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# Family homestead settlements and ecological villages as an innovative model of environmental, food and energy security management and young people social entrepreneurship development

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## Introduction

Currently, the development of rural areas goes beyond traditional agricultural production. It is a strategically important component of global food security and, for Ukraine, a powerful tool for economic recovery after the war. The domestic agricultural sector holds significant potential, but military actions have inflicted considerable losses. Therefore, the restoration of rural communities must be comprehensive and strategically planned. Future rural development is linked to multifunctional transformations, ensuring the social welfare of the population and the ecological sustainability of the territories. Rural communities need to transform into modern

centers that attract investments, create new jobs, and provide a high quality of life for their residents. It is crucial to ensure access for residents to quality education, healthcare, and other social services in rural areas. The development of agriculture and the livelihood of people must be combined with the preservation and enhancement of the natural-resource potential of the country's territories and its ecological security.

The topic of ecovillages as innovative models of environmental, food, and energy security management is being actively studied in academic circles in Europe and the United States[1]. Researchers from various disciplines are devoting their work to studying this phenomenon, analyzing its potential and challenges. Key areas of research include sociological aspects (studying people's motivation to unite, social structure, culture and values of communities), environmental aspects (analyzing the environmental consequences of creating new type of social models, their impact on biodiversity, use of renewable energy sources and waste management), economic aspects (revealing economic models of functioning, issues of self-sufficiency, development of local production and social entrepreneurship), political aspects (studying the interaction of society, government and the environment). According to the results of scientific research by Hernando de Soto, David Holmgren, Satish Kumar, M. King Hubbert, Nessa Winston[2] and the activities of organizations such as the Global Ecovillage Network (GEN), Findhorn Foundation, the development of ecological settlements is a multifaceted and promising area, where ecological settlements are recognized as communities that consciously choose to live in harmony with nature, strive for self-sufficiency in energy, food and other aspects[3]. This movement has become widespread in Europe, America and other regions of the world[4].

## Literature review

The Sustainable Development Goals (SDGs) reflect humanity's aspirations for a fairer and more sustainable future. These ambitious goals are aimed at creating a more equitable and sustainable world. Specifically, they involve: improving population health, promoting education, decent work and economic growth, sustainable consumption

1 E.A. González-Arnedo, M. Izquierdo Gascón, Á. Rubio-Gil, *Ecovillages as a development model and the case of Api-tourism in sustainable settlements*, "PASOS. Revista de Turismo y Patrimonio Cultural" 2022, vol. 20, no. 5, pp. 1143–1161, https://doi.org/10.25145/j.pasos.2022.20.077.

2 N. Winston, *Sustainable community development: Integrating social and environmental sustainability for sustainable housing and communities*, "Sustainable Development" 2022, vol. 30, no. 1, pp. 191–202, https://doi.org/10.1002/sd.2238.

3 P.S. Prasetyo *et al.*, *Inovation to Establish Prominent and Sustainable Village*, Friedrich-Ebert-Stiftung (FES) Indonesia Office, Jakarta 2017, https://library.fes.de/pdf-files/bueros/indonesien/14332.pdf [accessed: 22.12.2024].

4 O. Prokopenko *et al.*, *Innovative models of green entrepreneurship: Social impact on sustainable development of local economies*, "Economics Ecology Socium" 2024 vol. 8, no. 1, pp. 89–111, https://doi.org/10.61954/2616-7107/2024.8.1-8.

and production, peace, justice, and strong institutions[5]. Achieving these goals requires the combined efforts of governments, businesses, civil society, and international organizations[6]. The Priority Development Goals of Ukraine are: 1) ensuring access to quality healthcare for all, reducing disease mortality rates, and combating epidemics; 2) creating equal opportunities for lifelong quality education, developing essential skills for modern life; 3) generating new jobs, enhancing living standards, and reducing poverty and inequality; 4) minimizing environmental impact, transitioning to more eco-friendly technologies; 5) establishing a safe and just society, combating corruption and violence.

