

# Evaluation of the financial support for the implementation of the 2030 Sustainable Development Goals in the border regions of Poland and Ukraine

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**Abstract.** In 2015, the United Nations General Assembly adopted a resolution on the implementation of a new paradigm of the world development – the sustainable development. In the aforementioned resolution, Sustainable Development Goals (SDGs) were formulated with the prospect of their implementation by 2030. The aim of the paper is to perform a multi-criteria assessment of the level of financial support for the process of achieving the SDGs determined on the basis of the 2030 Agenda in Poland and Ukraine. The analysis focused on the Polish and Ukrainian regions adjacent to the external border of the EU. The subject matter of the research comprises theoretical, methodological and practical rules for performing this assessment, which can be useful for local authorities of the border regions in their decision-making. The research period, covering the years between 2017 and 2019, has been determined on the basis of the availability of statistical data. The 17 predefined SDGs (identified at a global level by the 2030 Agenda) have been divided into three components: social, economic and environmental. The multi-criteria assessment was performed on the basis of the index method, which involved the gradual defining of individual indexes (measures), group indexes (corresponding with the SDGs), cross-group indexes (corresponding with the components), and an integral index for specific border regions and border areas of Poland and Ukraine. The study confirmed the hypothesis that the border regions of Poland received significantly higher financial support for the implementation of the SDGs than the border regions of Ukraine. However, in all the studied regions during the research period these indexes saw a negative, downward trend. It has been concluded that the available statistical data are insufficient for the full measurement of the contribution of particular sources and areas of financing to the implementation of the SDGs. Therefore, creating an international database dedicated to this purpose has been recommended.

**Keywords:** 2030 Sustainable Development Goals, financial support, border regions, multi-criteria assessment

**JEL:** C15, F37, G17, Q56, R11

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# Ocena wsparcia finansowego realizacji Celów Zrównoważonego Rozwoju 2030 w regionach przygranicznych Polski i Ukrainy

**Streszczenie.** W 2015 r. Zgromadzenie Ogólne ONZ przyjęło rezolucję w sprawie nowego paradygmatu rozwoju świata, jakim jest zrównoważony rozwój. W rezolucji sformułowano Cele Zrównoważonego Rozwoju (Sustainable Development Goals – SDG) z perspektywą ich realizacji do 2030 r. (dalej: SDG 2030). Celem badania omawianego w artykule jest przeprowadzenie wielokryterialnej oceny poziomu wsparcia finansowego realizacji SDG 2030 w Polsce i Ukrainie. Do analiz wybrano regiony przylegające do zewnętrznej granicy UE. Uwzględniono teoretyczne, metodologiczne i praktyczne aspekty oceny, które mogą być przydatne władzom regionów przygranicznych w podejmowaniu decyzji. Ze względu na dostępność danych statystycznych badaniem objęto lata 2017–2019. Siedemnaście SDG 2030 zidentyfikowanych na poziomie globalnym podzielono na trzy komponenty: społeczny, gospodarczy i środowiskowy. Do oceny wielokryterialnej wykorzystano metodę indeksową. Polegała ona na kolejnym wyznaczaniu wskaźników (indeksów) indywidualnych, grupowych, międzygrupowych oraz wskaźnika zintegrowanego dla poszczególnych regionów przygranicznych oraz obszarów przygranicznych Polski i Ukrainy. W toku postępowania badawczego potwierdziła się hipoteza, że polskie regiony przygraniczne otrzymały relatywnie większe wsparcie finansowe na realizację SDG niż regiony ukraińskie. Niemniej jednak we wszystkich badanych regionach w analizowanym okresie wystąpiła negatywna tendencja spadkowa w zakresie wartości przyjętych wskaźników. Stwierdzono też, że dostępne statystyki nie pozwalają w pełni zbadać udziału wszystkich źródeł i obszarów finansowania dotyczących wdrażania SDG 2030, dlatego zaproponowano stworzenie stosownej bazy informacyjnej na poziomie międzynarodowym.

**Słowa kluczowe:** Cele Zrównoważonego Rozwoju 2030, wsparcie finansowe, regiony przygraniczne, ocena wielokryterialna

## 1. Introduction

Poland and Ukraine have both actively participated in the process of shaping the national priorities and the achievement of the Sustainable Development Goals (SDGs) based on the 2030 Agenda. Both of them have also already published their first voluntary monitoring reports on the intermediate results of the national implementation of the SDGs (*Implementation of the Sustainable Development Goals in Poland...*, 2018; Ministry of Economic Development and Trade of Ukraine, 2021). The importance of using various public-private funding instruments to achieve the 2030 SDGs is highlighted in the *Scaling Finance for Sustainable Development Goals Report. Foreign direct investment, financial intermediation and public-private partnership* (United Nations Global Compact, 2019).

The 26th UN Climate Summit (COP26) in Glasgow approved the Glasgow Climate Pact (United Nations, 2021) in November 2021. Chapter III of the Pact, which deals with the finances for the adaptation to climate changes, states that the

current provision of finance in this regard remains insufficient to respond to the ever-graver impact of climate change in developing countries. This calls for increased mobilization of finances, including private ones, to implement climate plans, using innovative approaches and tools to raise funds from private sources.

Within the European Union, it is the European Commission that addresses the issue of financing sustainable development or sustainable investment through its High-Level Expert Group on Sustainable Financing established in December 2016. The main task of this expert body is to assist in the development of a coherent strategy of the European Union on sustainable financing. In January 2018, the Group published a report containing eight key recommendations in the field of sustainable financing. In March 2018, the European Commission (2020) announced the Action Plan for Financing Sustainable Growth.

The European Green Deal for the European Union and its citizens (European Commission, 2019), i.e. the new EU environmental strategy to eliminate greenhouse gas emissions and eliminate fossil fuels by 2050, was adopted in 2019. In April 2021, the European Commission adopted the Sustainable Finance Package, which sets out the directions for the capital movements within the EU to increase the funding for sustainable economic activities aimed at achieving the EU's climate neutrality by 2050.

Within the Polish government, the institution responsible for pro-active policies is the Ministry of Economic Development and Technology (Pol. Ministerstwo Rozwoju i Technologii). It disseminates information and organises events with the main purpose of fundraising for sustainable development (Ministerstwo Rozwoju i Technologii, 2019). The Ministry commissioned some research by Deloitte, the results of which were published in the report entitled *Development Perspectives of Sustainable Funding – Implications for Financial and Non-financial Corporate Sector* (Deloitte, 2019). Among other findings, the report defined a set of problems which hindered the successful funding of the SDGs' achievement process.

In Ukraine, the issue of financing sustainable development is even more critical. During the economic crisis, which worsened due to the negative consequences of COVID-19, Ukraine developed a deficit in the funding of even basic social programmes.

In 2019, the Ukrainian President signed a decree on the Ukrainian SDGs following the 2030 Agenda (Ukaz Prezydenta Ukrainy..., 2019). In this document, the President supported the decision to take action aimed at achieving the SDGs and implementing their results, while taking into account the specific situation of Ukraine described in the national report entitled *Sustainable Development Goals* (Ministry of Economic Development and Trade of Ukraine, 2017a). At the end of 2021, the National Bank of Ukraine presented a complex vision of creating and the

further development of a sustainable financial sector in Ukraine, in a document based on the 2030 Agenda entitled *National Bank of Ukraine Policy on Sustainable Financing* (National Bank of Ukraine, 2021). The document was prepared in collaboration with the International Finance Corporation (IFC), and its aim was to create a future background for sustainable financing in Ukraine.

Regions of Poland and Ukraine are significantly different in terms of financial opportunities and the results of the economic activity. As the first step of the research, a comparative analysis of financing the process of achieving the SDGs based on the 2030 Agenda should be performed for those border regions of both countries which have socio-economic and cultural trans-border connections. This will help discover the benefits and shortcomings in the financing of the sustainable development sphere. Consequently, it will lead to creating common strategic models for region groups with the same level of financing.

