

SERI Background Paper

Lessons from the war in Ukraine: Resilience in Crisis Times

How Self-Organization for Energy and Food Sovereignty
Became a Factor for Building Resilience and Transition
Towards Sustainable Future

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Foreword

Most crises look similar - regardless of being born from nature or man-made. Earthquakes, tsunami, floods and wars destroy water and food supply, agricultural lands, critical infrastructure and economy, people's lives and societies. They destroy the past, but they bring opportunities for the future. As we live in the times of multiple crises (environmental, resource, climate, political) they lead to a spectrum of consequences evolving from barely visible through moderate and suddenly becoming catastrophic that we are often not prepared for or prepared only with delay.

When the Russian Federation invaded Ukraine, we also were mostly not prepared for this big war, its scales and consequences. It shows us how crises act and look like, what their consequences are, highlights the weaknesses and potentials of our systems. While learning the lessons of this war, we can conclude how to become more resilient and develop sustainability, and how to avoid future crises.

In this paper we will be looking for lessons of the war and for immediate crisis response actions which will compose a base for post-war sustainable recovery and reconstruction of Ukraine.

Summary

From Resilience to Green Recovery

Ukraine's self-organization and democracy, widely practiced by civil society institutions, local communities and movements have surprised the world with its resilience under the hit of Russian full-scale invasion.

Today, this movement is playing crucial role in providing emergency response to the war shocks: evacuation of civilians from the war zones, humanitarian aid, employment and business opportunities for internally displaced people, supporting vulnerable people, giving access to education for millions of Ukrainian children and training for adults, empowering women's leadership, supporting veterans and the injured, promoting resilience and mental health.

Starting from February 2022, about 60% of all Ukrainians participated in such public activities or volunteered, according to "Vidrodzhennia" Foundation.

The principal pillar for the process of recovery and rebuilding the country should be its participatory character on every stage, from development to implementation, ensuring that local communities and civil society will benefit the most from the recovery.

While Ukrainian civil society is strong, the state institutions are rather weak, lacking democracy and strong in their corruptive culture. In order to build a resilient future Ukraine has to fight on two fronts: one is against Russian invasion and another is against oligarchy and corruption. One for peace and another is for democracy.

The very process of civil society involvement in creating the vision of the country's future, decisions making and spending recovery' funds will have a crucial impact on the parallel process of reconstruction of the society, and on building resilient democracy in Ukraine.

Otherwise, the investments in reconstruction will only empower old, pre-war business oligarchy as well as a culture of endemic political corruption and undermine social trust and democratic development. This will undermine the successes of decentralization reform undertaken since 2014 to shift the political and administrative power from the centre to local councils and administrations, which is seen as a way to increase local participation and combat corruption.

During the war the government introduced military-civil administrations to control of war-affected regions. That was vital for the war time but imposing risks that the centre, not the regions and local communities will be the main political actors and beneficiary from the reconstruction process. To ensure this process moves Ukraine forwards, not backwards, the government needs to establish a state institution and an internal public fund, which was proposed by EU funding to lead the recovery and reconstruction processes in accountable, transparent and participatory way, at both, local and national level. This funding system and approach are under creation together with international donors and the Ukrainian Government and that would lead the recovery and reconstruction processes in accountable, transparent and participatory way, at both, local and national level.

The EU and international donor community priority should be to ensure that civil society groups will participate in the main decision-making processes, as well as to enable them in their work to reinforce Ukraine's democracy in the years to come.

The second pillar for recovery and rebuilding the country should be Green Recovery from the very first steps of immediate response (restoration). Clear priorities should be determined for further development of the country, as well as common vision and shared goals.

*The green recovery is a systematic rebuilding of the country, using a new model of the infrastructure and economy based on the **principles of sustainability** and minimizing existing and future risks, taking into account the environmental and climate components. These **principles are**:*

- *Integration of environmental and climate policy into all sectors;*
- *Reconstruction should serve the needs of Ukrainians and promote the sustainable development of Ukraine;*
- *Development of the green economy;*
- *Environmental standards at all levels;*
- *Adherence to European environmental planning tools for Ukraine's restoration;*
- *The role of local self-government, transparency, and involvement of the public and communities in decision-making;*
- *Effective functioning and use of targeted/donor funds for post-war recovery and green economic development.*

The post war rebuilding should not reproduce the pre-war economy, which was based on fossil fuels, energy and pollution intensive. The priority in the state policy should be reforming the economy through the construction of more energy-efficient and less energy-consuming industrial and transport systems, communal facilities and housing, as well as the use of low-carbon materials and the development of nature-positive and low-carbon agriculture. It is important to define and articulate the goals of breaking the dependency on fossil fuels and making the green transition and sustainability a key element to all aspects of post-war economic development. This should apply not only to the territories most affected by the war, but also to all territories of Ukraine.

It should be planned now to shape the rebuilding process from the very beginning at maximum possible scale.

The need to restore Ukraine after Russia's full-scale military offense arose immediately after the de-occupation of the northern regions of Ukraine - we all saw the terrible consequences of the Russian occupation and had to react immediately and adequately. Immediately, several different communities and numerous experts offered their proposals, on the basis of which the development of the national recovery plan of Ukraine began.

Decentralization of energy system

The Ukrainian energy system consists of several dozen large sources of electricity and a centralised infrastructure of transformers and transmissions that are easy targets for shelling and vulnerable to "peaceful" challenges. Rapid loss of any of them affects the entire system.

From the very first hours after the invasion, Russian troops massively shelled Ukrainian cities as well as critical energy infrastructure facilities.

As of December 10, in result of more than 1,000 heavy missiles and drones launched by Russia, about 50% of the energy infrastructure was seriously damaged, or completely destroyed all thermal and hydro power plants are partly damaged, 40% of transformer high-voltage substations and power distribution equipment damaged or destroyed, which is preventing the generated power from being provided.

November 22 was the first time in a history, that Ukraine's four nuclear power plants were simultaneously shut down. The largest of them is the Zaporizhzhia nuclear power plant which normally provided about 25% of electricity. It is occupied by Russian Federation and so became a weapon for nuclear terrorism. The Civilian population is going through hardship of blackouts and regular power cuts, followed by water and heat cuts at sub-zero temperatures.