Some papers analyze the development of family homesteads as a model of sustainable living that contributes to the restoration of ecological harmony, strengthening of family values and improvement of self-governance in rural areas. It emphasizes the importance of self-financing and entrepreneurial activity for the sustainable functioning of settlements[7]. Xiaoli Zheng et al. conducted systematic literature review based on the theory of the four pillars of sustainable development. The paper identifies the key economic, environmental, social and cultural factors that ensure the sustainability of traditional villages and is suitable for assessing and developing similar models of sustainable development[8]. Another article describes aspects of the economics of small-scale farming, including crop diversity, the use of innovative technologies such as precision agriculture, and maintaining environmental sustainability through agroforestry and biodiversity. This source shows how smallholder farms can contribute to food security[9]. The study emphasizes the effectiveness of ecological settlements, such as family farms, for the development of social cohesion and autonomous management. The work provides a valuable context for evaluating innovative approaches to managing rural communities.

Article from the World Economic Forum demonstrates how innovative solutions from entrepreneurs can contribute to food security in arid climates. It provides examples of projects focused on local needs, including technical and financial support

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5 *What are the Sustainable Development Goals?*, United Nations Development Programme, https://www.undp.org/ukraine/sustainable-development-goals [accessed: 22.12.2024].

6 I. del Arco, *et al.*, *Implementing SDGs to a sustainable rural village development from community empowerment: Linking energy, education, innovation, and research*, "Sustainability" 2021, vol. 13, no. 23: 12946, https://doi.org/10.3390/su132312946.

7 K. Walker, M. Plotnikova, *Ecological settlement as a self-government model in rural area*s, "Management Theory and Studies for Rural Business and Infrastructure Development" 2018, vol. 40, no. 3, pp. 416–423, http://doi.org/10.15544/mts.2018.39.

8 X. Zheng *et al.*, *Sustainable characteristics of traditional villages: A systematic literature review based on the four-pillar theory of sustainable development*, "Sustainability" 2024, vol. 16, no. 23: 10352, https://doi.org/10.3390/su162310352 [accessed: 22.12.2024].

9 *Understanding the economics of small-scale homestead farming*, Texas Real Food, https://discover.texasrealfood.com/homesteading-innovations/the-economics-of-small-scale-homestead-farming [accessed: 22.12.2024].

for development[10]. Some publications examine the role of social entrepreneurs in addressing global food insecurity by developing solutions that promote the efficiency of small farmers[11]. The studies analyze the role of entrepreneurship in rural areas for sustainable development, including the challenges and opportunities associated with youth entrepreneurship[12].

## Materials and methods

Attempts to generalize existing approaches to research on the restoration of the natural resource potential of territories, the formation of principles of food and energy security, are not unequivocal and cause discussions in academic circles, particularly from the perspective of the practice of implementing practical and strategic approaches to managing the development of territories and communities. The requirement for the commercialization of research results by research institutions and universities may be challenged by civil society organizations. This has determined the need to develop an author's research methodology that is independent of market conditions and can be practically applied to different categories of territories providing a synergistic effect. Lower levels of development, population density, and spatial distribution in rural areas enhance the connection with nature and post-urban challenges due to lower infrastructure development. Rural areas, as regions focused mainly on agriculture, agribusiness, and infrastructure development, play a vital role in ensuring food security, conserving natural resources, and supporting the economic development of rural communities. Rural areas are the primary source of food products, providing the population with food, playing a key role in biodiversity conservation, ecosystems, and ecological stability, and reducing environmental impact while ensuring social stability and development, fostering the agricultural sector, creating jobs, and supporting local communities. It is essential to identify the factors that determine the multifunctional nature of territorial transformations, particularly depopulation processes and conditions conducive to sustainable rural development. The study conducted from 2013 to 2024 involved using a monographic method, statistical analysis, unstructured interviews, and spatial statistical analysis to identify the state of multifunctionality in rural

[10] *How entrepreneurs can strengthen food security in arid climates*, World Economic Forum, Jan 19, 2023, https://www.weforum.org/stories/2023/01/how-entrepreneurs-can-help-strengthen-food-security-in-arid-climates [accessed: 22.12.2024].

[11] *Social entrepreneurship: An innovative solution to the world's food insecurity*, Water and Energy for Food Grand Challenge, 2019, https://we4f.org [accessed: 22.12.2024].

