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N. Patyka,

Doctor of Economic Sciences, Professor, Head of the Department of Socio-Economic Development of Rural Areas, National Scientific Centre "Institute of Agrarian Economics"

ORCID ID: <https://orcid.org/0000-0003-0062-7631>

Yu. Pasichnyk,

Doctor of Economic Sciences, Professor, Chief Researcher of the Department of Socio-Economic Development of Rural Areas, National Scientific Centre "Institute of Agrarian Economics"

ORCID ID: <https://orcid.org/0000-0001-9742-1378>

A. Fesun,

PhD student at the Institute of Economic policy and Finance,

Slovak University of Agriculture in Nitra

ORCID ID: <https://orcid.org/0009-0005-4145-5460>

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METHODOLOGICAL APPROACHES TO ASSESSING OF THE SOCIAL DEVELOPMENT SUSTAINABILITY IN UKRAINE'S RURAL AREAS

Н. І. Патика,

д. е. н., професор, завідувач відділом соціально-економічного розвитку сільських територій, Національний науковий центр "Інститут аграрної економіки"

Ю. В. Пасічник,

д. е. н., професор, головний науковий співробітник відділу соціально-економічного розвитку сільських територій, Національний науковий центр "Інститут аграрної економіки"

А. О. Фесун,

аспірантка Інституту економічної політики та фінансів, Словацький сільськогосподарський університет в Нітрі

МЕТОДИЧНІ ПІДХОДИ ДО ОЦІНЮВАННЯ СТІЙКОСТІ СОЦІАЛЬНОГО РОЗВИТКУ СІЛЬСЬКИХ ТЕРИТОРІЙ УКРАЇНИ

Various challenges, including economic, political, institutional, environmental, etc., can have a negative impact on the social sphere and social security of the population, leading to a decline in their well-being and life quality. The purpose of the article is to develop methodological approaches and calculate the level of sustainability of rural areas' social development, and to identify the main factors influencing it. Results of the study: Methodological approaches to assessing the level of sustainability of social development in Ukraine's rural areas are substantiated. An assessment instruments have been developed, which includes the calculation of an integral index of sustainability of rural areas social development based on the generalization of four sub-indices: rural population, employment and income of the rural population, rural household expenditures and provision of social infrastructure. According to the author's methodology, the level of sustainability of social development of Ukraine's rural areas for 2014-2021 is assessed, trends and main factors of influence on it are identified. It was found that during the analysed period, the value of the integral index of social development sustainability decreased, which indicates an increase in the social crisis in rural areas. The main factors influencing its level are identified. Demographic characteristics, in particular the depopulation of rural areas — a decline in the rural population, primarily the working age population, a birth rate crisis and a high mortality rate — have the most significant impact. The second place is occupied by the crisis in the rural labour market, the lack of jobs, and thus the decline in employment and the rise in unemployment of the rural population. Another important factor is the decline of social infrastructure in rural areas and worsening access to necessary social services. The developed methodological approaches to the calculation of the integral index of sustainability of rural areas social development can serve as an effective instrument for developing an effective socio-economic policy to improve the welfare and life quality of the rural population.

Різноманітні виклики, зокрема економічні, політичні, інституційні, екологічні тощо, можуть мати негативний вплив на соціальну сферу та соціальну захищеність населення, призводячи до зниження їх добробуту та якості життя. Метою статті є розробка методичних підходів до розрахунку рівня стійкості соціального розвитку сільських територій та визначення основних факторів, що на нього впливають. Результати дослідження: обґрунтовано методичні підходи щодо оцінювання рівня стійкості соціального розвитку сільських територій України. Розроблено інструментарій оцінювання, що включає розрахунок інтегрального індексу стійкості соціального розвитку сільських територій на основі узагальнення чотирьох субіндексів: людності сільських територій, зайнятості та доходів сільського населення, витрат сільських домогосподарств та забезпечення соціальною інфраструктурою. За авторською методикою оцінено рівень стійкості соціального розвитку сільських територій України за 2014-2021 рр., визначено тенденції та основні чинники впливу на його рівень. З'ясовано, що за аналізований період значення інтегрального індексу стійкості соціального розвитку знижувалося, що свідчить про посилення соціальної кризи на селі. Ідентифіковано основні фактори впливу на його рівень. Найвагоміший вплив мають демографічні характеристики, зокрема знелюднення сільських територій — зниження чисельності сільського населення, і в першу чергу працездатного, криза народжуваності та високий рівень смертності. На другому місці — кризова ситуація на сільському ринку праці, відсутність робочих місць, а відтак зниження рівня зайнятості та зростання рівня безробіття сільського населення. Іншим важливим чинником впливу є згорання соціальної інфраструктури на селі та погіршення доступу до отримання необхідних соціальних послуг. Розроблені методичні підходи до розрахунку інтегрального індексу стійкості соціального розвитку сільських територій можуть слугувати дієвим інструментом розробки ефективної соціально-економічної політики щодо підвищення добробуту та якості життя сільського населення.

Key words: sustainability, social development, rural population, employment, income, expenditure, social infrastructure, rural areas.

Ключові слова: стійкість, соціальний розвиток, сільське населення, зайнятість, доходи, витрати, соціальна інфраструктура, сільські території.

PROBLEM DEFINITION AND ITS CONNECTION WITH IMPORTANT SCIENTIFIC OR PRACTICAL TASKS

Any economy, society, or enterprise is constantly exposed to various shocks and risks in today's globalized world. Therefore, the issue of assessing the level of sustainability of the socio-economic system towards certain shocks and its combinations is very important. D. Cherevatskyi particularly emphasizes the sensitivity of the economy and society to various challenges, such as pandemics, wars, natural disasters, etc., which requires an assessment of its sustainability and subsequent development of measures to ensure it [1].