To be resistant to various types of risks, the energy system should consist of a large number of local distributed elements, so that the loss of one or more of them can be more easily compensated by others. This is possible only at the expense of locally available renewable sources of energy - sun, wind, biomass, which will also break the historical highly dependence of the Ukrainian energy sector on Russian fuel supply including processing of spent nuclear fuel.

Energy security and sovereignty issues should be an imperative for the recovery. It is crucial for a resilient decentralized energy system to be based on consumer oriented local autonomous and integrated energy systems with the priority given to different scales producer-consumer energy communities with individual and collective, non-state forms of social organisation. They should be equipped with energy storage systems and have access to the grid.

Similar to generation, the distribution infrastructure should be based on decentralised local and micro energy networks of various forms of ownership and management: households and local/territorial communities, enterprises and municipalities, energy cooperatives of multi-floored residential buildings and neighbourhoods, social infrastructure objects, as well as their associations. Such associations will be able to cooperate and support each other in case of shortages, technical malfunctions, emergencies and military threats.

The role of the state should be to create conditions and support for the transition towards decentralisation, including technical and financial support programmes. It should provide general standardisation, coordinate cluster and regional planning, balancing bodies and decentralised maintenance infrastructure.

The **concept of energy freedom** should be the crosscutting essential for energy transition strategy in Ukraine. This is a concept of maximum possible ability for individual households, communities and organizations to produce and manage energy in their households, building relations with other customers in order to produce, distribute, store and sell energy.

Local energy distribution networks are also way more efficient allowing to avoid losses during the transmission over long distances and large number of electricity transformations on the way from the producer to the consumer. Within this architecture there will be no need for big regulating capacities that can be substituted with local automated regulation systems.

Those modern technologies exist already for years and are quite developed, we are lacking just political will for this transition. We need to study and implement the best global experience of creating and exploitation of local energy sources with high efficiency and low environmental impact, such as the German experience of using balcony solar energy installations using solar panels, the Japanese experience of window solar panels, etc. There are also many efficient up-to-date Ukrainian technologies that need to be supported and implemented.

This form of ownership will stimulate communities' energy efficiency efforts to reduce heat consumption as the majority of the Ukrainian residential sector is highly inefficient and needs modernization. The heat is mainly provided by centralized heating systems involving large combined heat and power plants, fuelled by gas, transmitting heat to long distances which became easy targets for Russian artillery and missiles leaving hundreds of thousands without electricity, water and heat. Local districts' decentralised boilers, that consume variable bio fuel are more efficient and

resilient to multiple risks while heat pumps allow 5 times decrease in energy use for heating.

As for immediate steps, Ukrainian Energy sector legislative and regulatory framework should be brought in compliance with the principles of the **Fourth Energy Package** of the European Union to establish regulatory framework and implementation mechanisms to ensure the support of local small-scale RES projects, establishing for promotion of the organization of energy communities and other forms of citizens' associations.

Communalisation of energy resources (both fossil and generated) on national and local communities' level should be made based on local self-governance architecture, newly established by decentralisation reform, to ensure just transition and equal access of local communities across the country. We need to learn and analyse international experience in this field as well as discuss the most appropriate ways of its adaptation to local conditions in Ukraine. **This process should be based on wide involvement of civil society and experts, and best international practices of a wide public consultation should be used.**

Both, communalisation of energy and development of individual and community owned local distributed energy systems will serve several goals of greatest importance at the same time. It will not only provide energy security and sovereignty for the people and communities stimulating emancipatory self-governance and democracy practices, but will play a crucial role for dissolving corruption and the oligarchical system on local, regional and national levels in an evolutionary way. That could be clear when taking into account the nature of the biggest corruption schemes and the biggest oligarchs' power in Ukraine which grew from privatized big scales' energy generation and infrastructure facilities.

Food security

The war has revived the long-standing discussion on how to feed the world, especially in times of crisis which affects the lives of billions of people around the world, and shape our natural and social environment for many years to come.

Both climate and food security crises dictate the need for the current industrial scale food system transformation towards **localized sustainable food systems with a priority to provide local food sovereignty.** This can be done with development of **small local farms, agricultural cooperatives, direct cooperation between producers and consumers, short logistics chains and change of business models for food production and consumption to more sustainable ones.**

The "colonial" architecture of agriculture production supported by the World Bank policies when poorer countries export mainly unprocessed production for cheap prices to richer countries should be tackled from both sides. This undermines the development of the sector in poorer countries affecting their food security on the one hand and sustainability of global food chains on the other.

Similarly, the disbalanced domination of unprocessed agriculture production in Ukraine should be tackled from both Ukrainian and European policy sides, especially through Ukrainian EU Integration processes and mechanisms. **Development of short, local food systems, based on agroecological methods is crucial for building resilient, sustainable, nature and people-oriented food systems. This particularly involves building local processing of raw food products oriented on local consumption.**

The war in Ukraine also demonstrated that Input-intensive agricultural production is a threat to food security during wartime and crises. The transition to local food systems proved to be vital in crisis time, ensuring survival of local farms and businesses as well as local communities.

Under crisis conditions we need to seek less input intensive agricultural methods for agricultural

production such as no-till technology, polyculture cultivation, organic farming, and agroforestry cultivation, that can help both, reduce the resource input needed for the production and increase its sustainability. Such methods have a number of advantages: reduction of soil erosion, reduction in irrigation, mineral fertilizers and pesticides use, stable and more predictable yields, and increased drought resistance, etc.

*Based on the experience of catastrophic consequences of electricity and water supply cuts for industrial animal and poultry farming, we see the need for transition to **more sustainable free grazing in integrated agroforestry systems**, where animals in combat conditions have a chance to hide among trees, find food or water in the environment in order to survive.*

Another option to reduce the risks of animal husbandry is the production of **alternative proteins**, which is more sustainable and its costs proved to be more stable than traditional meat products.