Based on the general comparative analysis of the Polish and Ukrainian socio-economic development measures, the following hypothesis could be formed: the Polish regions bordering Ukraine receive higher financial support for their attempts to achieve the SDGs based on the 2030 Agenda than the corresponding regions of Ukraine (along the border with Poland). For the assessment of this difference, an index method of multi-criteria assessment should be used.

The research requires the choice of criteria for the assessment of the level of the financial support for the SDGs in the border regions of Poland and Ukraine, and the selection, compilation and grouping of statistical indicators for each criterion, which should be officially available, adequate and suitable for interregional comparisons. It is also important to choose an acceptable method of calculating synthetic indicators in the process of a multi-criteria assessment based on the comparison of data referring to the border regions of Poland and Ukraine.

The aim of the paper is to perform a multi-criteria assessment of the level of financial support for the process of achieving the SDGs determined on the basis of the 2030 Agenda in Poland and Ukraine. More specifically, the authors attempt to develop and test the methodology for the above-mentioned assessment and to justify the proposals for improving relevant regional statistics and developing regional sustainability strategies. The detailed objectives of the study comprise forming the criteria, sub-criteria and the system of indicators of the above-mentioned assessment, developing a methodology for it (as mentioned before), and performing this assessment for the border regions of Poland and Ukraine by means of the index method.

There are 17 SDGs, therefore it is often the case that when performing the assessment of the level of the financial support for their achievement, one or more generalised measures are omitted. It is because every SDG has its own focus on

solving a specific global issue, so in most cases not all the measures are necessary. Moreover, the current statistical system enables every country to define several indicators describing the process of obtaining and using funds on achieving each particular Goal. If a cross-regional comparative analysis is performed, additional issues like the relevance, comparability and time-accuracy of statistical data should be taken into consideration.

In general, the experience of the European Union and Poland in creating financial support systems for the process of implementing SDGs is valuable for Ukraine, as this country is on its way to the European integration. An important piece of knowledge that could be learnt from the above-mentioned experience is to what extent these financial support systems are effective. In addition, the performance of the assessment of the level of financial support for the SDGs' achievement process in the border regions of Poland and Ukraine is important from the point of view of defining problems which interfere with a successful funding and setting priorities for regional financial policies.

## **2. Research method**

The research object is a multi-criteria assessment of the implementation process of the SDGs determined on the basis of the 2030 Agenda in the border regions of Poland (Lubelskie Voivodship and Podkarpackie Voivodship) and Ukraine (the Volyn Oblast and the Lviv Oblast). The Zakarpatska Oblast has not been taken into consideration due to the comparatively short length of the Ukrainian-Polish border there and the fact that the international policy of the Zakarpatska Oblast is mainly focused on Hungary.

The idea of making cross-regional comparative analysis of the SDGs' achievement process is widely known and described in numerous studies. Practically every country creates its individual system of indicators for this purpose. Such indicators were also predefined both in Poland (Główny Urząd Statystyczny, n.d.) and Ukraine (Ministry of Economic Development and Trade of Ukraine, 2017b).

Also, units of public statistics in Poland and Ukraine run official internet platforms where reports on the advancement in the process of the implementation of the SDGs are published: the National Reporting Platform for Poland and the SDG Open Platform for Ukraine. However, the common problem is that the data on those platforms reflect the general situation for the whole country, i.e. are not region-specific. This does not allow us to perform a cross-regional comparative analysis of the same measures-indicators set for this sphere respectively by Polish and Ukrainian official statistics.

The study also uses data coming from the following institutions: for Poland – Statistics Poland and the Statistical Office in Lublin and the Statistical Office in Rzeszów at regional level and for Ukraine – State Statistics Service of Ukraine and the Statistical Department in the Volyn Oblast and the Statistical Department in the Lviv Oblast at regional level. For Ukraine, data from the Ministry of Finance of Ukraine and the National Bank of Ukraine were used as well.

The study was conducted on the basis of official statistical data on the border regions of Poland and Ukraine available at the end of 2021, for the period of 2017–2019. All the estimates and proposals are based on these data. Obviously, shock periods for Poland and Ukraine's economies such as the COVID-19 pandemic (2020 and 2021) and the full-scale war in Ukraine (2022) will significantly affect and delay the implementation of the proposals aimed at increasing the financial support for the SDGs presented in this study. It is especially true about the border regions of Ukraine, because during the war the main task is to attract all the resources and reserves to defeat Russia. Nevertheless, the study is important from the point of view of the methodology, as it is designed to identify the shortcomings in the creating and monitoring of an effective system of financing the implementation of the SDGs based on the 2030 Agenda.

The research is based on a dialectic approach which is connected to learning things and processes in their development, also in the dynamic context. Therefore, while carrying out a multi-criteria assessment of the level of the financial support for achieving the SDGs, it is important to use data not just for one year, but for a longer period of time. Moreover, approximately every three years might bring changes to the social, economic and environmental conditions in a region. For this reason, the assessment and the comparative analysis of the levels of financial support should be performed on the data from the last three years (if available). In our case, making allowances for the fact that statistical data on GDP in Poland are published with a two-year delay, the period of 2017–2019 was chosen as a base research period. Also, in order to smoothen the potential non-typical deviations in this period, it is recommended that average values of indicators or values of indexes computed on their basis for those three years be calculated and taken into account.

Many studies assert that the SDGs based on the 2030 Agenda can be grouped into three key areas, which involves the traditional understanding of the concept of sustainable development as a harmonious combination of the environmental, social and economic components. For example, Ziolo et al. (2021) found a strong link between the model of sustainable financing and the social sustainability (Goals 1, 3, 4, 5, 10, 16), the environmental sustainability (Goals 11, 12, 13, 15), and the economic sustainability (Goals 8, 9, 17).

A similar approach was applied by the Ministry of Economic Development and Trade of Ukraine (2021) to forming the 2030 SDGs in Ukraine. Thematic working expert groups were established in four main areas: economic (Goals 2, 8, 9, 12), environmental (Goals 6, 7, 13, 14, 15), social (Goals 1, 3, 4, 10) and institutional (related to the previous areas – Goals 5, 11, 16, 17).

In this study, the predefined 17 SDGs based on the 2030 Agenda have been categorised on the basis of three components, namely social (Goals 1, 3, 4, 5, 10, 16), economic (Goals 2, 8, 9, 11, 17) and environmental (Goals 6, 7, 12, 13, 14, 15).

When analysing statistical data, major problems can be identified. Because of those, it is much more difficult to create a system of measures for the assessment of the level of financial support for sustainable development in the border regions of Poland and Ukraine, and especially one which would include all the possible sources and financing opportunities.

In Poland, there are several restrictions on data collection and processing, e.g.:

- statistical data on exports and imports of goods and services and on loans and deposits are not published at voivodship level;
- the National Bank of Poland does not provide open data on bank loans, foreign investment or capital instruments at voivodship level;
- Statistics Poland does not publish annual reports on salaries and pensions of women and men in voivodships for comparative analysis;
- statistical data on the economic aspects of the environmental protection do not include information about the ongoing expenses on the environmental-protection activities in voivodships;
- the data on GDP and other macroeconomic indicators are published with a two-year delay.

Likewise, there are problems with data collection and processing in Ukraine, e.g.:

- due to the administrative reform, no full and detailed statistics on incomes and outcomes of regional budgets (local units in new regions) are available;
- lack of data sources like the Polish Local Data Bank, where one could find relevant data for a particular region (voivodship) based on various criteria;
- lack of official statistical data on the development process and the financing of the renewable energy sector and the circular economy for regions;
- some statistical measures referring to households cannot be compared with similar data for Poland.

What should be done in the future is the selection of the most widely-accepted indicators based on available statistics that would meet certain criteria and sub-criteria for the evaluation.