Both global and internal factors, such as financial, economic and political crises, the COVID-19 pandemic, the Russian-Ukrainian war, administrative-territorial reform, the acquisition of the status of a candidate for EU membership, etc. have significantly affected the development of Ukraine's rural areas, and especially its social sphere. It led to such shocks as migration, decrease of social protection level, deterioration of access to necessary social services, destruction of social infrastructure, loss of jobs and sources of income and livelihoods, labor shortages and economic downturns. L. Bogush [2] believes that Ukraine has been historically characterized by economic, demographic and ecological disproportions both in the sphere of production and social activity.

Such disparities and risks, both internal and external, pose a threat to country's social stability and require immediate response.

Ukraine has been actively integrating into the European community. Ensuring decent life for the population, including the rural population, is one of the main principles of European Union's functioning. Thus, it is necessary to implement solutions regarding increase of the level of the Ukrainian rural population's well-being and development of models and mechanisms to ensure the sustainability of the socio-economic development of rural areas and their ability to withstand, adequately respond to various challenges and adapt to new operating conditions.

REVIEW OF RECENT RESEARCH AND PUBLICATIONS

The study of the sustainability category has been reflected in the works of foreign and Ukrainian scientists. N. Priamukhina [3] defined the most common sustainability concepts, such as "sustained positive economic growth" (as a characteristics of dynamic equilibrium and sustainable efficient development), "unchanging trend", "steady state" (by R. Solow), and "sustainable development". She states that these concepts boil down to the observance by the elements of socio-economic regional systems of a single movement vector with a predicted pace and frequency of change. S. Kozlovskyi and G. Mazur [4] define the

following types of the "sustainability of economic system": external, internal, industry, global. M. Kravchenko [5] has researched the economic etymology of the terms "stability", "constancy", "equilibrium", "stationarity", "reliability" and "predictability". He believed that equilibrium and constancy partially define system's stability over time and space, stationarity and reliability characterize the mechanism of stability formation, while predictability is a result of such mechanism. M. Savchenko [6] defined an economic sustainability of the enterprise as a complex concept reflecting the ability of an enterprise to maintain sufficient level of economic parameters that ensure its effective functioning and sustainable development and create uniqueness of an enterprise to ensure its competitiveness on the market. Based on the principles of systems theory and synergy, she identified the characteristic features of the inter-related categories of stability, balance, functioning, development, and homeostasis. A. Hutorov and M. Pugachov [7] define resilience of an agricultural enterprise as its ability to effectively adapt, recover and develop in conditions of various endogenous and exogenous challenges. They claim that nowadays an entrepreneurial concept of profit maximization is being gradually replaced by increase of resilience as an ability of enterprise to effectively manage its risks, be resilient towards endogenous and exogenous shocks while maintaining the viability of the entire economic system [8]. A. Boiko [9] offered set of principles of national economy's stability reflecting its characteristics essential for optimal functioning and fulfilment of its purposes, which includes the principle of sustainable development, the principle of national self-sufficiency, the principle of self-organization and the principle of respect for the natural hierarchy.

As for the dairy products market, O. Nikishyna et al. [10] believe that formation of local networks of family dairy farms with a completed reproductive cycle of goods movement in small towns and districts is a priority direction of ensuring its stable and resilient functioning.

National Economic Strategy 2030 [11] notes insufficient economic sustainability of small agricultural producers as one of the challenges to achieving the strategic goal of "Promotion of development and full-fledged market offer". Also, strengthening the financial stability of producers is mentioned among the ways of achieving the strategic goal of "Provision of quality infrastructure to market players".

Foreign researchers mainly focus on the study of sustainability at the enterprise level. Alisa

Spiegel et al. [12] evaluated European farmers' perception of the sustainability potential of their farms using an expert survey. Such possibilities of resilience as the robustness, adaptability, and transformability were considered along with a wide range of short- and long-term shocks affecting it. The study of Thomas Slijper et al. [13]. defines characteristics of a farm that determine its resilience and assess their impact. Miranda P. M. Meuwissen et al. [14] considers resilience of agriculture as the ability to provide system functions under shocks and stresses, and distinguishes between three capacities: robustness, adaptability, and transformability. The researchers proposed a conceptual and methodological framework for an integrated assessment of sustainability of agricultural systems, which includes the following aspects: sustainability is multifaceted, it cannot be measured by a single indicator; it is expedient to assess sustainability by differentiating its three properties — reliability, adaptability, ability to transform. They believe that this will enable an assessment of the range of possible sustainability strategies and identify trade-offs and synergies between them.

Review of scientific economic literature evidences that sustainability was studied by the authors at the level of the economic system, the national economy, industry markets, and at the level of the enterprise. At the same time, the issues of definition, evaluation and monitoring of the sustainability of social development of rural areas and main ways of its provision have not been studied so far. In our opinion, that the complexity, lack of study, and unresolved issues at its theoretical, methodological, and applied levels require thorough research, constant monitoring of the dynamics of the situation in rural areas, the development and implementation of effective measures aimed at ensuring the development of rural areas, improving welfare and quality of life of rural population, which is an important task of the Ukrainian state social and economic policy. The specified circumstances became a prerequisite for the authors to develop the issue of assessing the sustainability of social development in Ukraine's rural areas of.

THE PURPOSE OF THE ARTICLE (SETTING THE OBJECTIVE)

The purpose of the article is to substantiate scientific and methodological approaches to assessment of the sustainability of social development in rural areas, to calculate the level of sustainability and to determine trends and factors influencing it.

The following research tasks were formulated to achieve the defined purpose:

- to substantiate scientific and methodological approaches to the development of an integral index of sustainability of social development of rural areas,
- to calculate the integral index of sustainability of social development of rural areas;
- to identify trends and factors affecting its level.

The theoretical provisions of the article are based on the works of domestic and foreign scientists who develop the theory of sustainability, substantiate its dependence on macro— and microeconomic factors and the peculiarities of the functioning of rural areas. The methodological basis of the article is a systematic approach to the study of the researched phenomena and processes and a dialectical method of cognition, which allowed to comprehensively consider the processes related to the social development of Ukraine's rural areas in a changing internal and external environment.