[12] N. Sobhan, *Rural entrepreneurship as a tool for sustainable development while ensuring poverty alleviation: an analysis of opportunities and challenges of female entrepreneurs in the informal sector from an Asian context*, [in:] *The 20th Rural Entrepreneurship Conference: Challenges and Opportunities for Rural Entrepreneurship in Times of Crisis*, 2023, https://research-portal.uws.ac.uk/en/publications/rural-entrepreneurship-as-a-tool-for-sustainable-development-whil [accessed: 22.12.2024].

areas and the impact of factors on depopulation. The results show that demographic changes significantly influenced the development of multifunctionality in rural areas. Compared to regions with growing populations, the weakening of multifunctionality in rural areas more often occurred in districts with declining populations. In regions with varying population sizes, natural, geographical, and administrative factors played important roles in the development of rural areas. Population decline was further influenced by economic factors, and from 2019 to 2024, by the impacts of the COVID-19 pandemic and military actions in the country. The synergistic effect of the interaction between natural, social, and economic factors is stronger than the influence of each factor individually. The interaction effect of economic and natural factors, their impact on demographic changes, aims to maintain a moderate population, and actively combat the impact of population decline on the functioning of rural areas according to different stages of population decline. The study results illustrated the impact of the demographic situation on the multifunctional development of rural areas (in communities with positive population dynamics, multifunctionality is more likely than where population decline occurred). The main conditions for the manifestation of multifunctional development are natural factors and urbanization of the population. The interaction of natural, social, and economic factors in rural areas exhibited a stronger multifunctional development character than each factor separately. Therefore, reducing the impact of crisis processes on rural development and their revival is associated with demographic changes and the multifunctionality of rural areas. The need to develop viable solutions to overcome the crisis is aimed at combining the efforts of researchers and practitioners interested in expanding the circle of participants in this search, legislatively substantiating the resilience and capacity of territories while enhancing their natural resource potential in the process of reconciling the interests of the parties, combining cognitive and empirical knowledge at different levels, and developing practical solutions that can be scaled.

## Results

Currently, the dependence on fossil fuels persists[13], which exacerbates geopolitical instability in the context of climate change, migration, water scarcity, and food security[14]. Overcoming current challenges lies in the realm of innovative technologies, transitioning to nature-friendly lifestyles and practices, and enhancing the social

[13] L. Nacke, A. Cherp, J. Jewell, *Phases of fossil fuel decline: Diagnostic framework for policy sequencing and feasible transition pathways in resource dependent regions*, "Oxford Open Energy" 2022, vol. 1, no. 1: oiac002, https://doi.org/10.1093/ooenergy/oiac002.

[14] A.H. Abdi, A.A. Mohamed, M.O. Sugow, *Exploring the effects of climate change and government stability on internal conflicts: evidence from selected sub-Saharan African countries*, "Environmental Science and Pollution Research" 2023, vol. 30, pp. 118468–118482, https://doi.org/10.1007/s11356-023-30574-w.

responsibility of individuals and their communities for their lives and environment[15]. This also includes socio-ecological governance[16] as a result of transitioning from linear production and consumption to a systemic biocentric approach of humans in harmony with nature[17], as well as a part of culture manifested through the system of relationships[18]. The ongoing innovations in the ecological aspects of life and management, the UN's Sustainable Development Goals for 2030, and the Paris Agreements on combating climate change are insufficient. The activation of private initiatives, the inclusion of all societal layers in the ecological processes based on a conscious and responsible approach, the dissemination of best practices, the provision of inspiring examples, and social control from the community, particularly through the development of ancestral and ecological settlements, will facilitate the practice of knowledge transfer and societal transformations.

The traditional characteristics of rural areas, such as having abundant natural resources, lower population density compared to cities, a closer connection between the population and the surrounding environment, and predominantly agricultural or related production activities, are accompanied by lower levels of infrastructure development. The intensification of urbanization has been accompanied by higher rates of job reduction in rural areas compared to cities, and migration processes to cities and abroad have worsened the demographic situation, increased population aging, and were characterized by lower birth rates. At the same time, among residents of reproductive age (from 18 to 49 years), rural areas see higher numbers of marriages (by 25%), births (by 33.3%), and lower divorce rates (by 31.8%) per 1,000 people (table 1). Migration processes to cities and abroad, aging rural population, depopulation of rural areas, and other problems of rural decline, the loss of quality labor due to the marginalization of the public sector and non-agricultural land use have created new problems for rural development, worsening in areas with underdeveloped economies. Ukraine's choice of European integration has defined support in the national policy of the EU's Common Agricultural Policy[19].