Some authors, e.g. Ziolo et al. (2019), used the method of inverse matrix of correlation coefficients to select indicators for monitoring changes in the sustainable development by means of the environmental, social and economic components. Other researchers, such as Balas and Molenda (2016), proposed a common set of

indicators for assessing Poland's sustainable development without dividing them into particular components. Kłos (2017) focused on identifying the main models for the implementation of revolving financial instruments in the EU, analysed the effectiveness of their use, and identified barriers to their implementation.

Following Gordon (1996), it could be observed that without a clear selection method, indicators may be distorted and might fail to take full account of the key principles of sustainable development, which would render them ineffective. Zioło (2020) identified a system of indicators that can be used to assess sustainable funding in Poland at the national level according to the available information base. But in the case of Ukraine, most indicators cannot be determined according to the specific way of the presentation of Ukrainian statistics.

Some researchers, e.g. Zhukovska et al. (2021), believe that because financial and legal instruments to promote the implementation of sustainable development policy direct financial resources to certain goals, a gap in the implementation of other SDGs is thus created. Kozhukhova (2017) argues that when choosing indicators, it is important to take into account that the main forms of financial support for sustainable development should include financing, lending and investment, which, depending on the source, can be divided into public and private, national and international. At the same time, specific financial instruments can be used for each form of the financial support for sustainable development. According to Miszczuk (2017), the selected indicators should take into account the current developmental issues in regions adjacent to the Polish-Ukrainian border.

Based on the comparative analysis of the data from the official statistical databases in Poland and Ukraine (mentioned earlier), several general measures that could be used for assessing the level of the financial support for the SDGs based on the 2030 Agenda were defined.

The international dollar was chosen for the comparative purposes, as it is suitable for juxtaposing the measures expressed in the cost format (Polish zloty or Ukrainian hryvnia). Therefore, it has been proposed that measures in the national currencies of Poland and Ukraine be divided by the corresponding coefficients of the purchasing power parity (PPP) of these countries (Table 1). These coefficients are defined and published by the World Bank (n.d.).

**Table 1.** PPP correlation coefficient used for the GDP recalculation – national currency (LCU<sup>a</sup>) to international dollar

Country	2017	2018	2019
Poland .....	1.7429	1.7470	1.7644
Ukraine .....	5.9163	6.6672	7.0905
United States .....	1.0000	1.0000	1.0000

a Local currency unit.

Source: the World Bank (n.d.).



The system of indicators grouped by each criterion and sub-criterion for the assessment of the level of the financial support for achieving the SDGs, which are adapted to obtain comparable statistics on the border regions of Poland (Lubelskie and Podkarpackie voivodships) and Ukraine (the Volyn Oblast and the Lviv Oblast), is presented in Tables 2–4.

As the border regions of Poland and Ukraine do not have the access to the sea, there is no data specifying the additional sub-criterion for Goal 14 (the ecologic component). Therefore, this sub-criterion could not be taken into consideration for these particular regions while creating a common assessment system.

In general, our system of measures for the multi-criteria assessment of the level of the financial support for the implementation of the SDGs determined on the basis of the 2030 Agenda consists of 67 measures-indicators which characterise different sources of fundraising and financing. This system was created on the basis of statistical databases which were available at the time of performing the research, and is capable of performing a comparative analysis of regions of Poland and Ukraine.

The introduction of additional indicators or the replacement of indicators presented in Table 2 requires additional statistical observations in order to collect and summarise the necessary statistical data. This necessitates appropriate decisions from the statistical institutions of Poland and Ukraine. However, it is also possible that the Eurostat will develop a broad system of indicators for the EU countries including Poland, and Ukraine will join this initiative on a voluntary basis.

**Table 2.** Sub-criteria and indicators for assessing the level of financial support for the implementation of the SDGs based on the 2030 Agenda by the component criterion

Goal (sub-criterion)	Financial support assessment indicator	Unit of indicator	Simulator (+), destimulator (-)
<b>Social component</b>			
1: No poverty	Expenditure of local government units on social welfare and other social policies <i>per capita</i>	international \$	+
	Gross disposable income in the households sector <i>per capita</i>	international \$	+
	Average monthly household expenditure <i>per capita</i>	international \$	+
	Extreme poverty rate (percentage of people in households where the level of the total expenditure (Poland) or income (Ukraine) was lower than the extreme poverty threshold (real minimum existence))	%	-
3: Good health and well-being	Expenditure of local government units in the 'healthcare' section <i>per capita</i>	international \$	+
	Expenditure of local government units in the 'physical education' section <i>per capita</i>	international \$	+
	Capital expenditure in the 'healthcare' and 'social assistance' sections <i>per capita</i>	international \$	+
	Average monthly gross wages and salaries in the 'healthcare' and 'social assistance' sections	international \$	+
	Capital expenditure in the 'arts, entertainment and recreation' section <i>per capita</i>	international \$	+

**Table 2.** Sub-criteria and indicators for assessing the level of financial support for the implementation of the SDGs based on the 2030 Agenda by the component criterion (cont.)

Goal (sub-criterion)	Financial support assessment indicator	Unit of indicator	Simulator (+), destimulator (-)	
<b>Social component (cont.)</b>				
4: Quality education	Expenditure of local government units in the 'education' and 'higher education' sections per schoolchild, student or doctoral student	international \$	+	
	Capital expenditure in the 'education' section per one schoolchild, student or doctoral student	international \$	+	
	Average monthly gross wages and salaries in the 'education' section	international \$	+	
5: Gender equality	Female to male ratio	-	+	
	Ratio of the average wages and salaries of women and men	-	+	
	Average gross wages and salaries of women	international \$	+	
10: Reduced inequality	Average gross wages and salaries of men	international \$	+	
	Gini coefficient	%	-	
	At-risk-of-poverty rate after social transfers	%	-	
	Inequality of income distribution S80 / S20	%	-	
16: Peace, justice and strong institutions	Average retirement pay divided by average monthly gross wages and salaries	%	+	
	Expenditure of local government units in the 'public safety and fire protection', 'national defence' and 'the justice system' sections <i>per capita</i>	international \$	+	
	Expenditure of local government units in the 'public administration, and 'offices of supreme state authority, control and protection of law and the judiciary' sections <i>per capita</i>	international \$	+	
	Investment outlays in the 'public administration and national defence' section and in the compulsory social security <i>per capita</i>	international \$	+	
2: Zero hunger	Average monthly gross salaries in the 'public administration and national defense' section and in the compulsory social security	international \$	+	
	<b>Economic component</b>			
	Expenditure of local government units on agriculture, and hunting, forestry and fishing per 1 ha of agricultural land, forests and wooded and bushy land or land under surface waters	international \$	+	
	Gross value added in the 'agriculture', 'forestry', 'hunting and fishing' sections in current prices per 1 value of capital formation	international \$	+	
8: Decent work and economic growth	Investments in the agriculture, forestry, hunting and fishing per 1 ha of agricultural land, forests and wooded and bushy land or land under surface waters	international \$	+	
	Share of the expenditure on food and non-alcoholic beverages in the total household expenditure	%	-	
	Total gross domestic product dynamics (current prices), previous year = 100	%	+	
	Gross domestic product (current prices) <i>per capita</i>	international \$	+	
	Average monthly gross wages and salaries	international \$	+	
8: Decent work and economic growth	Personal income tax to the local government units' budgets <i>per capita</i>	international \$	+	
	Share of wages and salaries in the total household resources	%	+	

**Table 2.** Sub-criteria and indicators for assessing the level of financial support for the implementation of the SDGs based on the 2030 Agenda by the component criterion (cont.)