Upon summarizing the theoretical and methodological aspects of the research of the sustainability of the social development of rural areas and determining the priorities of its provision, the techniques of the abstract-logical method, analysis and synthesis, induction and deduction, analogy and comparison were used. Economic and statistical methods, such as comparative analysis, analysis of average and relative values, trend analysis, graphical method, index and coefficient analysis, method of normalization, etc. were used to establish certain relationships between characteristics and facts with a purpose of diagnosis of the dynamics of demographic and socio-economic indicators. Correlation and regression analysis were used to determine the influence of certain types of expenditures of rural households on the subindex of expenditures.

The method of expert evaluations was applied to determine the importance of the criteria when calculating the integral index of sustainability of social development of rural areas. An expert survey (questionnaire) was conducted among specialists who are familiar with the problems of social development of the rural settlements, officials of local self-government authorities, individuals — members of rural households and scientific workers. The expert survey covered 178 people from four regions: Kyiv, Sumy, Poltava, and Cherkasy. The survey was carried out by the method of random selection, in which all objects of the general population had equal opportunities to be included in the sample. The composition and structure of the parameters of the sample population of respondents

correspond to the general population of experts, which allows the survey to be considered representative and its results to be extrapolated. The statistical error is 5.1%. Information processing, logical and arithmetic control of the primary information contained in the respondents' answers and summarization of the results was carried out using the Microsoft Excel 2019 software.

Statistical data published by the State Statistics Service of Ukraine for 2013—2021 was used for the research [15].

RESULTS

A comprehensive review of information sources on the issues of assessing sustainability, social development, ensuring the well-being and quality of life of the population allows us to conclude that relevant scientific researches are carried out at the global level, at the level of individual states, at the local level, at the level of economic entities, households, and individuals. Ukrainian and foreign scientists offer various theoretical constructions regarding the assessment of sustainability, ensuring the social development of rural areas and increasing the level of welfare of the rural population. It is reasonable to state that sustainability is the main goal of every economic unit — enterprise, community, region, industry, economy, country, etc.

Resilience Measurement Technical Working Group [16] proposed to define resilience as "a capacity that ensures adverse stressors and shocks do not have long-lasting adverse development consequences". We believe that this definition of resilience is the most consistent with the intended results of this research, being clear, understandable, concise and measurable. Accordingly, within the scope of this study, we will consider the concept of "sustainability of social development of rural areas" as the ability of the subject (the social sphere of the rural area) to adequately respond to various internal and external shocks, to be able to resist negative changes, minimize or eliminate risks, not to miss positive changes, and at the same time as the ability to use these changes to ensure the improvement of the social situation in the rural areas.

We consider the concept of "policy to ensure the sustainability of the social development of rural areas" as a system of actions, regulatory measures of influence and financial priorities for improving the social situation in the rural areas, raising the level and quality of life of the rural population by ensuring its employment, improving the working and living conditions of the peasants, preserving humanity in rural settlements, development of agricultural and non-agricultural production, protection and preservation of the environment,

formation of motivation of subjects of economic activity to increase their social responsibility.

It is worth noting that methods, approaches, algorithms, assessment models, etc. quite often differ from each other in the practice of management and economic analysis. Scientists tend to explain the variety of existing evaluation methods and their differences in terms of methods, approaches and indicators, namely by:

- the variety of assessment goals, which requires a variety of approaches;
- compliance of individual methods only with certain stages or tasks of the research;
- involvement of both statistical and expert indicators in the assessment process;
- using the method of expert evaluations to assign weighting coefficients of partial indicators in integrated evaluation systems;
- problems related to the lack of necessary statistical data;
- difficulties in assessment due to overloading of the system of indicators;
- the complexity of choosing an object for comparison, etc. [17; 18].

Determination of the most adequate methodology is now often recognized as one of the most difficult problems in the practical implementation of assessments. V. Litvinova [19] believes that an additional complication is based on the fact that the evaluation method should be universal, positioning, informative, and accessible.

Despite the ramification of the methodological apparatus, it can be confidently stated that rating (index) systems are among the most widely used methods of sustainability assessments. Ratings are used in all spheres of life upon the necessity to distinguish any objects or phenomena according to a single criterion or a set of criteria. These can be numerical, relative or ordinal indicators that reflect the status, influence, importance, popularity or other characteristics of an object or phenomenon. Partial indicators of the characteristics of specific objects were named "indices", representing a number or some combination of numbers, letters or symbols that shows the place of a certain object in the general population (in the rating) or characterizing its condition. Usually, indices can be used both in the rating system and separately. Indices can be full-fledged analytical indicators or be integrated into a single complex criterion.

The Social Progress Index [20], proposed in 2013 by Harvard University professor Michael Porter, is relevant to this study as an indicator of the country's social development and public well-being. There the social progress of the state is determined by indicators in three groups: basic

human needs — such as nutrition and basin medical care, water and sanitation, shelter and personal safety; development opportunities — such as personal freedom and choices and personal rights; and people's well-being — such as health and wellness, access to basic knowledge, access to information and communications, environmental sustainability. Bezon Kumar [21] emphasizes the importance of including household expenditure indicators when assessing its well-being. He proposed a new Household Welfare Index (HWI) based on aggregate statistics of per capita household expenditure in rural Bangladesh, which considers consumption expenditures, education expenditures, healthcare expenditures, accommodation expenses and investment expenditures.

Analyzing the approaches of foreign and Ukrainian scientists [1—4; 7—10; 12—14; 16; 20—26], we believe it is expedient to state:

1. The problem of raising the standard of living of the rural population, which lags significantly behind the urban population, has been brought to the fore during the last decades, which necessitates the search for appropriate directions, mechanisms, and schemes for its increase. Accordingly, scientists and other specialists offer certain criteria for assessing the standard of living.

2. Differences in the argumentation of methodological approaches to the evaluation of this level have been revealed, considering personal views of the researcher, the specifics of the socio-economic development of the country, the mentality of a specific nation and the scientific tools used. There is also no consensus in the scientific community on which set of indicators should be used to conduct such assessment and whether it is worth calculating a certain complex aggregated indicator or it is sufficient to use a set of individual indicators.