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[15] O. Buluy *et al.*, *Trends of asymmetries and imbalances in rural development*, "Scientific Horizons" 2020, vol. 23, no. 2, pp. 66–74, https://doi.org/10.33249/2663-2144-2020-87-02-66-74.

[16] M. Plotnikova *et al.*, *Family homestead as an innovative project for the development of tourism, entrepreneurship and management of socio-economic systems*, "Lecture Notes in Networks and Systems" 2023, vol. 621, pp. 776–795.

[17] O. Prysiazhniuk, M. Plotnikova, *Mechanism of management of development of territorial communities*, "Scientific Horizons" 2018, vol. 21, no. 11, pp. 56–61.

[18] G.V. Kurmyshev *et al.*, *Noospheric worldview in education*, "Scientific Horizons" 2018, vol. 21, no. 5, pp. 24–31.

[19] *1962–2022: The EU common agricultural policy at 60*, European Parliament, https://ukraine.europarl.europa.eu/cmsdata/269715/1274846UK.pdf?form=MG0AV3 [accessed: 22.12.2024].

Table 1. Comparative analysis of rural and urban residents

| Indicator | 2000 | 2024 | 2024 vs 2000 (+/-) |
|---|---|---|---|
| Population, million people | 48.9 | 37.9 | -10.9 |
| Aged 18 to 49 | 15.5 | 12.1 | -3.4 |
| of which men | 7.5 | 5.9 | -1.7 |
| of which women | 8.0 | 6.2 | -1.8 |
| Girls under 18, million people | 4.5 | 3.5 | -1.0 |
| Boys under 18, million people | 4.2 | 3.3 | -0.9 |
| Men over 50, million people | 6.0 | 4.7 | -1.3 |
| Women over 50, million people | 7.5 | 5.9 | -1.7 |
| Urban population, million people | 33.0 | 25.9 | -7.1 |
| Rural population, million people | 15.9 | 12.0 | -3.9 |
| Number of marriages per 1,000 people aged 18 to 49 | 3.7 | 3.1 | -0.7 |
| in rural areas | 3.5 | 2.8 | -0.7 |
| in urban areas | 4.2 | 3.6 | -0.6 |
| Number of divorces per 1,000 people aged 18 to 49 | 1.7 | 2.4 | 0.7 |
| in rural areas | 1.5 | 2.2 | 0.7 |
| in urban areas | 2.0 | 2.8 | 0.8 |
| Number of births per 1,000 people aged 18 to 49 | 11.4 | 8.4 | -3.0 |
| in rural areas | 12.0 | 9.0 | -3.0 |
| in urban areas | 10.0 | 7.0 | -3.0 |

Source: State statistics service of Ukraine, https://www.ukrstat.gov.ua; *Ukraine Population 1950–2025*, Macrotrends, https://www.macrotrends.net/global-metrics/countries/UKR/ukraine/population?form=MG0AV3 [accessed: 22.12.2024].

The multifunctionality of rural development is one of the factors in creating a favorable environment for people and nature at the local level at the current stage of economic development. This is achieved through the expansion of traditional rural functions in favor of ecological, social, and cultural aspects, increasing regional resilience, restoring soil fertility, preserving and enhancing natural resource potential, which is strengthened by cooperation with urban and other rural systems through synergistic connections. In 2022, Ukraine's population reached 41.17 million people, which is 10.67 million less than in 1990, including a decrease in the rural population from 32.7% to 30.3%, indicating a significant population decline and highlighting the impact of demographic changes in rural areas. The share of people over 65 years old increased from 12% to 18%, while the youth population decreased from 25% to 18%. The number of people employed in agriculture in rural areas decreased from 60% to 40%, while those in the service sector increased from 20% to 35%. If in 2000, Ukraine's population was estimated at 48.5 million people, then in the context of the war in 2024, it is 28–30 million people, along with an increase in the number of unemployed and a decrease in the employed population.