Goal (sub-criterion)	Financial support assessment indicator	Unit of indicator	Simulator (+), destimulator (-)
<b>Economic component (cont.)</b>			
9: Industry, innovation and infrastructure	Net revenue on sales of products (goods and services) in the 'industry' section per capital expenditure	international \$	+
	Expenditure of local government units in the 'transport and communication' and 'IT' sections per 1 km <sup>2</sup> of the region's area	thousands of international \$/km <sup>2</sup>	+
	Capital expenditure in the 'information and communication' section in current prices <i>per capita</i>	international \$	+
	Net revenue on the sale of goods and services by the 'transportation and storage' section per value of capital expenditure	international \$	+
	Net revenues on the sale of goods and services in the 'industry' section per 1 outlay on innovative activities of industrial enterprises	international \$	+
11: Sustainable cities and communities	Share of local governmental unit's own income in the total income of the consolidated local budget	%	+
	Expenditure of local government units in the 'housing management' and 'municipal management and environmental protection' sections <i>per capita</i>	international \$	+
	Net revenue on the sales of goods and services in the 'construction' section per capital expenditure	international \$	+
	Share of capital expenditure in the total local budget expenditure	%	+
	Net revenues on the sales of products, goods, and materials in the 'administrative services and support activities' section per capital expenditure	international \$	+
17: Partnership for the goals	Share of liabilities due to foreign direct investment in the region at the end of the year in its total balance by country	%	+
	Share of local budget revenues on the financing and co-financing of EU programmes and projects in the total revenues of the local budget	%	+
	Share of the financing of investment outlays of enterprises at the expense of foreign investors	%	+
<b>Environmental component</b>			
6: Clean water and sanitation	Gross value added in the 'water supply, sewage and waste management' and 'reclamation' per capital expenditure	international \$	+
	Environmental fees for the discharge of sewage per 1 hm <sup>3</sup> of industrial and municipal sewage discharged into waters or into the ground	thousands of international \$	+
	Fixed capital formation for water treatment <i>per capita</i>	international \$	+
	Industrial and municipal sewage treated per outlay on fixed assets for wastewater management and water protection	m <sup>3</sup> /international \$	+

**Table 2.** Sub-criteria and indicators for assessing the level of financial support for the implementation of the SDGs based on the 2030 Agenda by the component criterion (cont.)

Goal (sub-criterion)	Financial support assessment indicator	Unit of indicator	Simulator (+), destimulator (-)
<b>Environmental component (cont.)</b>			
7: Affordable and clean energy	Share of household expenses for the use of a flat or house and energy carriers	%	-
	Capital expenditure in the 'electricity, gas, steam and air conditioning production and supply' section <i>per capita</i>	international \$	+
	Gross value added in the 'electricity, gas, steam and air conditioning production and supply' section per 1 capital expenditure	international \$	+
	Share of renewable energy sources in the total electricity production	%	+
12: Responsible consumption and production	Outlays on fixed assets for waste management per 1 km <sup>2</sup> of the region's area	thousands of international \$/km <sup>2</sup>	+
	Net revenues from the sale of goods and services in the 'wholesale and retail trade' and 'repair of motor vehicles and motorcycles' sections per capital expenditure	international \$	+
	Environmental fees for waste management per 1 t of waste generated	international \$	+
	Waste neutralised per 1 fixed capital expenditure on waste management	t/thousands of international \$	+
13: Climate action	Outlays on fixed assets for air and climate protection per 1 km <sup>2</sup> of the region's area	thousands of international \$/km <sup>2</sup>	+
	Environmental fees for air and climate protection, including CO <sub>2</sub> emissions, to marshal offices per 1 t of air-pollutant emissions	international \$/t	+
	Share of borrowed funds (not own funds) in the total expenditure on fixed assets for environmental protection	%	+
	Outlays on fixed assets for air and climate protection per 1 t of air-pollutant emission	international \$/t	+
15: Life on land	Outlays on fixed assets for the rehabilitation of heaps, tailings ponds and waste landfills as well as other devastated and degraded areas per 1 ha of devastated and degraded land requiring reclamation	thousands of international \$/ha	+
	Outlays on fixed assets for the protection of biodiversity and landscape per 1 ha of area of legally-protected special natural value	international \$/ha	+
	Investment outlays in forestry per 1 ha of forests and wooded and bushy land	international \$/ha	+
14: Life below water	not applicable	-	not applicable

Source: authors' work based on data from the official websites of Statistics Poland, State Statistics Service of Ukraine, the National Bank of Ukraine and the World Bank.

Consequently, a method for defining the indexes should be chosen, which is highly important, as sometimes indexes that are obtained as a result of integral assessment (as well as group indexes based on the prime ones) differ depending on

the chosen method. The main task here is to choose the right approach for recalculating final numbers into their individual indexes.

Perlo (2014) presents a detailed analysis of the sustainable development-modelling methods for regions, and her research reflects the economic and statistical cross-regional comparative analysis based on statistical indexes. The research of Poburko (2004) features the analysis of the benefits and shortcomings of different methods of making cross-regional comparisons as well as the approaches to creating a system of criteria and sub-criteria for a multi-criteria assessment.

The Eurostat used different assessment methods for analysing the tendencies of change in indicators while preparing a monitoring report on the SDGs' achievement process in the EU (Eurostat, 2021). Those methods were chosen on the basis of whether there were or were not any qualitative requirements in the framework of prime measures. In general, the Eurostat did not make an integral assessment of all SDGs.

Before, many authors used the index method to perform a multi-criteria assessment of processes connected to the SDGs, e.g. Karman et al. (2021) and Khvesyk et al. (2017). However, recently it has been the taxonomy method that has been used in the majority of cases while defining individual indexes based on prime measures.

Since the level of the financial support for the achievement process of sustainable development is a variable (and its maximisation is necessary), the maximum and the minimum levels of corresponding measures from the whole period should be taken as a base in the comparative analysis (for stimulants and destimulants, respectively). The main reason for this is the standardisation of the process.

The first prime (individual) indexes of measures-indicators will become the base for defining sub-criteria indexes. These indexes will correspond to particular SDGs based on the 2030 Agenda and will be calculated as an average of the corresponding individual indexes. Then, the criteria indexes will be calculated (as an average of the sub-criteria indexes) and grouped as belonging to one of the three components of sustainable development. Only the indicators that could be determined for both Poland and Ukraine were selected.

The integral index of the level of the financial support for the sustainable development achievement process will be calculated as an average of the criteria indexes (economic, social and environmental).

Primary indexes of indicators of financial support for SDGs based on the 2030 Agenda  $I_{ij}^{kp}(t)$  according to regions, SDGs and the direction of the indicator (stimulant or destimulant), will be determined by the following formulas:

- for indicators stimulants: 
$$I_{ij}^{kp}(t) = \frac{W_{ij}^{kp}(t)}{WMA_j^{kp}(t)}, \quad (1)$$

- for indicators destimulants: 
$$I_{ij}^{kp}(t) = \frac{WMI_j^{kp}(t)}{W_{ij}^{kp}(t)}, \quad (2)$$

where:

$W_{ij}^{kp}(t)$  – the value of the  $j$ -th evaluation index from the  $k$ -th sub-criterion and the  $p$ -th criterion for the  $i$ -th region in analysed year  $t$ ,

$WMA_j^{kp}(t)$  – the maximum value of the  $j$ -th evaluation index among the  $k$ -th sub-criteria forming the  $p$ -th criterion in analysed year  $t$  among all regions,

$WMI_j^{kp}(t)$  – the minimum value of the  $j$ -th evaluation index among the  $k$ -th sub-criteria forming the  $p$ -th criterion in analysed year  $t$  among all regions,

$p = 1, \dots, P$  – number of the component (criterion) of the financial support assessment,  $i$ -th region in period  $t$  ( $P = 3$ ),

$k = 1, \dots, K$  – number of the SDG (sub-criterion) for the assessment of financial support included in the  $p$  component (criterion) of the  $i$ -th region in period  $t$ ,

$j = 1, \dots, S$  – number of the individual indicator in the group of sub-criteria,

$i = 1, \dots, m$  – number of the studied region ( $m = 4$ ),

$t = 1, \dots, T$  – number of the indicator evaluation period ( $T = 3$ ).