3. Common and different components in the proposed integral indices were determined. Social protection, education, medicine are defined among common ones, while demographic development, intellectual development, availability of cars per 100 families, sleep and rest etc. are defined among the different ones.

4. Upon arguing the essence of the proposed indicators, they are divided into quantitative and qualitative indicators, which are mutually complementary.

5. Regarding obtaining the necessary information for calculating specific indices, researchers referred to official statistical data, results of scientific research by other scientists, experts' services, and surveys of specified respondents.

We believe that it is most relevant to consider all indicators that serve as a measure of the

Table 1. List and description of demographic and socio-economic parameters used to form an integral index of sustainability of rural areas social development

№	Name of group / parameters	Designation	Description
1. INDICATORS OF SUB-INDEX OF THE RURAL POPULATION ($I_{population}$)			
1	Number of working age rural population, thousands of people	N_{wap}	This group's indicators assess the level of sustainability of rural areas social development primarily via the level and dynamics of its population. After all, the sustainable development of rural areas cannot take place without proper development of the socio-demographic sphere of the countryside, with a human potential as its important component. Given indicators reflect the influence of various factors (economic, social, ecological, political) on the demographic situation in the rural areas. Considering that all selected indicators have a decisive influence on the rural population, and to avoid the subjectivity of expert assessments, simplify calculations and ensure better comparability, the weight of the indicators included in the population index is assumed to be the same (0.25): $I_{population} = 0.25 \times N_{wap} + 0.25 \times K_{fnp} - 0.25 \times K_{mrp} + 0.25 \times K_{mgrp}$, (1)
2	Total fertility rate of rural population, %	K_{fnp}	
3	Total death rate of the rural population, %	K_{mrp}	
4	Total rates by migration increase / decrease in the number of the rural population (per 10,000 people of the present population), %	K_{mgrp} K_{mnch}	
2. INDICATORS OF SUB-INDEX OF EMPLOYMENT AND INCOME OF THE RURAL POPULATION ($I_{employment\ and\ income}$)			
1	Employment rate of rural population, %	R_{empl}	The second group indicators characterize the level of sustainability of rural areas social development by assessing the employment of the rural population and their income level, being an important pillar of the well-being of the rural population and reflecting the level of their social status and protection. The weights by which the indicators of employment and income are considered in the sub-index are taken to be the same according to the logic that at the regional level the low level of development of one aspect cannot be compensated by the high level of development of another important aspect of life: $I_{employment\ and\ income} = 0.2 \times R_{empl} + 0.2 \times R_{unempl} + 0.2 \times S_{ALWtr} + 0.2 \times S_{ALWci} + 0.2 \times S_{RPacci}$, (2)
2	Unemployment rate of rural population, %	R_{unempl}	
3	Share of the actual subsistence minimum in the total resources of the rural population, %	S_{ALWtr}	
4	Share of the actual subsistence minimum in money income of the rural population, %	S_{ALWci}	
5	Share of rural population by per capita equivalent money income per month below subsistence line, %	S_{RPacci}	
3. INDICATORS OF SUB-INDEX OF EXPENDITURE OF RURAL HOUSEHOLDS (I_{exp})			
1	Total expenditure of rural households for meals and non-alcoholic beverages, UAH	E_{food}	The third group includes indicators characterizing the expenditure of rural households. We believe that they provide a more in-depth characteristics of the standard of living, because volumes of food consumption, utilities, medical, cultural, educational services, etc. is the most objective measure of the population's well-being. A calculation sub-index of expenditure of rural households can be performed using the following formula (the explanation of the weighting factors is provided further in the article): $I_{exp} = 0.759 \times E_{food} + 0.178 \times E_{hous} + 0.06 \times E_{health} + 0.008 \times E_{educ}$, (3)
2	Total expenditure for housing, water, electricity, gas and other fuels, UAH	E_{hous}	
3	Total expenditure for health care, UAH	E_{health}	
4	Total expenditure for education, UAH	E_{educ}	
4. INDICATORS OF SUB-INDEX OF RURAL AREAS' PROVISION WITH SOCIAL INFRASTRUCTURE ($I_{infrastructure}$)			
1	Provision of rural areas with preschool education institutions (kindergartens, nurseries)	I_{presc}	The fourth group includes indicators that reflect the provision of rural settlements with the most necessary facilities: children's preschools, schools, paramedics and midwives, polyclinic facilities, cultural institutions, sports and recreational facilities, public utilities and trade establishments. Social infrastructure is designed to meet the needs of the population in high-quality social and cultural, housing, communal and household services, and thus contribute to the formation of labour potential, raising the standard of living and well-being of the rural population. A calculation of the rural areas' provision with social infrastructure sub-index can be performed using the following formula (the explanation of the weighting factors is provided further in the article): $I_{infrastructure} = 0.14 \times I_{presc} + 0.32 \times I_{sc} + 0.25 \times I_{hc} + 0.08 \times I_{uc} + 0.05 \times I_{sf} + 0.07 \times I_{ef} + 0.06 \times I_{tr} + 0.03 \times I_{pcf}$, (4)
2	Provision of rural areas with secondary schools	I_{sc}	
3	Provision of health care facilities	I_{hc}	
4	Provision of public utility companies	I_{uc}	
5	Provision of sports facilities (gyms, outdoor sportgrounds)	I_{sf}	
6	Provision of entertainment facilities	I_{ef}	
7	Provision of trade facilities	I_{tr}	
8	Provision of public catering facilities (canteen, buffet)	I_{pcf}	

Source: Developed by the authors based on their own research.

resilience of social development in rural areas in four dimensions: incomes and expenditures of rural households; the level of infrastructure provision and access to services; indicators of population and employment of rural residents.

To develop an integral index of the level of sustainability of social development of rural areas, we will determine the principles of its formation. Considering the peculiarities of the research, we will define them as follows:

1. Consideration of the vectors of Ukraine's social development towards joining the European Union and orientation towards European legislation and European human values.

2. Consideration of foreign and Ukrainian theoretical and methodological developments regarding the development of a similar index and its components.