Using sociological methods and spatial analysis allowed for identifying depopulation factors between 2000 and 2022.

Rapid urban growth has led to overpopulation, housing shortages, slums, and the spread of disease. This creates unacceptable living conditions for a large part of the population and causes social tensions. Urbanization is often accompanied by an increase in crime, unemployment and social exclusion. Traditional social ties are breaking down, and new ones are not always formed. Increased industrial emissions, air and water pollution, and waste accumulation all have a negative impact on people's health and quality of life. Intensive urbanization has led to the spread of urban forms of life in rural areas due to the migration of urban residents), which is caused by: high prices for housing, food and utilities; high taxes; poor ecology; increased risk of pandemics; and the interest of young people in forming the basis for food and economic security. The rapid growth of cities has generated many challenges, including environmental, demographic and social problems. Sustainable development, community building and more effective governance are needed to address these problems through the ability to be creative; the possibility of distance learning and employment, including in non-agricultural activities in rural areas, the reproduction of the natural resource potential of the territory and a mechanism for overcoming the biosphere and social crisis. The response to these decisions was the emergence of ecological and family homesteads. Recent trends have shifted the emphasis of socio-economic development from industry to a more nature- and human-centered approach, and social capital is essential for strong and capable communities (table 2).

The pursuit of a sustainable future requires a harmonious relationship between people and nature, as well as a focus on social, economic and environmental well-being. By developing informal institutions and promoting community engagement, we can build social capital and create more resilient communities. This leads to new types of settlements that prioritize sustainability and community. Ecovillages, sustainable development communities, downshifters, cohousing communities, and many others are demonstrating through their lives how life can change if we make greener choices. This approach has marked a shift towards more inclusive and sustainable development methods in all aspects of society. The search for a way out of the crisis in society took place in stages (from traditional settlements to family homestead settlements). Representatives of the United States and the European Union have considerable experience in environmental control, energy conservation, resource recovery, etc.

Table 2. Comparison of the modeling institutions of communities

| Characteristics | Typical rural settlements | Conscious communities | Ecological villages | Family settlements |
|---|---|---|---|---|
| The goals of the creation | Minimize costs, maximize profits, improve production efficiency | Sharing of resources (co-housing and kibbutz) | Ecologization of life and economy, sustainable development, renewable energy sources, permanent culture, zero-waste life | Returning love to the family and the Earth as the ideal habitat of Man according to the Creator's plan |
| Management and administration | Public administration and local self-government | Joint decision-making, cooperation | Sociocracy, settlement circles, project management, crowdfunding | Veche, council of elders, civil society organizations, associations within the community, community associations |
| Technologies | Management of revenues (maximization of income and profit) and expenses (minimization of costs), satisfaction of needs through the consumption of natural resources | Mostly traditional (common) technologies | Mostly alternative technologies (use of renewable energy sources, organic production, permaculture, commitment to recycling and zero-waste living) | Harmony with nature: human beings are part of nature, playing their own role in the universe. Use of alternative technologies: renewable energy sources, permaculture, non-wasteful living, consumption at a minimum level and sufficient for constant spiritual growth |
| Causes of occurrence | Concentration of resources, capitalization, development of productive forces, scientific and technological progress | Improving the quality of life, enhancing communication and interaction between individuals | Understanding the responsibility for preserving the environment for future generations | Raising the level of consciousness and responsibility of a person in relation to their own life and the world around them, harmonizing the relationship between humans and nature |
| Efficiency | Mainly economic and technological through innovations, intensification, use of natural and human resources | Emphasizing social effects and awareness of the role of a person in society, protection of common interests in a market economy, coordination of activities, involvement | The main goal is to achieve sustainable development goals: a combination of economic, social and environmental effects | Restoration and enhancement of soil fertility, continuous improvement of the quality of water, air, other natural resources and products from them, restoration of human health, improvement of the standard and quality of life of the population, free access to resources for all segments of the population and their conscious responsible consumption |
| Consequences | Individual development, conflict of interest, desire to satisfy personal desires, search for resources to meet needs | Socialization, communication, activation of individuals within the community | Minimizing the anthropogenic impact of humans on nature, developing environmental awareness | Restoration and enhancement of the Earth's natural resource potential, health of humans and nature, restoration of diversity and their comfortable coexistence |

Source: own research.