The group index of the level of the financial support for the  $i$ -th region according to the  $k$ -th sub-criterion referred to the  $p$ -th criterion in period  $t$  –  $I_i^{kp}(t)$  is calculated as the arithmetic mean of the individual indexes of indicators:

$$I_i^{kp}(t) = \frac{\sum_{j=1}^S I_{ij}^{kp}(t)}{m}. \quad (3)$$

The intergroup index of the level of financial support for the  $i$ -th region according to the  $p$ -th criterion in period  $t$  –  $I_i^p(t)$  is calculated as the arithmetic mean of the group indexes:

$$I_i^p(t) = \frac{\sum_{k=1}^K I_i^{kp}(t)}{K}. \quad (4)$$

The integral index of the level of financial support for the  $i$ -th region in period  $t$  –  $I_i(t)$  is calculated as the arithmetic mean of the group indices:

$$I_i(t) = \frac{\sum_{p=1}^P I_i^p(t)}{P}. \quad (5)$$

The value of total indexes for the 2017–2019 period is defined as the arithmetic mean of the index values for individual years.

Grouping of regions according to the levels of the financial support for sustainable development is based on the values of indicators (by the method of equal intervals):

0.00–0.33 – low level;

0.34–0.67 – medium level;

0.68–1.00 – high level.

In order to illustrate the results of grouping the border regions according to the levels of financial support, it is advisable to use combined graphs and a cartographic method of visual presentation of interregional comparisons.

### 3. Results

Tables with the initial data for each of the SDGs based on the 2030 Agenda were compiled at the beginning of the assessment, except for Goal 14, as the border regions of Poland and Ukraine do not have access to the sea. Due to the fact that the tables contain a massive amount of information, and following the idea of the optimisation of information in this research, the tables have not been included in this paper, but are available upon request.

What is shown in the paper, are the generalised data on the calculated group indexes. As mentioned before, they correspond to particular Goals and are grouped according to one of the three components of sustainable development.

Table 3 presents the results of the assessment of the level of financial support for the implementation of the SDGs based on the 2030 Agenda in the border regions of Poland and Ukraine in the years 2017–2019 in terms of the social component.

As regards Goal 1: No poverty, the Polish border regions, i.e. Lubelskie Voivodship (0.83) and Podkarpackie Voivodship (0.80) had the highest level of financial support in the years 2017–2019. These figures significantly exceed the ones obtained (according to the same sub-criteria) for the Lviv Oblast (0.56) and the Volyn Oblast (0.52). To sum up the results regarding Goal 1, the Polish border regions indicated a significantly higher level of financial support (0.81) than the Ukrainian border regions, which reached a medium level (0.53).

A similar situation was observed for Goals 3, 4, 5 and 16: the Polish border regions demonstrated a high level of financial support towards achieving the SDGs for the social component (0.70–0.97), while the Ukrainian border regions reached a low (Goal 3) or medium level (Goals 4, 5 and 16).

Goal 10: Reduced inequality, on the other hand, was the only area where both the Ukrainian and Polish border regions reached a high level of financing of the SDGs achievement process. Notably, the Lviv Oblast was the leader among all the border regions, with a group index for 2017–2019 at 0.86. However, if all the data on Goal 10 are generalised, the Polish border regions demonstrated a higher financial support level (0.82) than the Ukrainian border regions (0.79).

The next phase of the analysis involved the assessment of the level of financial support facilitating the achievement process of the SDGs based on the 2030 Agenda in the border regions of Poland and Ukraine in 2017–2019 in terms of the economic component (Table 4).

The results show that the Polish border regions secured a high level of financial support when achieving Goals 2, 8, 9 and 11, with the corresponding group indexes reaching 0.71 to 0.95. The Ukrainian border regions showed a high level of financial support in achieving Goal 8 (due to a high index noted in Lviv Oblast), a medium level in reaching Goals 2 and 17, and a low level in achieving Goals 9 and 11.

In the process of achieving all the Goals in terms of the economic component, the Volyn Oblast had the lowest level of financial support among all the border regions. It is crucial for the Volyn Oblast to arrange for an increase in funding the process of achieving Goals 9, 11 and 17, as the level of financial support indicated low values during the entire research period.

Table 5 contains the results of the assessment of the level of funds devoted to achieving the SDGs based on the 2030 Agenda in the border regions of Poland and Ukraine in 2017–2019 in relation to the environmental component.

The group indexes for Goals 6, 7, 12, 13 and 15 (environmental component) demonstrated a significant range of changes. Moreover, a clear pattern could be observed showing that the Polish border regions obtained higher results than the Ukrainian ones. However, a high financial support level among the Polish border regions was reached only in relation to Goals 7 and 13, while a medium level for Goals 6, 12 and 15.

When analysing the Ukrainian results referring to the level of the financial support for the process of achieving the SDGs based on the 2030 Agenda in terms of the environmental component, the situation was less favourable. A medium financial support level was achieved for Goals 6, 7, 13 and 15, although it was significantly lower than in the case of the Polish border regions. A low level of financial support for the achievement of the SDGs was noted for Goal 12. Here too, it would be advisable to devote additional attention towards the further increase of funding in the Volyn Oblast for the process of achieving Goals 12, 13 and 15, where the results ranged as low as from 0.12 to 0.21.



**Table 3.** Assessment of the level of financial support for the achievement of the SDGs based on the 2030 Agenda in the border regions of Poland and Ukraine in terms of the social component by group indexes

Voivodship, oblast or region	Goal 1: No poverty				Goal 3: Good health and well-being				Goal 4: Quality education				Goal 5: Gender equality				Goal 10: Reduced inequality				Goal 16: Peace, justice and strong institutions			
	2017	2018	2019	2017–2019	2017	2018	2019	2017–2019	2017	2018	2019	2017–2019	2017	2018	2019	2017–2019	2017	2018	2019	2017–2019	2017	2018	2019	2017–2019
Lubelskie .....	0.80	0.84	0.84	0.83	0.73	0.58	0.80	0.70	0.76	0.98	0.98	0.90	0.96	0.95	0.94	0.95	0.84	0.83	0.74	0.80	0.71	0.79	0.73	0.75
Podkarpackie .....	0.78	0.77	0.86	0.80	0.82	0.82	0.78	0.81	1.00	0.98	0.94	0.97	0.93	0.92	0.90	0.92	0.84	0.83	0.84	0.84	0.85	0.89	0.86	0.87
Volyn .....	0.51	0.52	0.52	0.52	0.29	0.28	0.28	0.29	0.34	0.37	0.36	0.36	0.71	0.70	0.69	0.70	0.82	0.71	0.73	0.76	0.34	0.37	0.38	0.36
Lviv .....	0.52	0.59	0.57	0.56	0.31	0.32	0.33	0.32	0.33	0.37	0.38	0.36	0.72	0.71	0.68	0.70	0.76	0.91	0.91	0.86	0.42	0.45	0.45	0.44
Polish border regions .....	0.79	0.80	0.85	0.81	0.77	0.70	0.79	0.75	0.87	0.98	0.96	0.94	0.95	0.93	0.92	0.93	0.84	0.83	0.78	0.82	0.78	0.84	0.80	0.81
Ukrainian border regions .....	0.51	0.54	0.53	0.53	0.31	0.31	0.32	0.31	0.33	0.36	0.38	0.36	0.72	0.70	0.68	0.70	0.79	0.78	0.80	0.79	0.39	0.42	0.43	0.41

Source: authors' calculations based on data obtained from Statistics Poland and the State Statistics Service of Ukraine.