3. Justification of the purpose upon the development of the specified index.

4. Selection of a priority approach and distinguishing between qualitative and quantitative criteria.

5. Certainty in the formation and use of information sources.

6. Reflection of the Ukrainian mentality, rural life specifics and the realities of rural development.

7. Consideration of the genesis of interpretation of the components of this index.

8. Consideration of the hierarchy of the research object.

The main purpose of calculating the integral index of sustainability of rural areas social development (I_{SRASD}) is to calculate its retrospective and current value using various indicators and to combine them in a single quantitative statistics. Within the research twenty-one indicators were substantiated, which make it possible to assess the level of sustainability of social development of rural areas and to further compare it between regions of Ukraine.

The indicators are divided into four groups, each of which reflects the state of a certain area: rural population, employment and income of the rural population, expenditure of rural households and provision of social infrastructure and access to services (Table 1). An individual index (a sub-index) is calculated for each group, which together after weighting shows the integral index of sustainability of rural areas social development (I_{SRASD}) in a given year. Upon choosing sub-indices and their components, we oriented ourselves towards those that most comprehensively characterize the social situation, well-being of rural populations, are qualitative, and are available.

The quantitative approach was chosen as a priority one. It is important that the selected indicators are not based on general, usually subjective experts' assessments, but are generally recognized and are actually existing indicators. Official statistical data, annually published by the State Statistics Service of Ukraine, are taken as a basis upon searching for information sources. The national hierarchy level of the research object was chosen.

We can provide additional justification for the selection of specific indicators. Thus, to testify that the most effective indicators of the well-being and living conditions of the population is the ratio of total resources and money income of the rural population to the actual subsistence minimum the following can be used. According to the UN European Economic Commission methodology, families in which the average per capita income does not reach 2/3 of the average level of the

Table 2. Total resources and money income in relation to the actual subsistence minimum (on average per month per member of a rural household)

Indicators	Years							2021 to 2015
	2015	2016	2017	2018	2019	2020	2021	
Total resources, UAH	2414	2884	3717	4357	5132	5369	6183	+2.5 times
incl. money income, UAH	1989	2257	3012	3654	4410	4731	5479	+2.7 times
Legally established subsistence minimum, UAH ¹	1227	1388	1603	1745	1902	2078	2250	183.4%
Actual subsistence minimum, UAH ²	2257	2642	2941	3263	3661	3847	4311	191.0%
Share of actual subsistence minimum								
in total resources, %	93.5	91.6	79.1	74.9	71.3	71.6	69.7	-23.8 p.p.
in money income, %	113.5	117.1	97.6	89.3	83.0	81.3	78.7	-34.8 p.p.
Share of population by per capita equivalent money income per month below subsistence line, %								
in rural areas	72.4	73.6	57.6	48.4	41.0	39.9	н/д	-32.5 p.p.
in urban areas	57.6	60.6	44.6	33.6	23.8	23.8	н/д	-33.8 p.p.

Source: Calculated by the authors based on the data of the State Statistics Service of Ukraine [15].

¹ The legally established subsistence minimum is approved annually by the Verkhovna Rada of Ukraine in the Law on the State Budget of Ukraine for the relevant year

² The actual subsistence minimum is calculated monthly by the Ministry of Social Policy of Ukraine to monitor the dynamics of the standard of living in Ukraine based on statistical data on the level of consumer prices [27].

country's subsistence minimum are classified as poor. In Ukraine both total resources and money incomes of the rural population grew and increased by 2.5 and 2.7 times respectively over 2015—2021. Similarly, the legally established and actual subsistence minimum also steadily increased by 183.4% and 191.2% respectively (Table 2). However, its general dynamics compared to the total resources and money income of residents has a clear tendency to decrease. During the indicated period the share of the actual subsistence minimum in total resources decreased by 23.8 p.p., and in money income — by 34.8 p.p.

A similar analogy is observed for equivalent per capita money income of the rural population over the studied period. The proportion of the population with equivalent money income per month in 2020 compared to the legislatively established subsistence minimum in rural areas was 5.6% and 39.9% compared to the actual subsistence minimum. For comparison, these indicators for urban population are 1.8% and 23.8%, respectively. These indicators have improved over the period 2015—2020. However, the situation remains challenging since almost half of the rural population earnings are below the actual subsistence minimum, indicating issues of well-being and poverty. Moreover, there is a significant differentiation compared to the urban population. And the actual subsistence minimum nowadays exceeds the legislatively established one by almost twice.

As a result of inflation and the continuous increase in prices and tariffs for social services, the purchasing power of rural residents is decreasing. There is a reduction in the consumption of food products (over almost two decades 53—67% within the overall structure of total expenditures is

Table 3. The result of the influence of selected expenditures on the total expenditures of rural households (sub-index), 2014–2021

Years	Impact of variable Y1 on V	Impact of variable Y2 on V	Impact of variable Y3 on V	Impact of variable Y4 on V	Actual V
2014	3673	3305	3699	4729	3759
2015	4906	4433	4688	4925	4697
2016	5529	6623	6159	5513	5528
2017	6536	7935	6247	5905	6717
2018	7549	8064	7784	9237	7619
2019	8831	8481	8487	9629	8857
2020	9209	7978	8926	8257	8903
2021	10416	9830	10661	8453	10569

Source: Authors' own calculations [34].

allocated only to food products in rural families), non-food goods and services. The cost of living for rural residents continuously rises, leading to a deterioration in their quality of life. Therefore, it is reasonable to state that despite the increase in total resources and money income, the well-being of the majority of rural families not only does not improve but significantly worsens.

As a compelling argument for considering the expenditures of the rural population as one of the important criteria for the sustainable development of rural areas, the views of I. Perevozova and M. Polenkova [26], M. Talavyria [28], V. Zahorskyi and Ye. Borshchuk [29], O. Dudziak [30], O. Mikhaylenko [31], G. Morozova [32] are presented. They tend to believe that sustainable rural development should be based on the main principles of sustainable development outlined in the "Agenda 21" [33]. These principles ensure the achievement of the main goals of sustainable development, such as improving the quality of life, ensuring the guaranteed health of the

population, satisfying basic life needs of both the present and future generations, combating poverty, as well as rational production and consumption structures, rational use of natural resources, and preservation of ecosystems, climate, and the ozone layer.