The transition to these alternatives was long-time discussed from climate and environmental reasons. Today it proved **to be vital for survival during crisis times. It is crucial that this transition should be made with wide involvement of local communities with a cross priority to provide their food sovereignty and security.**

Communities need to develop their skills and potential for cooperation, entrepreneurship, and sustainable development. Local institutions and public spaces for the development of entrepreneurship, community initiatives and social entrepreneurship should be created. The culture of self-organisation should be developed and stimulated at different levels of society.

1. Lessons from the war

1.1. Centralized energy system proved to be highly vulnerable for military attacks

The Ukrainian energy system was designed during the Soviet Union as highly centralized, with prevailing big generation capacities and centralized infrastructure. The biggest share (55.5% in 2021) of generation is made by nuclear power plants, coal made up the second largest share, at 23.2 %. Meanwhile, renewable sources accounted for about 14 percent of the power output.

Historically the Ukrainian energy sector was highly dependent on Russian fuel supply including processing of spent nuclear fuel.

From the very first hours after the invasion, Russian troops massively shelled Ukrainian cities as well as critical energy infrastructure facilities. After nuclear power facilities and transmission lines, renewable energy power plants became the second target for the Russian invaders.

The vast majority of Ukrainian renewable energy facilities in the country are concentrated in the south and southeast of Ukraine, where active hostilities have been going on for the past 6 months. 30-50% of solar power plants and about 90% of wind power plants were hit and often looted by the Russian army, according to figures provided by the Ukrainian Minister of Energy, Herman Halushchenko.

As of December 10, about 50% of the energy infrastructure was seriously damaged, or was completely destroyed according to Oleksandr Kubrakov, the Ukrainian infrastructure minister. Moreover, all thermal and hydro power plants are partly damaged. Still the main targets are high-voltage transformer substations and power distribution equipment which are 40% damaged or destroyed, which is preventing the generated power from being provided. Russia launched more than 1,000 heavy missiles and drones at Ukrainian energy infrastructure facilities during the 2 months between October 10 and December 10, national Energy Company Ukrenergo stated.

In the meanwhile, on November 22, the first time out of 40 years, Ukraine's four nuclear power plants were simultaneously shut down. It was a precautionary measure, the head of state nuclear energy company Energoatom Petro Kotin states.

The country's largest Zaporizhzhia Nuclear Power Plant which is now occupied by Russian Federation, became a weapon for nuclear terrorism and has been out of operation since September 2022. The plant, supplying about 25% of electricity, is also the biggest power plant in Europe.

While repair teams work desperately to repair the damage and restore the system from blackouts during days and hours, there is a deficit of electricity in the system which will likely remain through the winter. In order to balance the national power grid, Ukrainian authorities are applying a regular scheduled electricity cuts system leaving many households without electricity for hours every day, which often also means the cuts in water and heat supply at sub-zero winter temperatures.

1.2. War consequences for Ukrainian food security: general facts and statistics

The war in Ukraine affects not only the physical objects and population, it affects nature and social environment, infrastructure and logistical chains.

At the beginning of the war, the established logistic chains and critical infrastructure were the first

which were hit. Water and food, energy, and heat supplies were disrupted, and in some cases disappeared altogether. It turned out that the food production and supply system cannot quickly respond to such challenges.

Since the full-scale invasion, many enterprises have suspended their work either because of the immediate military threat or because of blocked access to markets for sales or purchases of raw materials. Against this background, a radical change is taking place not only in the system of inter-industry relations, but also in the structure of the economy as a whole.

According to the Ukrainian State Statistics Service, the reduction of real GDP at the end of the first quarter amounted to 15.1 %, in the second quarter the decline accelerated to 37.2 %. The Russian army is destroying the infrastructure of cities and the countryside, stealing or destroying a considerable number of agricultural machineries, elevators, cargo terminals, targeting or stealing food storages, etc.. Ukrainian food security is facing multiple risks as consequence of the war:

- Destroyed or damaged infrastructure for electricity, heating water supply, transportation, bridges, roads as well as high threat from minefields and unexploded shells;
- Military actions and the occupation of regions with the largest areas of grain and oil crops and vegetables;
- Disrupted food chains caused food shortages in many regions as the traditional long food chains made food systems very sensitive to obstacles in supply chains over long distances, brought production costs up and increased its resource intensity and carbon footprint,
- Damaged and destroyed numerous intensive animal farming facilities particularly large poultry and meat farms in the east and south, the destroyed large warehouses in many regions including Kyiv, as these became an easy target for the enemy shells and bombs, and are very vulnerable to power outages and supply chain disruptions, particularly to lack of fuel and lubricants;
- The spring and fall sowing campaigns, as well as most of the other agricultural works, have been undermined due to the heavy fighting on the fields to be worked on, minefield and unexploded shells, as well as due to a shortage of diesel fuel, mineral fertilizers and pesticides;
- Big number of IDPs. Many IDPs moved from big cities to rural areas increasing local population sometimes in times, overloading local water, food and healthcare infrastructure;
- In most parts of Ukraine local communities organized detachments of territorial defence, which protect their communities but take people off their usual jobs and further distorting the traditional economy activities of the communities;
- The state failed to provide all necessary support and social care for all these communities at war time. Local communities had to manage themselves on local conditions and needs.

As of December 1, 2022, Ukrainian farmers harvested 41.9 million tons of grain and leguminous crops, which is almost half as much as last year, before the full-scale invasion.

Russia reaped at least 6 million tons of Ukrainian wheat (worth of \$1 billion) that was harvested in areas under the control of the Russian army, according to satellite imagery research from NASA's food security and agriculture program. Almost a quarter of Ukrainian wheat is grown on lands that are currently occupied or are in war zones.

Due to combat operations in the southern and eastern regions as well as fires, damages and mining of agriculture fields only 58% of winter crops sown, compared to 7.7 million hectares last year

Ukraine, according to the Ministry of Agriculture. With the uncertainty of how the winter crops will survive the winter some experts estimate that the 2023 harvest might be “even worse than bad”.

In general, Ukrainian agricultural exports dropped by 16,7% of its volume compared to last year. Experts estimate certain reorientation of the next year sowing campaign to the domestic market including the change in crops share. About 25% of food production is consumed domestically.