**Table 4.** Assessment of the level of financial support for the achievement of the SDGs based on the 2030 Agenda in the border regions of Poland and Ukraine in terms of the economic component by group indexes

Voivodship, oblast or region	Goal 2: Zero hunger				Goal 8: Decent work and economic growth				Goal 9: Industry, innovation and infrastructure				Goal 11: Sustainable cities and communities				Goal 17: Partnership for the goals			
	2017	2018	2019	2017–2019	2017	2018	2019	2017–2019	2017	2018	2019	2017–2019	2017	2018	2019	2017–2019	2017	2018	2019	2017–2019
Lubelskie .....	0.83	0.87	0.81	0.84	0.94	0.92	0.93	0.93	0.82	0.61	0.82	0.75	0.92	0.85	0.83	0.87	0.54	0.42	0.51	0.49
Podkarpackie .....	0.70	0.70	0.72	0.71	0.97	0.96	0.92	0.95	0.82	0.83	0.86	0.84	0.87	0.85	0.91	0.87	0.69	0.90	0.82	0.80
Volyn .....	0.56	0.55	0.52	0.54	0.63	0.63	0.61	0.62	0.26	0.34	0.28	0.29	0.26	0.23	0.28	0.26	0.38	0.18	0.43	0.33
Lviv .....	0.58	0.53	0.53	0.55	0.74	0.74	0.74	0.74	0.40	0.31	0.38	0.36	0.35	0.35	0.34	0.34	0.67	0.39	0.38	0.48
Polish border regions .....	0.79	0.81	0.78	0.79	0.96	0.94	0.92	0.94	0.78	0.67	0.82	0.76	0.87	0.82	0.87	0.85	0.61	0.67	0.67	0.65
Ukrainian border regions .....	0.57	0.54	0.53	0.55	0.70	0.69	0.69	0.69	0.34	0.30	0.34	0.33	0.32	0.31	0.32	0.32	0.54	0.27	0.34	0.38

Source: authors' calculations based on data obtained from Statistics Poland and the State Statistics Service of Ukraine.

The generalised assessment involved defining group indexes (criteria indexes) and grouping them by one of the three components of sustainable development. The next step included the calculation of the integral index of the assessment of the level of financial support for the SDGs achievement process in the border regions of Poland and Ukraine in 2017–2019 (Table 6).

The results of the calculation of the group indexes indicating the financial support level in terms of the social component showed a relatively high value for the Polish border regions (Lubelskie Voivodship – 0.82, Podkarpackie Voivodship – 0.87). Meanwhile, the Ukrainian border regions reached a medium level of financing (the Volyn Oblast – 0.50, the Lviv Oblast – 0.54). To sum up, there is a significant difference between Poland and Ukraine in their financial support levels for achieving the SDGs based on the 2030 Agenda in terms of the social component, with the Ukrainian border regions receiving financing at a lower level.

The next part of the paper presents a detailed analysis of the dynamics of the changes in the financial support level group of indexes in terms of the social component for the particular years of the analysed period.

What is noticeable is that the positive trend among Polish border regions, which noted a relatively high level of financial support in terms of the social component, occurred due to the high values of the measures for Lubelskie Voivodship. However, this region reached the measure of 0.84 of the group index in 2019, which was lower than the minimal measure in Podkarpackie Voivodship in the same year (group index of 0.86). Among the Ukrainian regions, which in general had a medium level of financial support in terms of the social component, a positive trend was noted only in the Lviv Oblast (the index increased from 0.51 to 0.56), while in the Volyn Oblast group indexes varied at lower levels – from 0.50 to 0.51.

When analysing the general trend of the financial support levels for border regions of Poland and Ukraine, a positive trend of the corresponding group index in both areas was observed. However, in the Polish border regions it increased from high to even higher measures (from 0.83 to 0.85), while in Ukrainian border regions these changes were minimal (from 0.51 to 0.52). To sum up, the level of the financial support for the achievement process of the SDGs based on the 2030 Agenda in terms of the social component was on the rise. Nevertheless, it would be advisable for Ukrainian regions to increase the funding aimed at achieving the Goals relating to this component.

The analysis of the financial support level of the process of achieving the Goals concerning the economic component shows that it was similar to the social component. The Polish border regions reached a high level of financial support (Lubelskie Voivodship – 0.78, Podkarpackie Voivodship – 0.84), and the Ukrainian border regions reached a medium level (the Volyn Oblast – 0.41, the Lviv Oblast – 0.50). Additionally, Ukrainian border regions achieved even lower medium results in terms of the Goals corresponding to the economic component compared to the Goals concerning the social component.

**Table 5.** Assessment of the level of financial support level for the achievement of the SDGs based on the 2030 Agenda in the border regions of Poland and Ukraine in terms of the environmental component by group indexes

Voivodship, oblast or region	Goal 6: Clean water and sanitation				Goal 7: Affordable and clean energy				Goal 12: Responsible consumption and production				Goal 13: Climate action				Goal 15: Life on land			
	2017	2018	2019	2017–2019	2017	2018	2019	2017–2019	2017	2018	2019	2017–2019	2017	2018	2019	2017–2019	2017	2018	2019	2017–2019
Lubelskie .....	0.55	0.57	0.41	0.51	0.89	0.83	0.82	0.85	0.47	0.52	0.67	0.55	0.55	0.76	0.66	0.66	0.54	0.57	0.73	0.61
Podkarpackie .....	0.73	0.69	0.68	0.70	0.93	0.84	0.86	0.88	0.75	0.75	0.75	0.75	0.89	0.64	0.67	0.73	0.67	0.67	0.34	0.56
Volyn .....	0.39	0.42	0.40	0.41	0.45	0.48	0.46	0.46	0.14	0.14	0.17	0.15	0.23	0.28	0.14	0.21	0.15	0.13	0.09	0.12
Lviv .....	0.47	0.54	0.46	0.49	0.56	0.57	0.54	0.56	0.24	0.26	0.32	0.27	0.58	0.36	0.49	0.47	0.74	0.41	0.48	0.54
Polish border regions .....	0.62	0.62	0.55	0.60	0.91	0.82	0.83	0.86	0.40	0.52	0.61	0.51	0.70	0.71	0.67	0.70	0.57	0.55	0.52	0.55
Ukrainian border regions .....	0.45	0.52	0.43	0.47	0.52	0.55	0.52	0.53	0.21	0.23	0.28	0.24	0.51	0.35	0.45	0.44	0.47	0.25	0.34	0.35

Source: authors' calculations based on data obtained from Statistics Poland and the State Statistics Service of Ukraine.

**Table 6.** Integral assessment of the level of the financial support for the achievement of the SDGs based on the 2030 Agenda in the border regions of Poland and Ukraine by intergroup indexes

Voivodship, oblast or region	Social component				Economic component				Environmental component			
	2017	2018	2019	2017–2019	2017	2018	2019	2017–2019	2017	2018	2019	2017–2019
Lubelskie .....	0.80	0.83	0.84	0.82	0.81	0.74	0.78	0.78	0.60	0.65	0.66	0.64
Podkarpackie .....	0.87	0.87	0.86	0.87	0.81	0.85	0.84	0.84	0.80	0.72	0.66	0.72
Volyn .....	0.50	0.49	0.50	0.50	0.42	0.39	0.42	0.41	0.27	0.29	0.25	0.27
Lviv .....	0.51	0.55	0.56	0.54	0.55	0.46	0.47	0.50	0.52	0.43	0.46	0.47
Polish border regions .....	0.83	0.85	0.85	0.84	0.80	0.78	0.81	0.80	0.64	0.65	0.64	0.64
Ukrainian border regions .....	0.51	0.52	0.52	0.52	0.49	0.42	0.44	0.45	0.43	0.38	0.40	0.40

Source: authors' calculations based on the data presented in Tables 3–5.

Subsequently, the trends showing the changes in the group indexes of the financial support level of sustainable development relating to the social component were analysed.

The Polish border regions, which showed a high level of financial support concerning the social component, did not show a positive trend in terms of increasing the funding. Podkarpackie Voivodship produced the highest results of the group index in the years 2017–2019; however, in 2019 it slightly decreased from 0.85 to 0.84 in comparison to the year before. The same situation was observed in Lubelskie Voivodship – the maximum occurred in 2017 (0.81), although in 2019 it decreased to 0.78.