Examples of the practical implementation of new values are the practice of "zero waste", "5 R's", permaculture, sociocracy, etc. According to the 5 rules, four actions should be taken before recycling, if possible: refuse, reduce, reuse, repurpose, and then recycle. Permaculture is an approach to designing sustainable systems and farming systems that work in harmony with natural processes with minimal labor and without harming the environment. It includes a diversity of species and their interactions. Sociocracy is a way of governance based on simple methods. It allows an organization to work effectively without a centralized power structure, in accordance with a self-organizing regime, promoting a broader decision-making process. Family homesteads and ecological settlements are based on the desire for a more sustainable and self-sufficient way of life. They focus on social, cultural, economic and environmental aspects. Ecovillages are specially designed communities that prioritize sustainability in all aspects of life. They often challenge traditional ways of life and prioritize a more interconnected and sustainable future. The ecovillage design training provides participants with an overview of the full range of design aspects to create truly sustainable communities.

A SWOT analysis helped to identify opportunities and challenges for forming a formal network of participatory management professionals to support community development (table 3). Family homesteads are often seen as pioneers of sustainable community development, emphasizing social responsibility, ethical values, and strong ties to the community. They become models of sustainable lifestyles, inspiring others to adopt nature-based livelihoods and management. Family homesteads account for 85% of the total number of environmentally oriented movements in Ukraine. Settlers are distinguished by a number of characteristics and traits that provide a creative and extraordinary approach to solving self-governance issues. This is due to a sense of responsibility, friendliness, desire for new knowledge, courage, confidence, sometimes a sense of exclusivity that develops into persistence in achieving the goal, business qualities, and cooperation. These are mostly socially and investor-oriented young people with higher education and a desire to learn and experiment (80% of their total number), who become catalysts for social change at the local, regional, and national levels (figure 1).

The settlers actively interact in the settlement network, own collective property, are members of public organizations, and have launched a social network based on blockchain principles. Their commitment to empowering families and building the foundations of sustainable communities, their focus on education and continuous self-improvement, the development of permaculture, zero-waste living and noosphere education, and the dissemination of positive innovative environmental practices in society help culture, education, and upbringing of children, and their desire for a healthy lifestyle and a safe environment make them drivers of the new model social system. Settlers prefer biodiversity, restore endangered plant species (plant even exotic plants

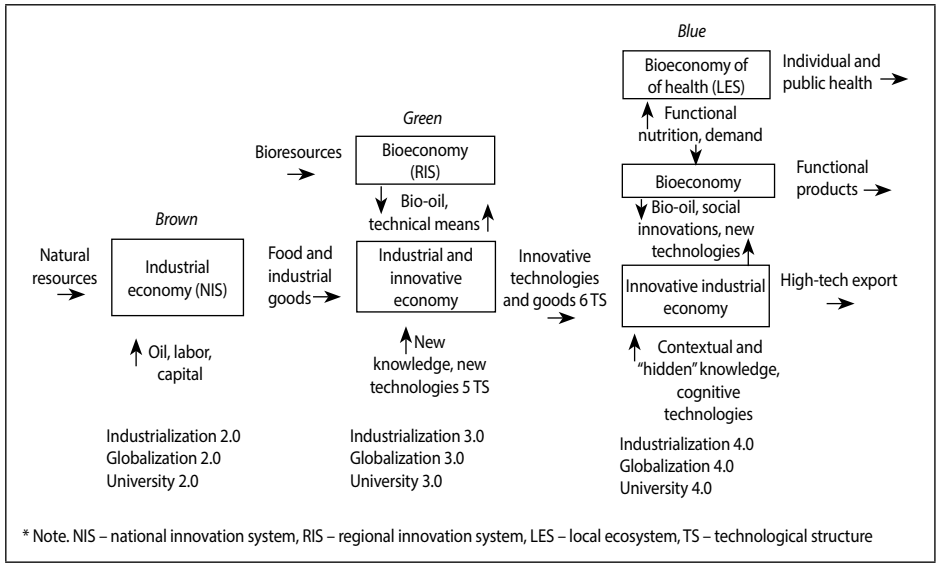
for Ukraine), strive for self-sufficiency, and buy products from the rural population, activating the local market. Energy-saving, soil-forming and soil-restoring technologies, organic farming, permaculture design, landscape design, use of renewable energy sources, and green building through practical activities and research are popular.