More than 30% of available cultivated land and more than 70% of irrigated land have been lost due to the war, according to the Ministry of Agriculture.

As it is stated in the World Food Program’s Ukraine Food Security Report 12 May 2022 more than one-third of Ukrainians reduced their food portion sizes to stretch out available food and 29% of adults restricted their consumption to allow children to eat. Nationally, one third of households were found to be food insecure, based on inadequate current food consumption and eroding ability to maintain adequate consumption levels in the future.

The latest FAO study revealed that 25% of Ukrainian agricultural households have stopped or reduced their production due to the war.

According to the UN OCHA August report, **nearly 18 million people are** in need of humanitarian assistance and protection, compared to April, when this figure was around 2 million people.

The current population of Ukraine as of January 1, 2022 was 34.5 million people according to the data provided by the State Statistics Service for 2023 State Budget draft law (No. 8000) and is significantly different from the population data as of January 1, 2022 which was 41.2 million people including the population of the occupied since 2014 parts of Donetsk and Luhansk regions. 12 million people crossed the border from Ukraine to European countries since February 24, 2022 while 5.3 million people returned to Ukraine according to the UN Refugee Agency, as of August 30, 2022.

As of 27 October 2022, the estimated number of internally displaced people within Ukraine is 6.5 million according to the International Organization for Migration.

According to the estimates of the Ministry of Health of Ukraine and the WHO, approximately 10 million people need psychological assistance due to war traumas.

1.3. Reaffirmation: Global food system needs fundamental transformation

The war has revived the long-standing discussion on how to feed the world, especially in times of crisis which affects the lives of billions of people around the world, and shape our natural and social environment for many years to come.

Current food systems were formed in the 60-s years of the 20th century at the times of cheap fuel and growing globalized neoliberal agri-food model. The drivers of the system (such as the World Bank) still argue that only large-scale industrial agriculture can feed the world’s growing population and the only strategy for food security is increasing the volume of industrial agricultural production, increasing agricultural land use as well as the use of mineral fertilizers, pesticides and fuel. This will lead to even deeper exhaustion of the planet’s natural resources, biodiversity loss and climate crises.

Modern global food system has food grown in one place, processed in another, and consumed somewhere often thousands of miles away. Such long food chains are very vulnerable at times of emergency, and make the food system very sensitive to possible obstacles in supply chains, bring

production costs up and increase resource use and carbon footprint of the food.

Local food systems are less sensitive to fluctuations in energy prices and to disruptions in food chains elsewhere. The transition to local food systems can improve food security and sovereignty on local and regional level, but stable income for local producers, lower the food price and its carbon footprint, improving the quality of the food available locally (due to lesser processing and storage need).

Both climate and food security crises dictate the need for industrial scale food system transformation towards localized sustainable food systems and focal food sovereignty: development of small local farms, agricultural cooperatives, direct cooperation between producers and consumers, short logistics chains and change of business models for food production and consumption to more sustainable ones.

1.4. War consequences for international food markets

This year's food security crisis happened due to the high dependency of the international food markets on Ukrainian production (similar to high dependence from Russian fossil fuel energy). Moreover, it is a part of the systemic problem of modern globalized food systems, particularly based on large scale industrial structure of food production and long food chains from production to consumption. This current crisis is just the beginning of the coming crisis unless we change the system.

Having the largest area in Europe (603.6 thousand km²), a significant amount of agricultural land (about 70% of the country's territory) and a climate favourable for farming, Ukraine provides food not only for itself, but also for about 600 million people around the world.

Ukraine is a global supplier of agricultural products and plays an important role in ensuring a sustainable food system and global food security.

Ukraine exports before February 2022:

10% of world wheat
15% of corn
15% of barley
50% of sunflower oil

The biggest share of Ukrainian exports is unprocessed production. This is profitable for the western market, supported by EU and World Bank policies, but not profitable for Ukrainian exporters as well as undermines development of the sector in Ukraine.

The disbalanced domination of unprocessed agriculture production in Ukraine should be tackled from both Ukrainian and European policy sides, especially through Ukrainian EU Integration processes and mechanisms. Development of short, local food systems, based on agroecological methods is crucial for building resilient, sustainable, nature and people-oriented food systems. This particularly involves building local processing of raw food products oriented on local consumption.

1.5. Input-intensive agricultural production as a threat to food security

The war in Ukraine also demonstrated that Input-intensive agricultural production is a threat to

food security during wartime and crises.

Physical destruction of logistics hubs, (destruction of finished product warehouses near Kyiv, for example) hostilities or seizure of transportation routes and interruptions in electricity and water supply destroyed many supply chains. Many farms had to simply distribute their products to the population, because they could not even provide storage due to the accumulation of a large number of products, (for example at the Chornobayivka Poultry Factory).

Some dairy production factories and milk farms had to use messengers, local community chats and local shops to sell raw milk from barrels to the buyer's containers. They found solutions in providing local services and food for the local communities, avoiding long transportation and helping the communities to survive.

In such crisis conditions the transition to local food systems proved to be vital, ensuring survival of local farms and businesses as well as local communities.

Food systems that use local resources for production and consumption ensure food security at the local level, are less sensitive to fluctuations in energy prices and to disruptions in food chains elsewhere.

*Modern agricultural production is too vulnerable due to its high dependency on fossil fuels and fertilizers. **Under crisis conditions we need to seek less input intensive agricultural methods for agricultural production such as no-till technology, polyculture cultivation, organic farming, and agroforestry cultivation, that can help both, reduce the resource input needed for the production and increase its sustainability.** Such methods have a number of advantages: reduction of soil erosion, reduction in irrigation, mineral fertilizers and pesticides use, stable and more predictable yields, and increased drought resistance, etc.*

- **no-till technology** requires up to three times less work on fields, therefore reducing resource use as well as the costs of the production.
- **no-till methods** facilitate soil restoration, improve soil fertility and its ability to hold water, and reduce wind and water erosion, contributing to a reduction of reliance on fertilizers and irrigation and producing more stable and drought-resistant yields.
- **polyculture cultivation** to maintain soil quality, **organic farming**, where mineral fertilizers and synthetic pesticides are not used, and **agroforestry cultivation**, where agricultural plants (grain or vegetables) are grown among trees.