Considering the 14 groups of consumer and non-consumer expenditures officially published by the State Statistics Service of Ukraine regarding total household expenditures, we will select four of the most vital ones, namely: meals and non-alcoholic beverages; housing, water, energy; health care, and education. Justifying the choice of these indicators, it's worth noting that Maslow's Hierarchy of Needs includes food, water, and shelter, and there should be no fundamental objections regarding the importance of health and education in the realities of the first quarter of the 21st century.

In determining the impact of individual indicators on the sub-index, correlation-regression analysis was employed, which is a component of Excel software (Table 3).

Regression statistics	
Multiple R	0.999314435
R-Squared	0.99862934
Adjusted R-Squared	0.996801794
Standard error	132.0977577
Observations	8

Cumulative impact of individual expenditures on total expenditures is illustrated in Figure 1.

Based on the results of calculations, the following conclusions can be drawn:

expenditures on food have the most significant impact on the total expenditures of the rural population. The coefficient of determination (R^2) is

0.994594, indicating a high level of accuracy in the approximation.

This suggests that the model reliably describes the phenomenon;

the F-statistic's significance level is less than $\alpha = 0.01$, which with a reliability of 99% rejects the null hypothesis of the inadequacy of the linear regression. This implies that the regression is adequate, indicating a direct relationship between total expenditures (V) and food expenditures (Y1);

p-value for the variable Y1 is $4.95E-08$, which is less than $\alpha = 0.01$. So β indicator obtains a reliability of 99%, confirming a linear relationship between the variable (Y1) and the dependent variable (V).

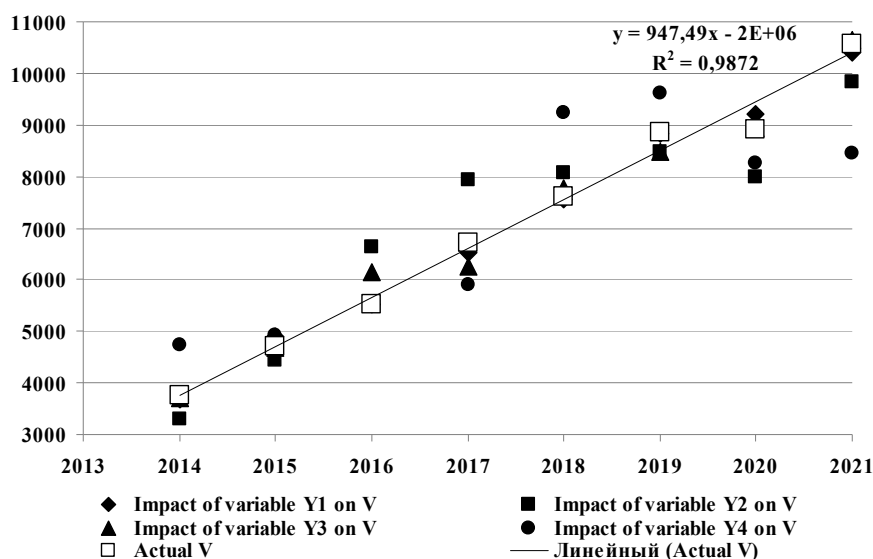


Fig. 1. Impact of selected expenditures of rural households on total expenditures of rural households, 2014–2021

Source: Compiled based on the authors' own calculations [34].

Table 4. Normative Indicators of Priority in the Need for Social Infrastructure Facilities in Rural Areas

Facility name	Priority coefficient (Weighting) ($\Sigma=1$)	Calculated Normative Demand in Social Infrastructure Facilities*
Kindergarten (Nursery)	0.14	30 places per 100 children under 6 years old
Secondary school	0.32	- for children up to 15 years old, a primary-secondary school – 100 places per 100 children. - for children from 15 to 16 years old – 40 places per 100 children.
Healthcare facilities: – Paramedic point – Paramedic-midwife point – Outpatient and polyclinic institution – District hospital	0.25	- settlements up to 100 residents - settlements up to 500 residents - settlements up to 1000 residents: 24 visits per 1000 people - settlements over 1000 residents: 14.1 beds per 1000 people
Utility companies	0.08	one enterprise in the central village
Gyms, outdoor sportsground	0.05	reconstruction, construction of gyms, and sportsground in school institutions based on a calculation of 83.5 m ² per 1000 population
Entertainment facilities	0.07	120 to 340 places per 1000 residents
Stores with groceries and non-industrial goods sections	0.06	90-270 m ² of retail space per 1000 residents
Public catering facility (canteen, buffet)	0.03	30-40 places per 1000 residents

Source: Calculated by authors.

To determine the weight of each of the four selected types of expenditures, the normalization method was used. In this case, it was assumed that the sum of all normalized values of partial household expenditure indices — food and non-alcoholic beverages (I1), housing, water, energy (I2), health care (I3), education (I4) — would equal 1.

To calculate the sub-index of rural areas' provision with social infrastructure (the fourth group of indicators) we surveyed qualified experts well-versed in the issues of social development in rural settlements to determine the weighting coefficients for the included indicators. Generalization of the survey results revealed that in terms of priority importance at the regional level during given period the highest shares were distributed among schools (0.32), healthcare facilities (0.25), preschool institutions (0.14), utilities companies (0.08), entertaining facilities (0.07), sports facilities (0.05), trade establishments (0.06), and public catering establishments (0.03). It was assumed that the sum of the weighting coefficients based on the daily service needs of rural residents in these specified directions of social infrastructure at that time should equal one (Table 4).