Table 3. SWOT-matrix of the co-creation models and establishment strategies in participative management of territorial communities

| Internal environment | |
|---|---|
| Opportunities<br>– labor market expansion;<br>– the attraction of additional social and intellectual capital;<br>– overcoming the asymmetry of the content saturation of the information field (in the regions of the experts stay);<br>– creation of conditions for the network meritocracy development;<br>– "Medici Effect" (emergence of innovations at the intersection of ideas) | Threats<br>– bureaucratic resistance, hierarchy, and formalism;<br>– loss of information, unprotected intellectual products as legal objects of intellectual property;<br>– increase the heterogeneity of development between institutions that use collaborative models and institutions that work traditionally;<br>– "the effect of Matthew" (the phenomenon of prejudiced growth in the popularity of ideas that have received some recognition) |
| *Strengths – opportunities strategies*<br>*– targeting funds from transaction cost saving to start new projects;*<br>*– noonsourcing* | *Strengths – threats strategies*<br>*– preparation of a methodological basis that will allow implementing tools efficiently* |
| *Weaknesses – opportunities strategies*<br>*– application of algorithms for "social noise" filtering by using tools of facilitation (ensuring successful communication of the participants without affecting the content of the project);*<br>*– interaction with "brokers of knowledge" and innovative providers* | *Weaknesses – threats strategies*<br>*– diversification of research projects;*<br>*– harmonization of interests of co-creation stakeholders;*<br>*– attracting the necessary human, innovative and investment resources to increase the efficiency of management decisions* |
| External environment | |
| Strengths<br>– the ability to create a global product;<br>– reduction of the time to achieve the result:<br>– reduction of transaction costs due to the absence of need for personal meetings;<br>– the high internal motivation of participants (an increase of experts personal income at the expense of royalty, the opportunities for training and professional development, social motives) | Weaknesses<br>– the complexity of the system technical support;<br>– the need to allocate resources for viewing options. communication with the audience;<br>– internal competition in the expert environment;<br>– special group dynamics of the community, caused by a high social diversity of its members;<br>– linguistic barrier;<br>– the problem of controlling the intellectual property rights distribution |

Source: own research.

Figure 1. Conceptual scheme of the evolution of development




Source: own research.

The occupations of internally displaced persons reflect their values, worldview and sphere of interests, contributing to the diversification of employment in the territories, involving the local population in new types of work and possible expansion of income sources (60% of income is earned in the settlement, and 30% is remote work). Restoration of 600 settlements that are currently off the map of Ukraine and 600 settlements with one to 10 residential buildings according to the passport data, provided that at least one third of the area is planted with non-bearing trees to avoid soil erosion, compliance with environmental legislation and development of the "Family Homestead" idea will allow for more than twelve thousand ancestral places (table 4). This idea is attractive to forced migrants from Ukraine. Adoption of the relevant Law of Ukraine "On Family Homesteads and Family Settlements in Ukraine" could become the basis for a strategy of return migration and revival of the country's economy in the postwar period.

Table 4. Results of homestead operations – settlements

| Result | family estate, thousand euros | when completing 600 of the settlements, taken from the map of Ukraine in 1991–2016, and 600 settlements that have 1–10 houses according to the certification, billions euros |
|---|---|---|
| 1) investments of physical persons | 4 | 1,1 |
| 2) organic production | 3 | 1,0 |
| 3) budget savings | 2,5 | 0,4 |
| 4) employment, thousands persons | | 12,5 |

Source: own research.