An unstable tendency indicating a decrease of this group index in 2018 and a slight increase in 2019 was typical for the Ukrainian border regions with a medium financial support level in 2017–2019. In general, the analysis of the financial support level in terms of the economic component indicated that the border regions in Poland reached almost a twice as high level as the border regions in Ukraine in 2017–2019 (0.80 and 0.45, respectively). The Polish border regions boasted a positive trend (increase from 0.78 to 0.81), while the Ukrainian ones saw a negative trend (fall from 0.49 to 0.44). Therefore, it was crucial for the Ukrainian border regions to increase the funding for the achievement of the SDGs based on the 2030 Agenda relating to the economic component.

The analysis of the group indexes concerning the environmental component indicates that the situation in Polish border regions was less positive than the situation in those regions regarding other sustainable development components. Lubelskie Voivodship (0.64) was the region with a medium financial support level, and only Podkarpackie Voivodship reached a comparatively high result (0.72). As regards the Ukrainian border regions, the Volyn Oblast with a minimal index of 0.27 was the only region with a low level of financial support in terms of the environmental component, while the Lviv Oblast reached a medium level in this respect (0.47).

The next step of the research focused on the analysis of the changes which occurred in the group indexes of the financial support of the SDGs achievement process relating to the environmental component for the particular years of the studied period.

The level of the financial support in the Podkarpackie region (which is the only region that achieved a high financial support level in general) showed a negative trend in the analysed years – a decrease from 0.80 to a critical level of 0.66; therefore, the region status shifted from belonging to the group of regions with a high financial support level to the group with a medium one. However, a positive trend in this respect was observed in Lubelskie Voivodship – the index increased from 0.60 to

0.66 and nearly reached the level which corresponded to the indexes belonging to the group with a high level of financial support.

The Ukrainian border regions faced an unstable situation as well. The Volyn Oblast achieved a relatively low level of financial support during all the studied years. A negative trend, indicated by a decrease from 0.27 to 0.25, was observed. The Lviv Oblast, despite the fact that it secured a medium-level financial support, also followed a negative trend (decline from 0.52 to 0.46).

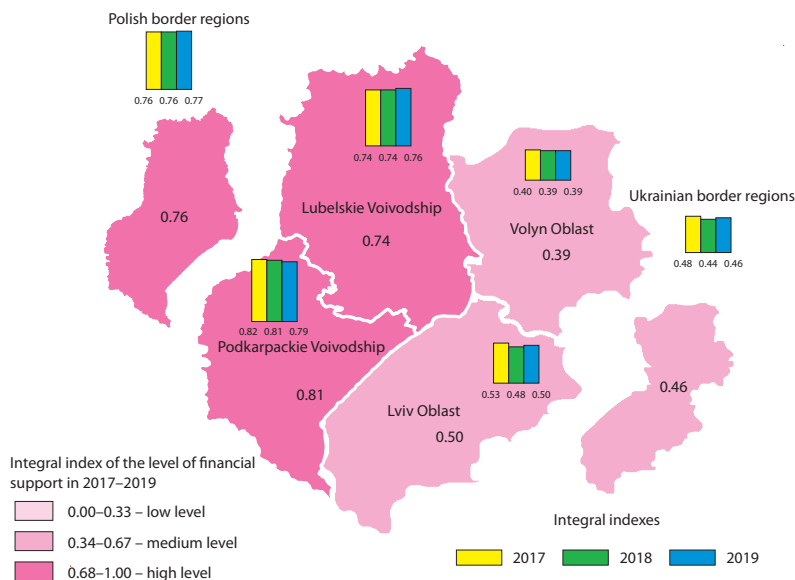
It is very important to take timely actions to increase the financial support and assure the effective use of these funds in the process of achieving the environmental component of the SDGs based on the 2030 Agenda in the Podkarpackie Voivodship, the Lviv Oblast and, most importantly, the Volyn Oblast. The final part of the research involved defining the integral index of the financial support level, which generalises all the financial support levels corresponding to every criterion. Among all the border regions, it was those situated in Poland that obtained a high level of financial support for the achievement process of the SDGs, i.e. Podkarpackie Voivodship (0.81) and Lubelskie Voivodship (0.74). Ukrainian border regions achieved a medium integral financial support level: the Lviv Oblast 0.50 and the Volyn Oblast 0.39, i.e. the lowest results among all the considered border regions.

The analysis of the dynamics of the integral index in the particular years of the studied period (see the Map) showed that the Polish border regions, which reached a relatively high level of financial support, followed both positive and negative trends in its annual change: Podkarpackie Voivodship noted a decrease from 0.82 to 0.79, while Lubelskie Voivodship saw an increase from 0.74 to 0.76. In other words, Lubelskie Voivodship was effectively equal in this respect to Podkarpackie Voivodship, and they both remained in the group of regions with a secured high level of financial support. Ukrainian regions generally remained in the group of a medium level of financial support, even though their indexes declined: in the Lviv Oblast from 0.53 to 0.50, and in the Volyn Oblast from 0.40 to 0.39. Consequently, the Volyn region seemed to have been likely to fall into the group with a relatively low level of financial support in the years to follow.

A general analysis of the integral index trends in the border regions shows that Polish voivodships experienced its slight increase from 0.76 to 0.77, i.e. they reached a high level of financial support during the 2017–2019 period. The decrease observed in Ukrainian regions was minor (from 0.48 to 0.46), although it suggested that the studied oblasts were approaching a low level of financial support.

To sum up, it is highly recommended that both Polish and Ukrainian regions introduce (where necessary) measures designed to increase their financial support and assure its effective use in achieving the SDGs based on the 2030 Agenda.

**Map.** Results of the integral assessment of the level of financial support for the achievement process of the SDGs based on the 2030 Agenda



Source: authors' work.

All group indexes (all criteria) as well as the integral index confirm that Polish regions in general performed on a high financial support level when implementing the SDGs based on the 2030 Agenda. The average result was 0.76; however, it remained far from the maximum of 1.00. Ukrainian regions in general reached only a medium financial support level (0.46), which was also far from the control index result between the medium and high financial support level group (0.67).

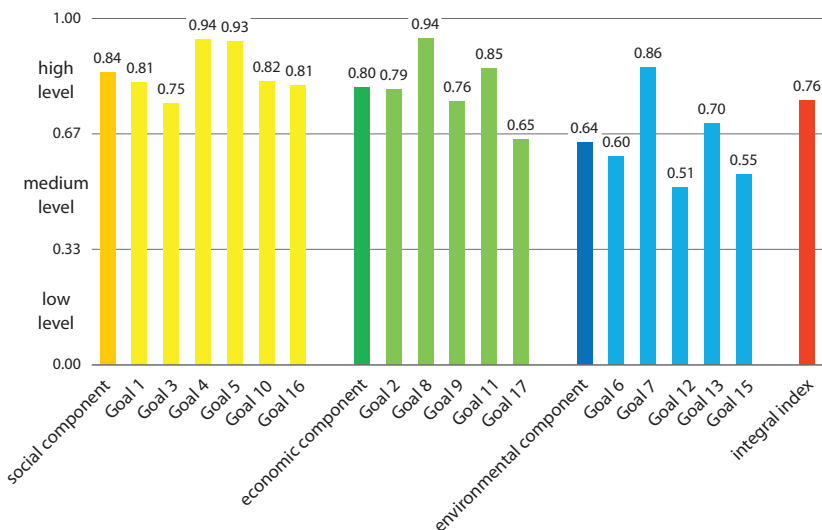
In conclusion, the financing for the implementation of the SDGs based on the 2030 Agenda definitely needed to be increased – especially in Ukrainian border regions, to enable them to join the group with a high level of financial support in the near future. It was also necessary to maintain the same financing level in the Polish border regions. It was important to seek new sources of financing (especially of the environmental component) in order to gradually reach a high level of the financial support there.

A comparative analysis of the financial support level in the years 2017–2019 (both a components-oriented and in terms of the specific Goals) should be actually conducted for all Polish border regions (Figure 1).