Considering that each of the sub-indices has a different degree of importance in calculating the integral index of sustainability of rural areas social development (ISRASD), the method of expert assessments was applied to determine the weight of criteria. The generalization of the survey in our example showed that at the regional level the highest share by the weight coefficient was obtained for the following indicators: employment and income of rural population (0.48); rural

Table 5. Criteria for the sustainability of social development in rural areas considered most important (priority) by respondents

Criterion	Number of people	Share of total respondents, %
Rural population	14	8
Employment and income of rural population	85	48
Rural household expenditures	52	29
Provision of social infrastructure for the rural population	27	15
Total	178	100

Source: Compiled by the authors based on the results of expert surveys.

household expenditures (0.29); provision of social infrastructure and access to services for the rural population (0.15) and rural population (0.08). The survey results are presented in Table 5.

As a result, an integral index of sustainability of rural areas social development (ISRASD), was compiled and calculated using the following formula:

$$I_{\text{SRASD}} = 0,08 \times I_{\text{population}} + 0,48 \times I_{\text{employment and income}} + 0,29 \times I_{\text{exp}} + 0,15 \times I_{\text{infrastructure}} \quad (5),$$

where
 $I_{\text{population}}$ — sub-index of the rural population;
 $I_{\text{employment and income}}$ — sub-index of employment and income of the rural population;

I_{exp} — sub-index of expenditure of rural households;

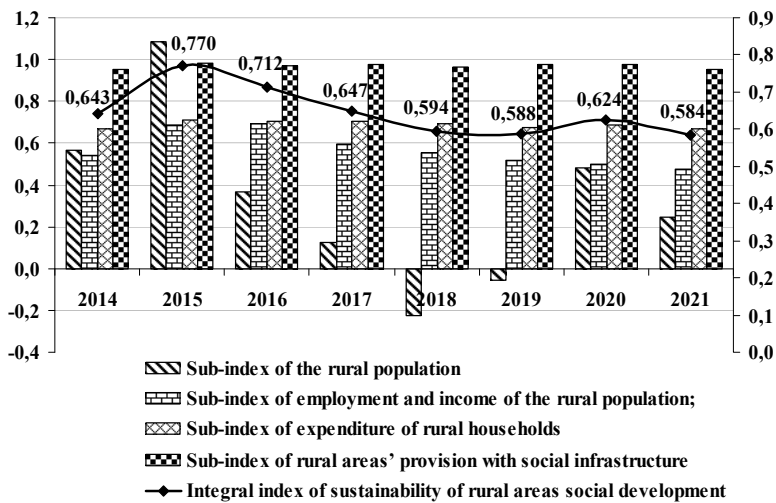
$I_{\text{infrastructure}}$ — sub-index of rural areas' provision with social infrastructure.

The versatility inherent in the formulation of the integral index facilitates its application to various comparative assessments. The determination of factors as elements of the integral index, coupled with a detailed description of each coefficient, affords a lucid and transparent analysis

Table 6. Calculation of the Integral Index of Sustainability of Rural Areas Social Development in Ukraine, 2014–2021

№	Indicators	Years								2021 to 2015, %
		2014	2015	2016	2017	2018	2019	2020	2021	
1	Sub-index of the rural population	0.565	1.088	0.369	0.124	-0.223	-0.055	0.480	0.248	22.8
2	Sub-index of employment and income of the rural population;	0.542	0.688	0.694	0.598	0.554	0.520	0.501	0.475	69.0
3	Sub-index of expenditure of rural households	0.671	0.708	0.703	0.703	0.695	0.677	0.685	0.666	94.1
4	Sub-index of rural areas' provision with social infrastructure	0.955	0.982	0.969	0.975	0.962	0.975	0.978	0.955	97.3
	Integral index of sustainability of rural areas social development	0.643	0.770	0.712	0.647	0.594	0.588	0.624	0.584	75.9

Source: Calculated by the authors based on the own research results.


Figure 2. Dynamics of the Integral Index of Sustainability of Rural Areas Social Development in Ukraine, 2014–2021

Source: Developed by the authors based on the calculations presented in Table 6.

of evolving trends pertaining to the social landscape within rural domains. Employing this metric in evaluations across different timeframes enhances its utility for operational oversight. This analytical framework may be further nuanced by incorporating additional pertinent indicators, thereby enriching the depth of assessment.

The computation of the integral index of sustainability of rural areas social development (ISRASD), along with the values of partial indices and their dynamics, is presented in Table 6.

Figure 2 illustrates the values of the indices and its dynamics.

As indicated by the calculated data in Table 6 and Figure 2, the integral index of sustainability of rural areas social development has shown a decreasing trend since 2015. Over the specified period its value decreased by 24.1%.

The observed trend in the ISRASD for rural areas in Ukraine, as depicted in Table 6, is predominantly influenced by the sub-index of the rural population. Over the period from 2015 to

2021 its value decreased by 87.2%, averaging 0.3245 over the analysed period. Regarding individual parameters contributing to the sub-index of the rural population, it should be noted that they varied with different intensities. The number of working-age rural population decreased by 5.5% (from 5482.5 thousand people in 2014 to 5183.5 thousand in 2021).

This reflects both the decline in the average population of rural areas and its aging, since according to statistical data, almost 40% of rural residents are pensioners and 17.5% of rural residents are aged 65 and older [15]. The fertility rate of the rural population steadily declined, reaching only 7.7% in 2021 compared to 12.2% in 2014, indicating a decrease of 4.5 percentage points over the analysed period. In contrast, the death rate increased, reaching its maximum value of 19.5% in 2021. Mortality in rural areas exceeds fertility rates by 2.5 times. The total rates by migration increase/decrease in the number of the rural population fluctuated significantly during the analysed period from a maximum of 15.3 in 2016 to its minimum value of -15.4 in 2019.