In addition, tree growths in agricultural landscapes can provide shelter not only for wildlife and pollinators but also for local people and territorial defence forces from the enemy during wartime.

Electrical agricultural machinery combined with renewable energy installations could be also a solution to break dependence from fossil fuels and shorten the logistical chains, at the same time providing more physical security for farmers and energy infrastructure under the risks of missile and artillery strikes.

1.6. Intensive livestock

During wartime intensive animal farming is even more unsustainable and lacks resilience not only as an easy target for airstrikes and artillery, due to its high intensity of resource use, and vulnerability to disruptions in logistics and supply chains. It is also very vulnerable to power outages and supply chain disruptions.

Intensive livestock has ridiculously high risks even in peaceful times due to the negative impact on climate and the environment. **More balanced and sustainable alternative to Intensive animal farming is free grazing in integrated agroforestry systems, where animals in combat conditions have a chance to hide among trees, find food or water in the environment in order to survive.**

Another option to reduce the risks of animal husbandry is the production of alternative proteins, which is more sustainable and its costs proved to be more stable than traditional meat products.

2. New strategies

2.1. Traditions of self-organization in Ukraine: From civilian resistance to creating a new future

Today in Ukraine, under attack by the Russian Federation, **a mass movement of self-organized local citizen initiatives have emerged**. These are providing all the critical services that the government, business and even NGOs are often incapable of providing.

During this war, people have spontaneously created new civil society models and networks— within and outside of the country. People of different professions who have never been civil activists before the full-scale invasion.

The history of Ukrainian self-organization could be traced back to the times of the so-called “Wild Field” — far from the political centres of various historical periods. It served as the basis of the Cossack republic, the land of independent farmers of the Makhno Republic in the 1920s.

However, this is not a purely Ukrainian phenomenon. Faced with natural disasters and wars people have always found ways to pull together to feed, house, provide health care and if necessary, mount a defence, even when their governments can't.

In Ukraine, self-organization has been systematically suppressed for several centuries - by the repressions of the Russian Empire and the Communists. Ukrainian society was atomized, public institutions were destroyed. The Russian military openly talks about the fact that they expected complete submission and acceptance of the change in power. The plan of the Russian invasion failed to predict not only the resistance of a civil society, but its very existence.

Resisting the aggressor, helping each other in crisis times, Ukrainians realize their power as full-fledged co-creators of their own country, and not objects that totalitarian institutions of power can do with as they please. Today, we are witnessing how the "the Gene of the Wild Field" manifests itself within the people who have encountered war.

This experience is completely new and irreversible for the majority of Ukrainians; they will never be the same as before. The joint struggle for survival changes yesterday's accountants and tractor drivers empowering them to build future on the land freed from age-old terror. The next step after healing the wounds of war will inevitably be the reform of state institutions, which must correspond to the new emancipated society. And these reforms will have to be made by the same people. Ukraine has a historical experience of self-governing societies - the so-called "Wild Field". But that was 300 years ago in the realities of almost complete social autonomy and primitive technologies.

Nowadays this self-organization is instrumental not only for Ukraine's victory in the war, but for its very existence and geopolitical stability. Given the proximity of an aggressive neighbour who far outweighs Ukraine in its military, economic and human power, as well as in the scope and size of its territory and natural resources, Ukrainian society leans heavily on its historical and cultural DNA.

The most crucial role of the self-organization movement in Ukraine today is in the transformation of Ukrainian society, in the process of creating a new post-war reality. This will define Ukraine's place in the modern world, as well as Ukraine's ability to offer new values to the modern world.

2.2. Decentralization reform and potential of local communities' mobilization (food and energy sovereignty)

Being located on the collision line of European and Asian civilizations, Ukraine was constantly the object of external pressure. Not having their own statehood for many centuries, formation of Ukrainians state administration traditions and elites was very complicated. Even after receiving independence, when the inefficiency of its model of public administration was clear, the legacy of the Soviet archaic administrative-territorial system was resisting the reforms. Weaknesses of state institutions contributed to the loss of control over Crimea and part of Donbas in 2014.

The decision to launch the reform at the circumstances of the war was somewhat unexpected, but it was necessary as an asymmetric move against the further destabilization of the internal situation in Ukraine, when Russia pressured Ukraine with the aim of its federalization in order to further divide the country and put a puppet government in Kyiv.

The start of the reform was relying on the efforts made in previous years, when already councils were elected by local communities in every region and district of Ukraine.

Ukraine has ratified The European Charter of Local Self-Government in 1997, committing to guarantee the political, administrative and financial independence of local authorities. It provides that the principle of local governance shall be recognized in domestic legislation. Local authorities are to be elected by universal suffrage, and it is the earliest legal instrument to set out the principle of subsidiarity - a principle of social organization where social and political issues should be dealt with at the most immediate or local level that is consistent with their resolution.

Ukraine implements its model of decentralization based on an integrated experience and best practices of primarily Scandinavian countries and Poland. Like in other European countries, Ukrainian decentralisation reform was implemented in two stages: voluntary and mandatory.

The first stage of the reform started in 2015 when local communities were allowed to amalgamate into a new level of self-government called Amalgamated Hromada (or amalgamated local community). The second stage started in 2019-2020 years when the rest of communities had amalgamated on a mandatory basis.

The first Amalgamated communities who got self-organised and elected their own new local governing bodies were not only granted the power to make executive decisions, collect significant share of the taxes paid locally but also enjoyed various types of support including subventions from the state budget. These subventions were aimed at the development of local infrastructure, business centres, education and training, micro-granting for local business and development projects. They were also given the opportunity to receive loans and grants for development projects, such as renewal of housing and infrastructure.

A very effective participative tool, which was extremely successfully implemented in the communities, was the creation of public budgets. It helped people to feel that their opinion matters and the budget money can be used for a common goal and good exactly where it is needed.

Between 2015 and 2019, more than 4,000 communities have amalgamated into over 1000 new Amalgamated Hromada, covering approximately 43.2% of the country's total territory, and 32.1% of its total population.