These initiatives will reinforce the positive effects of the European Green Deal on climate neutrality, biodiversity restoration and circular economy models, Horizon Europe and other funding programs for socio-environmental and technological innovation. Ecovillages and clan estates offer their own models of sustainable living, community governance and resilience building. These communities are developing practices in food systems, finance, energy, and governance that are critical to understanding the metabolic processes of society. Attention to the new formations on the part of local self-government, public authorities, scientific community will make this process purposeful, and political socio-ecological and economic transformations – popular in the society for its further improvement, increasing its sustainability. The social experiment in the crisis-affected areas of Ukraine, with the assistance of volunteers, will allow scaling up successful solutions by adapting practical examples to the conditions of the region through the functioning of supply chains, food production, use of renewable energy sources, and bottom-up social transformation.

Family homesteads and ecological settlements are a modern response to global environmental challenges. These communities offer an innovative model of living based on harmony with nature, self-sufficiency and social responsibility. Their key features are sustainability (use of renewable energy sources, organic food production, waste management), social cohesion (joint decision-making, mutual assistance, development of local communities), economic stability (development of local economies, social entrepreneurship), health and well-being (favorable living environment, healthy lifestyle). Benefits for society: food security (self-sufficiency in food), environmental protection (reduction of ecological footprint, preservation of biodiversity), social inclusion (creation of equal opportunities for all members of the community), economic development (creation of new jobs, development of local businesses). Young people play an important role in the development of ecological settlements. They bring new ideas, energy, and a desire to change the world. Social entrepreneurship within these communities gives young people the opportunity to realize their potential and create businesses that have a positive impact on the environment and society. In Ukraine, the idea of ancestral homesteads has received support at the state level. The Ministries of Education and Science and Justice have supported the development of this initiative by developing training programs and promoting the dissemination of experience. Family homesteads and ecological settlements are not just a fashion trend, but a promising model of social development. They combine traditional values and modern technologies, creating conditions for a healthy, sustainable and equitable life. These communities demonstrate that harmony with nature and social progress can exist side by side.

## Conclusions

This study employed a monographic method, field observations, experiments, and unstructured interviews, utilizing neural networks to forecast rural development. The COVID-19 pandemic and martial law, which severely deteriorated rural development indicators, undeniably influenced the research outcomes in Ukraine. The study assessed the prospects for the socio-economic system recovery, ensuring food, environmental, and energy security through the implementation of the family homestead concept. This concept involves the availability of a simplified and transparent mechanism for obtaining a one-hectare plot of land by every willing family for establishing a family homestead in Ukraine. At least one-third of the area should be planted with non-fruit trees to prevent soil erosion. For a family homestead, the area within one family cannot exceed one hectare. Based on the results, measures should be taken to legally secure the appropriate land use designation, create a land fund, and grant every family the right to receive one hectare of land for organizing a family homestead. The European Union's experience demonstrates that rural development is not only a matter of food security but also a strategic direction for national development. The restoration of rural communities should be comprehensive, based on attracting investments, developing the social sphere, and preserving the environment. Achieving global goals is impossible without close cooperation between business, government, and the public. In their further research, the authors aim to consider more variables related to the socio-ecological-economic development of rural areas and use other methods to assess and forecast socio-economic transformations. These variables include the level and quality of life of the population, population health status, soil fertility (humus content), water and air purity, resource availability (including for future generations), using exponential growth for calculating the natural-resource potential of territories.

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*Family homestead settlements and ecological villages as an innovative model of environmental, food and energy security management and young people social entrepreneurship development*

*Abstract*

In a world facing environmental challenges and instability, the concept of family homesteads and ecovillages is gaining popularity. These models of life offer an innovative approach to managing environmental, food and energy security, and create a favorable environment for the youth social entrepreneurship development. Family homesteads manage on small plots of land, where families grow their own food by permaculture, have healthy lifestyle and use renewable energy sources. Ecovillages are communities that strive to create a sustainable, capable ecosystem that meet the needs of all its members. One of the advantages of such social models is ensuring food security, striving for harmony with nature, overcoming global challenges. Permaculture promotes soil restoration and biodiversity, which is the basis of sustainable agriculture. The use of renewable energy sources, such as solar and wind power, allows reducing their dependence on traditional energy sources and their carbon footprint.

Keywords: family homestead, ecovillages, sustainable development, social entrepreneurship, food security, energy security, ecology