Another factor contributing to the adverse trend in the ISRASD in Ukraine is the sub-index of employment and income of the rural population with its average value of 0.5715 within 2014–2021 (Table 6). Primarily, the deterioration of this sub-index is attributed to a sharp decline in the employment rate of the rural population. In 2021, the employment rate in rural areas reached its lowest point since 2000, standing at 46.7%. Conversely, the unemployment rate of the rural population increased to 10.6%, and it rose to 11.2% among working-age individuals in 2021. One of the key factors contributing to the decrease in the employment rate of the rural population is the reduction in the demand for labour in agriculture. Specifically, the labour demand of agricultural enterprises decreased almost 7.5 times, from 10.4 to 1.4 thousand persons over 2005–2021. According to the State Statistics Service of Ukraine, in 2021, the share of the population employed in agriculture was 17.2%, while in 2000,

this indicator was 21.6%. The reduction amounts to 4.4 percentage points, and the number of employees decreased by almost 40% from 4,367 in 2000 to 2,693 thousand in 2021. This was the result of the narrowing of agricultural labour, changes in the structure of agricultural production, low levels of wages for agricultural workers and other factors. Although the total resources and money income of rural residents increased over the analysed period, the share of rural population by per capita equivalent money income per month below subsistence line remains relatively high at 32.4%.

The third influential factors were the indicators included in the sub-index of expenditure of rural households. The total consumer expenditures of rural households increased over the analysed period, although at a somewhat lower rate compared to the wages of peasants. In 2021, calculated per household, they grew by 2.8 times to 10,569 UAH. In absolute terms, expenditures on meals and non-alcoholic beverages, as well as on housing, water, and energy, increased the most, while spending on healthcare and education increased the least. Simultaneously, in percentage terms, expenditures on housing, water, energy, and healthcare increased the most, while those on education increased the least. If analysed in relation to total expenditures, spendings on housing, water, and energy increased the most, and expenditures on meals and non-alcoholic beverages slightly decreased. Expenditures on education remained practically unchanged.

The situation with the provision of rural areas with social infrastructure objects is complicated. There is a persistent trend of its reduction over 2014-2021. Particularly, the number of secondary schools decreased by almost 30%, of hospitals — by 28.6%, libraries — by 13.6%, entertainment facilities — by 1.3%, preschool institutions — by 3.7%, and sports facilities — by 5.9%. These changes consequently affected the value of the sub-index of rural areas' provision with social infrastructure. Although the value of the sub-index did not change over the analysed period, having the same numerical value of 0.955 in 2021 and 2014, its level varied over years from 0.955 reaching maximum of 0.982 in 2015 (Table 6). Those rural areas that have been and are currently under temporary occupation, in the area of military operations, the rural settlement network is being destroyed and its structural ratio is deteriorating. Residential buildings have been partially or completely destroyed, utility enterprises are non-functional, and the engineering infrastructure is in an unsatisfactory condition in most villages that were or are in the active combat zone.

In conclusion, the findings of this research lead to the observation that the situation in rural areas, particularly in the social sphere, has significantly deteriorated, despite the implementation of decentralization and territorial-administrative reforms in Ukraine, which were aimed at creating and sustaining a conducive living environment for citizens and providing high-quality and accessible public services. In certain regions, the circumstances are described as catastrophic. Ukrainian rural territories have proven vulnerable to new challenges. Given the prevailing trends, there is an imminent risk of a decline in the sustainability of social development in rural areas in the near future. The negative impact of the full-scale, unprovoked war by the Russian Federation against Ukraine has notably exacerbated the challenging conditions in the social sphere of rural settlements.

CONCLUSIONS

Currently, the significance of the sustainability concept is on the rise, with governments and economic entities showing an increasing interest in enhancing sustainability across all levels of governance. This requires for the necessity of its theoretical basis and the development of evaluation methods. An analysis of the methodological foundations of sustainability research reveals the absence of a universally accepted sustainability theory and a lack of singular methodological approaches for its evaluation, both at the macro and micro levels.

The methodological approach to assessing the sustainability of social development in rural areas in this study is based on a synthesis of institutional, motivational, resource-based theories and the theory of economic growth. The author's approach to the evaluation of the sustainability of social development in rural areas is based on a comprehensive analysis of indicators and is carried out using an integral index. Indicators serving as measures of social development sustainability in rural areas are considered in four blocks: indicators reflecting the demographic situation in rural areas; indicators characterizing the income and expenditure levels of the rural population; employment and infrastructure indicators, which attest to the rural population's access to various services and leisure. It is proposed to calculate these indicators based on an index approach, enabling the determination of the current level of sustainability and assessing its dynamics. The identification of factors constituting the components of the integral index, along with the description of each coefficient, allows for a clear and transparent analysis of trends in the social development of rural areas and the

measurement of the level of its sustainability. The universality of the integral index will enable the comparison of social development sustainability among different regions within the country and, if necessary, with other countries.

It has been established that the integral level of sustainability of rural areas social development of Ukraine decreased over the period 2014—2021, with its overall value decreasing by 24.1%. The negative dynamics were primarily attributed to demographic indicators and indicators of employment and income of the rural population. This is mainly caused by a decline in the pace of economic growth in agriculture, a change in its structure (dominance of crop production over livestock production), disparities in fundamental factors of the rural labour market, an increase in unemployment rate among the rural population, a shortage of quality jobs, and insufficient conditions for decent work. The rapid reduction in employment, the intensification of phenomena such as unemployment and poverty, and, in search of solutions, the mass migration of rural population, especially rural youth, lead to the depopulation of rural areas, a sharp decline in the population in rural settlements, and the loss of the human resources, the basis of agricultural production, ultimately leading to the economic degradation of rural territories as a whole.

Considering that each country, and consequently its rural territories and the population residing in these areas have their own specific characteristics and differences related to geographical location, dynamics of economic development, availability of resources, mentality, etc., we consider it inappropriate to impose the results of our research on other economies.

Not only individual countries differ in terms of available resources, territorial and climatic conditions, living conditions, and population well-being but even individual regions within a country can vary significantly, especially in large countries like Ukraine. Taking this into account, further research on this issue is needed. It should be directed towards considering other factors that may affect the sustainability of rural social development and, consequently, the well-being of the population. Additionally, expanding the scope of the studied territories to include regions and provinces of the country is crucial. It is also important to assess the degree of influence of each of the considered factors on the sustainability of social development in rural areas.

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