The impact of the reform was sensed by communities that initiated their amalgamation at the first stage of the reform, creating self-organization bodies of the level of streets, quarters or villages, while these who amalgamated on the mandatory stage, before the war, simply did not have time to

experience positive changes.

Decentralization reform was planned to reach its completion in 2022 with finalization of the national legal framework and adoption of long-awaited Constitutional amendments related to local self-government and public administration.

“Decentralisation is one of the reforms in Ukraine that has progressed well, at some stages surprisingly well. And we believe that it will be an inspiration and example for other reforms. I am confident that when this reform is completed, it may be presented as a best practice to other countries. I hope that by the end of 2022 the legislative part of the reform will be completed, and this, I must say, is a record in time”, commented Dan Popescu Head of Department of Democracy and Governance of the Council of Europe.

Unfortunately, the war prevented the reform from its completion, still the biggest part of it was implemented which played a crucial role in local communities' abilities to get self-organised for survival during the war and occupation.

Most of these **communities of the first wave of amalgamation who had already experience of participatory processes from taking decisions and self-governance to implementing local community projects and international cooperation, better coped with the war shocks.** They were more successful in self-organization and cooperation for fast-response humanitarian and security efforts, providing evacuation and medical aid, food and energy sovereignty, maintaining internet and cell-phone networks, hosting and supporting IDPs and organizing territorial defence units.

Notably, the Russian occupation showed that the Russians failed to understand how those communities' function and did not expect people to disobey the Russian “Gauleiters” but are inclined to self-organization.

In order to stimulate the self-organization of communities, it is necessary to enable them to be independent, to give the opportunity to create their own projects at the level of the street, quarter or community, together, for the public good. **Communities need to develop their skills and potential for cooperation, entrepreneurship, and sustainable development. Local institutions and public spaces for the development of entrepreneurship, community initiatives and social entrepreneurship should be created. The culture of self-organisation should be developed and stimulated at different levels of society from schools and kindergartens to adult education programs and local communities.** That is, the more authority and freedom people are given, the more people trust, join, cooperate, and help each other.

*The experience of almost 10 months of war teaches that communities must prepare for many challenges without waiting for help from the centre. They must renovate or build bomb shelters, take responsibility for their evacuation, accurately plan how, when and where, build a system of food, water and energy sovereignty. **It is necessary to develop fast-response plans for different emergency scenarios and a clear algorithm of actions on local community level.*** Unfortunately, this was lacking in many cases during the war, the plans were created on the fly, acting intuitively and urgently, using what was at hand.

Cooperation and self-organization processes within and between communities and local business proved to be crucial for survival in the condition of war and occupation, equalizing access to the water, food, energy and other livelihood resources. These best practices should be learned and analysed, supported and disseminated.

2.3. Individual and community farming in Ukraine

Traditionally, a considerable part of food in Ukraine was grown and produced by individual households run by both rural and city populations. In the 1990s, they saved many people in Ukraine from food shortages during the destruction of collective farms and economic crises after the collapse of the Soviet Union. Hence this tradition has been kept, mostly due to the big share of low-income Ukrainian families and lack of jobs in rural areas, the share of such production has been constantly decreasing, and substituting by imports.

With full scale invasion in February, for the sake of physical security a substantial share of city population moved to the countryside to their summerhouses, old family houses and friends, joined alternative “eco-settlements” communities or created new rural “co-livings”, cooperatives and informal communities. Realizing the war threats for their food security, they launched gardening and keeping pottery right away, sharing seeds, seedling and necessary expertise. The harvests were used not only for individual household consumption, but also to share within communities, IDPs, to supply to cities and help the army.

There are numerous examples of self-organization in local rural communities inspired by sustainability made it a basis for new practices providing improved resilience and self-sufficiency for local residents – such as the use of locally available services, independent from centralized electricity or water supply, local communities sharing food from local small farmers and family gardens, use of sustainable agricultural practices with fewer resources input, etc.

Still there is big potential for a movement of local communities’ food production.

Ukrainian households own about 10 million hectares of land, hundreds of thousands of plots of land were distributed for "dachas" in the late 1980s and there are many plots of undeveloped land for development around the cities. This can provide both food sovereignty and self-employment for hundreds of thousands of people, as well as to lift psychological pressure of military misfortunes.

Local businesses, charity organizations and volunteer groups are also supporting local communities with seeding material:

The BORSCH charity initiative provided more than 1 million households in communities of Chernihiv, Sumy, Poltava, Kyiv, Kharkiv, Mykolaiv, Dnipropetrovsk, Zaporizhzhya, Donetsk regions with seeds and seedlings of borscht vegetables free of charge.

Ukrainian agriculture company Hermes provided local communities with potato seeding material from the Netherlands free of charge.

Ukraine also receives a lot of help from the FAO, which, in particular, actively supports small farmers and rural families. FAO delivered seed potatoes to 17,740 households in ten regions of Ukraine. They are currently receiving winter wheat seeds to meet production needs for the 2023 harvest, as well as grain sleeves (over 30,000 plus 105 sets of special equipment for their loading/unloading) to ensure storage and protection of the crop this season. FAO also provides animal feed, multipurpose cash assistance and vouchers for the purchase of other tools for rural households.

The most effective way to support rural households and local communities in their food security and sovereignty efforts is to provide seeds, planting material or feed for poultry or individual and community households; small equipment for the cultivation of small areas of land with the necessary trailing/mounted equipment; tanks for storing reserve fuel; portable equipment for the production of cereals from local raw materials in small volumes in the community itself;

equipment for the production of canned meat and vegetables; technologies for obtaining maximum yields on small plots; creation of an exchange and donation fund of seeds and planting material as well as yield surplus.

Cooperation and self-organization processes within and between communities proved to be crucial for equalizing access to the food and other livelihood resources and need to be supported and stimulated.

3. Case Studies

3.1. Food sovereignty case studies

VICTORY GARDENS campaign case study

This campaign started more than hundred years ago during World War I food crisis and resumed during World War II. VICTORY GARDENS are vegetable, fruit and herb gardens planted as well as chicken keeping in private residences and public parks in the United States, Great Britain, Canada, Australia and Germany. They also used wasteland, parks and lawns, sports fields, backyards and apartment roofs. In addition to food supply and help to the war effort, ("home front"), such gardens were also seen as a "morale booster" for the citizens, as the gardeners were able to take pride in their work.