A positive aspect of the situation was that the Polish border regions reached a relatively high level of financial support for all the Goals corresponding to the social and economic components (except Goal 17). The highest level of financial

support was reached when implementing Goals 3, 4 and 8. The level of financial support in achieving the Goals corresponding to the environmental component remained problematic. The Polish regions reached a medium level of financial support in achieving Goals 6, 12 and 15 (the environmental component Goals in general), thus it seemed especially important to increase the financing allowing the effective implementation of the above-mentioned Goals.

**Figure 1.** Results of the integral assessment of the level of financial support for the achievement process of the SDGs based on the 2030 Agenda in the border regions of Poland in 2017–2019



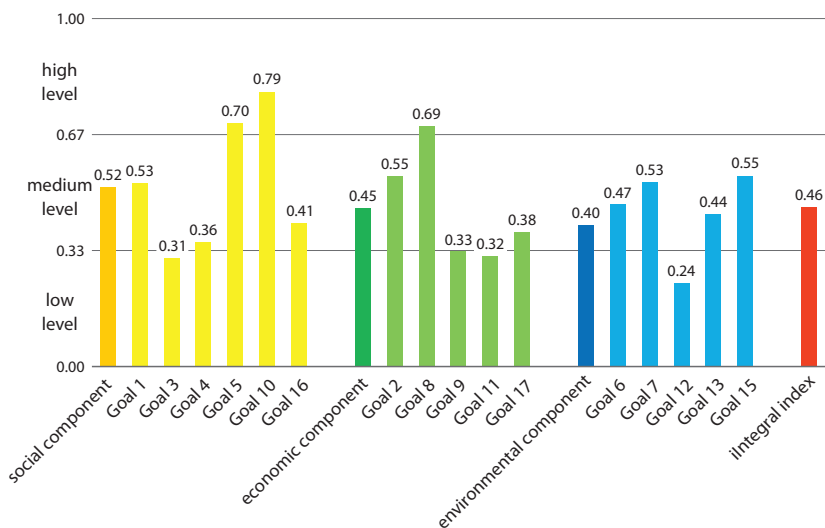
Source: authors' work based on data from Tables 3–5.

Then, a comparative analysis of the level of financial support for the achievement of the SDGs based on the components and specific Goals was conducted. The analysis concerned the border regions of Ukraine and covered the years 2017–2019 (Figure 2).

As shown in Figure 2, a medium financial support level was reached when achieving all the SDGs except for Goal 3: Good health and well-being (in terms of the social component). The general level of the implementation of the SDGs corresponding to the economic component was slightly lower than for the other components, and the financial support level for achieving Goal 11: Sustainable cities and communities and Goal 9: Industry, innovation and infrastructure was low. The level of achieving SDGs corresponding to the environmental component was generally of a medium value. Goal 12: Responsible consumption and production was

the only one with a low financial support level. In general, a high financial support level in the Ukrainian border regions was achieved for Goals 5, 8 and 10.

**Figure 2.** Results of the integral assessment of the level of financial support for the achievement process of the SDGs based on the 2030 Agenda in the border regions of Ukraine in 2017–2019



Source: authors' work based on data from Tables 3–5.

Future regional policy focusing on financing the development of border regions should aim at increasing the financial support wherever necessary in order to achieve the remaining SDGs based on the 2030 Agenda.

Further model strategies for the growth of the level of the financial support for every region, including the border regions (based on the components and specific SDGs) could be developed based on the sub-criteria, criteria and integral indexes, depending on the group results of Poland and Ukraine.

#### 4. Conclusions

The study is based on the well-known concept of sustainable development, which involves a harmonious combination of three components, namely social, economic and environmental. The globally defined SDGs based on the 2030 Agenda comprise 17 Goals, here grouped by the components: social – Goals 1, 3, 4, 5, 10, 16, economic – Goals 2, 8, 9, 11, 17, and environmental – Goals 6, 7, 12, 13, 14, 15. The financing of sustainable development is a very important issue for all countries in the world



today, essential to the rebuilding of the economy based on the 2030 Agenda-inspired SDGs. This financing strategy should comprise different sources of income and directions of investment as well as a variety of funding instruments.

According to the assessment, the financial support for the achievement of the SDGs (economic and environmental components or criteria) secured by the Polish regions was generally higher than that of Ukraine. Thus, the integral indexes of Polish border regions reached 0.76, as compared to Ukraine's 0.46. Poland's higher score in this respect was largely the result of the country's membership in the EU and the funds obtained from there. The positive aspect was that no single region had a low level of financial support (i.e. no low values of the relevant indexes were observed within any of the components). However, the differences between border regions were considerable, which confirms the hypothesis that the border regions of Poland reached a significantly higher level of financial support for the achievement of the SDGs than the border regions of Ukraine. The highest integral level of financial support for the achievement process of SDGs in the years 2017–2019 (from among all border regions) was observed in two Polish voivodships – Lubelskie Voivodship (0.74) and Podkarpackie Voivodship (0.81), while a medium level of integral financial support for Ukraine was noted in two oblasts – the Lviv Oblast (0.50) and the Volyn Oblast (0.39). The analysis of the trends for the indexes in specific years of the research period mainly showed a gradual deterioration in the financing level in the Ukrainian border regions, but a slight improvement in the level of financing in the Polish regions.

The detailed assessment of the level of financial support based on particular 2030 Agenda-inspired SDGs or certain sub-criteria leads to several conclusions. It was necessary for the Polish regions to assure financial support for achieving Goal 6: Clean water and sanitation, Goal 12: Responsible consumption and production, as well as Goal 15: Life on land (environmental component). Ukrainian regions, on the other hand, needed financial support for achieving Goal 3: Good health and well-being, Goal 4: Quality education, and Goal 16: Peace, justice and strong institutions (social component). Almost all the other economic-component Goals (2, 9, 11 and 17) also required additional financing. The only exception was Goal 8: Decent work and economic growth. The same strategy should be adopted for the environmental Goals (7, 12, 13 and 15). In general, the Ukrainian border regions required substantially higher funding essential to the achievement of the environmental SDGs than Polish border areas, which had a significantly higher financial support in this respect.

At the international level, it was necessary to create a sufficient information base allowing the assessment of the level of financial support needed for the achievement of the SDGs based on the 2030 Agenda and enabling a further region-based multi-

criteria assessment of the level of financial support required for sustainable development. We believe that the development of a comprehensive system of indicators evaluating the financial support necessary for the implementation of the SDGs based on the 2030 Agenda would be an extremely important task for the Eurostat. It should expand the analytical capabilities of an assessment of this kind to include all EU countries and selected regions such as NUTS 2 and NUTS 3.

What was highly important for Ukraine, as a country undergoing decentralisation, was to obtain any necessary knowledge from case studies accumulated by Statistics Poland. One good Polish example worth following by Ukraine is the establishment of the Local Data Bank. This Polish official statistical database has a system of measures for regional-level budgets as well as various measures reflecting the changes observed in social and economic development in gminas (communes or municipalities), cities, powiats (counties or districts) and voivodships (provinces). All these data could be used in the further assessment of the achievement process of the SDGs based on the 2030 Agenda. But Poland as well has areas that need improvements. For example, the country should be obtaining (at least at the voivodship level) statistical data on foreign investments, exports and imports, loans and deposits, and should update and publish annual reports on salaries (with detailed information on the measures and in a gender-based specification).

The results of the assessment of the level of financial support dedicated to the implementation of the SDGs based on the 2030 Agenda can form the basis for the further development of regional and joint border strategies aiming to increase the funding of common social, economic and environmental goals, and obtain synergies from the sustainable development of Poland. It is also likely to accelerate Ukraine's integration with the European Union.

The war that broke out in Ukraine in late February 2022 due to the Russian aggression meant that the issue of sustainable development had to be put on hold. After the war, this topic will certainly return. Western Ukraine, including the regions bordering with Poland, which seem for now to be far less damaged than the remaining territory, are likely to become an important area for the Ukrainian economy. Paradoxically, the need to rebuild Ukraine may provide a major impetus for its modernisation in line with the SDGs.

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