary to say a few words about urban farming as a phenomenon.

Urban agriculture or urban farming we describe as growing plants and raising animals in an urban area. The main feature of urban farming, which distinguishes it from rural farming, is the integration of farming into the economy of cities and the urban ecological system. Urban agriculture is surrounded by an ecosystem of megacities, with which it closely interacts.

Linkages include the use of typical urban resources (organic waste as compost and urban wastewater for irrigation), which has a direct positive impact on the city's ecology.

Urban farming is not a relic of the past, and not a habit brought by settlers from the villages, which subsequently disappears as unnecessary. This is a promising direction, an integral part of the urban system, which, with a reasonable and innovative approach, can solve many problems of megacities on a global scale, and for individual residents in particular.

Urban farms can be located within cities on adjacent plots, rooftops, and private as well as municipal areas such as city parks, schoolyards, and hospital yards. Urban farming includes the cultivation of food (grains, fruits, and vegetables, mushrooms). Most often, more expensive products are grown within the city, and urbanized farms are highly specialized.

Urban farming contributes to the greening of urban landscapes, and the productive use of urban waste, improving the ecological situation. In most developing countries, urban farms grow food for personal consumption.

With the use of modern technologies and innovative developments, urban farming has a huge potential, which has not yet been discovered in Ukraine.

Ackerman (Ackerman, 2012) gave a short definition of urban agriculture: it is seen as a sustainable practice with social, economic, and urban environmental benefits.

We offer for analysis a case related to gardening in the yards of a multi-story building in Kharkiv. Gardening in itself is not extraordinary for Kharkiv. Despite the high level of urbanization, many microdistricts of Kharkiv are built up with private houses with small plots of land, where it was always possible to keep household plots. During the events described, residents of such houses in Kharkiv found themselves in a less difficult situation in terms of food safety than residents of high-rise buildings. Even if they did not systematically maintain a household plot, they had the opportunity to support their livelihood with vegetables from their plots located right in their yards.

However, the case that attracted our attention is connected precisely to multi-story buildings. In one of the most industrialized districts of Kharkiv (Nemishlyansky), in the courtyard of several twelve-story buildings, in the spring of 2022, a resident planted a small garden with several beds. Cucumbers, tomatoes, potatoes, zucchini, and pumpkins were planted on the beds (Fig. 1–4).

It is noteworthy that this micro-district was not outlying, that is, it did not belong to the most shelled, but it was not safe («quiet») either: positions of Ukrainian troops were located near the described courtyard; Russian troops repeatedly launched rocket and artillery strikes on them. Taking into account the tensest situation, almost the only available method of collecting research information was to observe how the farming in this garden was carried out. Here are the results of this observation.

1) The owner of the garden did not stop working it, regardless of the dynamics of the military threat,



Fig. 1



Fig. 2



Fig. 3



Fig. 4

and during periods of aggravated missile and artillery danger, he did not leave his activity. 2) All crops grown in the beds gave fruit, that is, farming was efficient, although the beds were planted in the land of an ordinary city yard, which did not have the necessary agricultural characteristics. 3) Since most of the townspeople left Kharkiv due to intense shelling, the garden was almost not threatened by inattentive pedestrians (although the beds were not under the windows of the first floors in flowerbeds, but behind the access road, directly along improvised paths crossing the courtyard).

Repairing work with water and heating pipes became a real threat to the garden. However, they began after the decrease in the intensity of shelling, in the summer, when it was already possible to harvest from most of the beds.

The volume of the harvest obtained from the observed vegetable garden was not sufficient to feed even one person with this product. Therefore, it is impossible to consider the vegetable garden in our case as complete compensation for the food shortage. However, at the same time, this garden undoubtedly covered a significant part of the shortage of fresh vegetable products that were not included in the humanitarian packages that local authorities, international organizations and volunteers gave out to residents of shelled Kharkiv. Covering this deficit provided not only the simple satisfaction of the minimum requirements for food but also the requirements for vitamins. Even in peacetime, products from their garden for Kharkiv residents were significant as guaranteed environmentally friendly products, more useful than purchased ones (grown with the use of industrial fertilizers, pesticides, etc.). In wartime, their own garden became the only source of such products for a resident of a multi-story building.

Finally, in addition to the direct effect – the satisfaction of basic food needs – the garden has become an important tool for psychological relief, and self-rehabilitation. In the conditions of fading social life in the shelled city, the lack of opportunities to plan even the near future in any way, and the full uncertainty of prospects (that is, the maximum increase in social entropy), gardening partially stabilized the unstable everyday life of a Kharkiv citizen. The understandable regularity of the garden

activity acted as a compensatory alternative to the large-scale alarm caused by the constant threat of shelling, the immediate and inevitable threat to life.

Conclusions and perspectives. Of course, the information obtained as a result of observing one case does not give grounds for any conclusions. However, it allows us to outline promising directions for the necessary sociological research in the field we have designated. The case we have reviewed suggests that the impact of the military factor on the food practices of the inhabitants of a large city leads to the following areas of practice transformation:

- reorientation to self-sufficiency using urban land resources due to the collapse of urban food logistics;
- maintaining a farm (garden) economy near housing (including in the yards of multi-story buildings) to ensure physical security in the face of shelling;
- coming to the forefront of food survival as the main food strategy;
- the use of urban farming as a means of psychological relief in the context of continued hostilities.

Each of these directions opens up sufficient research space in microsociology for the application of primarily qualitative methods, such as observation, in-depth narrative and focus group interviews. However, the potential of problems of the military factor of food security in a large regional center is not exhausted by microsociological aspects. Such areas as self-organization of the population within the framework of collective practices for ensuring food security in military conditions; development of alternative logistics solutions within the boundaries of microdistricts; the spread of structured and organized volunteer practices, up to the institutionalization of the volunteer supply of humanitarian food aid, are of undoubted interest for meso- and macrosociological research. The prospects for comparative analysis are opening up: for example, studies of the transformation of food practices of various social groups (especially groups with high vulnerability and special needs); comparison of the characteristics of individual and collective practices of food survival; study of the factorial conditionality of the difference in the effectiveness of new food practices in different parts of the city. Even a simple list of these areas gives us sufficient grounds to state the high sociological potential of the problem field, outlined in the article and the need for the active development of this promising and acute topic for domestic and global sociology.

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