In Canada, during the First World War, about 209,200 Victory Gardens were planted across the country. And in 1944, 57,000 tons of vegetables were grown under this initiative. Nearly a third of all vegetables grown during WWII in the United States came from Victory Gardens.

Ukraine, 2022

Ukrainian Victory Gardens campaign was launched in March 2022, as a response to local food security risks with the aim to ensure that all residents of local communities have access to the main food groups in healthy quantities.

The program is focused on three groups- community experts, local businesses and households. It gives the flexibility to address the goals of the local community, achieving the ultimate aim - to ensure that all members of the community have access to the main food groups in rational quantities.

The campaign's experts offer communities the typical methodology "Supporting community self-sufficiency with food products for 2023-2024" which can be used by absolutely all communities to create food reserves and calculate their food needs. Food reserves simultaneously serve as reserves in case of emergency situations and provide certain categories of the population with access to food products.

One of the campaign's supporting tools is "vegetable calculator" and the recommended rates of sowing or planting certain vegetables, using average yield of these crops.

More than hundred communities in several regions joined the campaign providing food for themselves, for vulnerable families and IDPs, and helping the army.

As a result of the "Victory Gardens" food self-sufficiency programs, the communities of Cherkasy region grew more than 300 tons of vegetables, a third of which was delivered to the front line, IDPs, and low-income families in the region. Some communities also produce preserved condensed milk, meat and pottery, preserves as well as wild berries and mushrooms. They were supported by the SURGe project, which is financed by the Government of Canada and implemented by the Alinea International company, together with its partners provided the Chhyrynsk, Zorivsk and Butsk communities with equipment for processing and storing crops - dryers, autoclaves, freezers, electric frying pans, electric stoves, walk-behind tractor, etc. the Butska community was granted with a modern tractor with attached equipment from the SURGe project and partners.

Communities are also applying internet technologies for commercial sale of their production surpluses. The example of The Teofipolska community of the Khmelnytskyi region which created

Telegram chat bot for the sale of their household products shows that the demand for their production is up to 8 times higher than they are able to provide.

“Ashram” network of local communities case study

“Ashram” network of local communities or “co-livings” consists of several communities in Vinnytsia, Kyiv, Zhytomyr regions, as well as in Kyiv, Zaporizhzhia, and Dnipro, and members of the community calls their network “distributed lace.”

More than 150 people of different professions created the community, mainly moved from big cities to live together in rural areas. They grow vegetables in their garden greenhouses, practice permaculture, drying vegetables, fruits, mushrooms, medicinal herbs, and produce pastille for their own needs and for their “economy of share”. The community has organised a cooperative for tobacco cultivation, production of unique healing forest honey and beekeeping products, wood workshop, there is a volunteer centre that collects medical kits for front-line paramedics, drives cars for the front-line, recretionation and rehabilitating front-line soldiers and their family members. One of the networks’ communities reached its energy sovereignty by reinstalling solar batteries and generators.

Soup kitchens and food sharing case study

There are many examples of agriculture businesses donating their products for humanitarian aid groups, restaurants providing free meals and soup kitchens for vulnerable people and territorial defence.

3.2. Renewable energy case studies

The war in Ukraine proved that the use of wind and solar power is the key to the physical survival of the population in crisis situations. Without electricity, water and gas, many people had only one solution for heating houses in freezing temperatures and for cooking meals – use firewood. However, firewood cannot provide access to water and communication, but solar panels can.

During the occupation in the north of Kyiv region, home PV panels became the only source of energy for their owners and neighbours. Oleksiy H., a resident of **Yasnohorodka**, had a 10 kW solar-powered station in his garden. When the village came under occupation, Oleksiy, a power engineer by profession, was able to transform it into an autonomous SES and quickly set up an “energy island” for himself, and provided energy for the neighbouring houses, covering the basic needs of residents until the centralized energy supply was restored.

While a resident of **Zoryn village** in Vyshhorod district, Oleksandr Ts. who also had PV panels in his garden, disassembled them and passed them to the neighbours along with instructions on how to plug them in to supply electricity. Thanks to these panels, more than 50 houses and a local boarding house with more than 100 people (many of them with disabilities) were able to survive the Russian occupation, providing themselves not only with electricity but also with water through electric pumps.

A similar experience of PV use had residents of **Malyovnyche village** near the village of Myla located west of Kyiv. In the village, where all the power grids network had been burned along with wires and poles during the fighting in early March, there were two autonomous rooftop solar stations, so people were able to use them to charge phones, power banks, and water pumps to collect water from wells during the day. Currently, most residents of Malyovnyche have experienced the benefits of rooftop PV power stations, and many intend to install them in their own homes after the

restoration of the town. That was concluded not only by people who survived the occupation.

In mid-March, the gas transport system operator in Ukraine announced that it would equip gas distribution stations with solar panels to provide backup power – this was necessary due to significant damage to electrical networks in combat zones.

And at the end of April two local clinics in **Borodyanka and Irpin** – cities that suffered severely from the Russian occupation, installed six sets of solar panels with a 40 kW Tesla Powerwall energy storage system, donated to them by Tesla, to ensure uninterrupted energy supply.

Gostomil Ambulatorium was partly destroyed during Russian occupation, including its heating system destroyed by the water pit frozen inside when electricity supply was cut by the administration. This fall they installed a roof-top PV station in combination with a heat pump.

Elon Musk had previously donated a batch of StarLink systems to the country to ensure stable Internet access during hostilities and solar panel kits to power kits.

The use of renewable autonomous energy supply systems, in addition to energy independence and overcoming the climate crisis, enables the physical survival of people in extreme situations, providing not only a backup source of electricity but also access to water, most importantly, helps people to stay connected and have access to network communications.

There are other examples of energy sovereignty solutions in the modern world.

Notably, the Tesla company announced the transition to a new policy - **selling solar installations only equipped with a powerful electricity storage system** for households, communal facilities and industrial companies. This company's policy is aimed at the transition towards local distributed home generation-consumption systems of small wind or solar installations in a complex with powerful batteries connected to the grid for selling surpluses or outsourcing electricity generation when needed.

As part of this strategy, in 2021 Tesla and Miyakojima Mirai Energy Co installed more than 300 Tesla Powerwall batteries in private homes on the **Japanese island of Miyakojima**, connecting them to the local grid powered by local private solar panels and wind turbines, providing the entire island with electricity and sells excess energy during peak hours. This necessity came from the conditions the island is often cut off during frequent extreme weather events such as typhoons. Tesla plans to install another 1,000 Powerwalls in Japan by the end of 2023 and expand this scheme to the entire prefecture of Okinawa, suffering from extreme weather conditions and earthquakes.

Today in Ukraine we are observing an explosion of people's creativity in developing and sharing various technical solutions for local scale energy sovereignty from electricity and heat generation through storage and energy conservation. They help Ukrainians not only to survive through the winter having access to water, heat, to cook food, but to be able to continue working and fighting, staying in contact and using the internet and light.

4. Conclusions and recommendations

1. **The principal pillar for the process of recovery and rebuilding the country should be its participatory character on every stage**, from development to implementation, ensuring that local communities and civil society will benefit the most from the recovery.
2. The second pillar for recovery and rebuilding the country should be **Green Recovery from the very first steps** of immediate response (restoration). Clear priorities should be determined for further development of the country, as well as common vision and shared goals.
3. **Energy security and sovereignty** issues should be an imperative for the recovery. It is crucial for a resilient decentralized energy system to be based on consumer oriented local autonomous and integrated energy systems with the priority given to different scales producer-consumer energy communities with collective, non-state forms of social organisation, equipped with energy storage systems and access to the grid. These micro grids should be owned and managed by local households and rural communities, energy cooperatives of multi floored residential buildings and neighbourhoods, social infrastructure facilities and business.
4. The **concept of energy freedom** should be the crosscutting essential for recovery and energy transition strategy in Ukraine. This is a concept of maximum possible ability for individual households, communities and organizations to produce and manage energy in their households, building relations with other customers in order to produce, distribute, store and sell energy.
5. **Communalisation of energy resources (both fossil and generated) on national and local communities' level should be made based on local self-governance architecture, newly established by decentralisation reform, to ensure just transition and equal access of local communities across the country.** We need to learn and analyse international experience in this field as well as discuss the most appropriate ways of its adaptation to local conditions in Ukraine. **This process should be based on wide involvement of civil society and experts, and best international practices of a wide public consultations should be used.**
6. Both, **communalisation of energy and development of individual and community owned local distributed energy systems** will serve several goals of greatest importance at the same time. It will not only provide **energy security and sovereignty** for the people and communities stimulating emancipatory self-governance and democracy practices, but will play a **crucial role for dissolving corruption and the oligarchical system** on local, regional and national levels in an evolutionary way.
7. As for immediate steps, Ukrainian Energy sector legislative and regulatory framework should be brought in compliance with the principles of the **Fourth Energy Package** of the European Union to establish regulatory framework and implementation mechanisms to ensure the support of **local small-scale RES projects**, establishing a for promotion of the organization of **energy communities** and other forms of citizens' associations.
8. **The disbalanced domination of unprocessed agriculture production** in Ukraine should be tackled from both Ukrainian and European policy sides, especially through Ukrainian EU Integration processes and mechanisms. Development of short, local food systems, based on agro ecological methods is crucial for building resilient, sustainable, nature and people-oriented food systems. This particularly involves building local processing of raw food products oriented on local consumption.

9. **Global food system needs fundamental transformation** towards localized sustainable food systems, ensuring both sustainability and food sovereignty for local communities. development of small local farms, agricultural cooperatives, direct cooperation between producers and consumers, short logistics chains and change of business models to sustainable food production and consumption, based on nature-based to more sustainable ones.
10. The disbalanced domination of unprocessed agriculture production in Ukraine should be tackled from both Ukrainian and European policy sides, especially through Ukrainian EU Integration processes and mechanisms. **Development of short, local food systems, based on agroecological methods** is crucial for building resilient, sustainable, nature and people-oriented food systems. This particularly involves **building local processing of raw food products oriented on local consumption**.
11. Under crisis conditions we need to seek less input intensive agricultural methods for agricultural production such as ***no-till technology, polyculture cultivation, organic farming, and agroforestry cultivation***, that can help both, reduce the resource input needed for the production and increase its sustainability, stable and more predictable yields, increased drought resistance, while reducing soil erosion, the need in irrigation, mineral fertilizers and pesticides use.
12. Intensive animal farming should be replaced with **more balanced and sustainable alternatives, such as free grazing in integrated agroforestry systems**, and production of **alternative proteins**, which is more sustainable and its costs proved to be more stable than traditional meat products.
13. ***It is necessary to develop fast-response plans for different emergency and crisis scenarios and a clear algorithm of actions on local community level.***
14. **Communities need to develop their skills and potential for cooperation, entrepreneurship, and sustainable development. Local institutions and public spaces for the development of entrepreneurship, community initiatives and social entrepreneurship should be created.** The culture of self-organisation should be developed and stimulated at different levels of society from schools and kindergartens to adult education programs and local communities. The best international experience should be brought.
15. ***Cooperation and self-organization processes within and between communities and local business proved to be crucial for survival in the condition of war and occupation, equalizing access to the water, food, energy and other livelihood resources. These best practices should be learned and analysed, supported and disseminated.***
16. **Under war conditions Local communities and households should be supported in their food security and sovereignty efforts.** this should be provision of seeds, planting material or feed for poultry or individual and community households; small equipment for the cultivation of small areas of land with the necessary trailing/mounted equipment; tanks for storing reserve fuel; portable equipment for the production of cereals from local raw materials in small volumes in the community itself; equipment for the production of canned meat and vegetables; technologies for obtaining maximum yields on small plots; creation of an exchange and donation fund of seeds and planting material as well as yield surplus.

It is crucial that the development and implementation of the transition process will be made with wide involvement of local communities with the main priority to provide their food sovereignty and security.

5. Resources

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