

## PROPOSAL FOR THE MODIFICATION OF THE OECD AND EUROSTAT-BASED TYPOLOGIES FOR RURAL AREAS

Marian Skorupka

### Summary

According to the regionalisation procedure based upon OECD and EUROSTAT typologies, the land of EU Member States is subdivided into rural areas (ca. 90 per cent of the total EU territory) and urban areas (ca. 10 per cent thereof), generally based on the criterion of population density, with a threshold of 150 (OECD) or 300 (EUROSTAT) inhabitants per square kilometre.

The proposed modification of both typologies relies on distinguishing, on the local level, of the third type of areas, called “natural areas,” and characterized as follows:

- zero density of population;
- occurrence of dense areas with habitats of natural type (forests, lakes, mountains, swamps etc.) within the given area; combined with;
- low (negligible) level of human intervention.

Desirability of distinguishing between the “natural area” type as opposed to the “rural area” type results from:

- its functionality, which is wholly different from that of other types of “rural areas”;
- high share of such land in the total area of the EU (more than 40 per cent);
- the fact that the share of such areas in current type of rural areas – estimated as ca. 40 to 50 per cent – varies between the member states, from ca. 10 per cent (Benelux, Ireland) up to 80 and more per cent (Finland, Sweden), with less than 40 per cent share in Poland;
- possibility to obtain a better approximation of the actual condition, reflected in quality data, including spatial data, describing the environment of natural areas and the remaining rural areas.

As a consequence of distinguishing the “natural areas” on local level, we would be able to classify a region/sub-region type of “MOSTLY NATURAL” at regional level, with the share of “natural areas” on a threshold, e.g. 80 or 85 per cent, but no less than two thirds.

Implementation of the aforementioned modification of methodology in both types is simple, and it could be performed fast. This is because all of the EU Member States (including Poland) already possess the necessary data in the framework of their IT systems including spatial data systems such as GIS (Geographic Information Systems) included, inter alia, in the IACS (Integrated Administration and Control System), which is mandatory for all the EU Member States for the implementation of the Common Agricultural Policy; as well as other relevant ortho-photos and airborne imagery.

Moreover, each of the EU Member States possesses, in digital form, a “cadastre” or an equivalent thereof (such as the “records of land and buildings” in Poland) as well as a system of the State’s administrative division (TERYT in Poland) down to the level of a village/town/settlement. Furthermore, the proposed modification for both typologies is not contrary to the provisions of the existing EU’s and Poland’s regulations on regionalisation.

### **Keywords**

land • rural areas • modification of OECD and EUROSTAT typologies • natural areas • mostly natural regions

## **1. Introduction**

The impulse to take up the topic associated with approaching the essence of rural areas with a methodology different than before included: the current practice of describing almost the whole territory of the country under one concept, called the rural areas, despite the fundamental functional diversity present in this three-dimensional spatial entity; the inclusion in rural areas of all the territory of the country which is not classified as urban areas, that is, inclusion in one category of both the lands significantly transformed by human activity and irreversibly deprived of the characteristics of the environment, and the land still constituting unspoiled natural environment or having the characteristics of the natural environment and remaining close to the natural state; the fast paced urbanization, or industrial and agricultural transformation of the land, in its initial phase usually taking place at the expense of environmentally valuable parts of rural areas within the meaning of their previous classification; the use of ambiguous nomenclature in relation to the same parts of the country classified as rural areas, in legal, economic, social, and linguistic terms.

## **2. Land and related terms, with the view to the modification of the existing classification of land, used in the context of EU regionalization**

“Land” (or another synonymous term) is naturally adopted as the basic concept describing the surface of the Earth and its environment, to denote a multi-functional and, unfortunately, not very precisely defined spatial existence. Depending on the context used, there are different synonyms of the word: land, space, areas, territories – usually with the addition of the adjective “urban” or “rural” (area); meant to succinctly define the geo-climatic and socio-economic functions performed by the given space. Due to the imperfection of the above concepts, in the present study we shall use the terms “rural areas” and “urban areas”, as clearly defined in the existing typology of the OECD and the EUROSTAT, which we propose to modify. The proposed modification is the subject of the present study.

### 3. Basic solutions adopted in the typologies of the regions by the OECD<sup>1</sup> and EUROSTAT<sup>2</sup>, setting the principles of regionalization within the European Union

One of the primary spatial conventions is assigning individual parts of the country's territory the characteristics that classify these parts based on a relatively simple and universal criterion for possible use in diverse socio-economic conditions. Such a criterion, adopted in the framework of the EU, is the degree of urbanization, expressed in essentially one key indicator, which – in most cases – is the population, typically described as population density per area unit. Based on this criterion, procedures are implemented within the typology of regionalization of particular countries. Within the EU, currently two typologies of regions are used, i.e. the “Typology of regions according to the OECD standard” and the “Typology of regions according to the Eurostat standard.”

The assignment of a particular area of the country to the type of area, under both adopted typologies, takes place on two levels. The first level is the local one, providing segmentation of space in micro scale, with subdivision into rural and urban areas, while the second level is the regional / sub-regional one, aggregating the areas from the local level into types: predominantly rural, intermediate and predominantly urban.

According to the OECD typology, at the local level, the criterion for identifying and dividing of areas is the degree of urbanization, expressed with the measure resulting from population density, thus dividing land into:

- urban areas, where the population density is at least 150 people / km<sup>2</sup>;
- rural areas, where the population density does not exceed the limit of 150 people / km<sup>2</sup>.

As an elementary part of the land (space) within the local level typology, unit of the territorial division of the country has been adopted.

In connection with the occurrence of certain weaknesses in the OECD typology, related to difficulties in the comparability of individual categories of spatial units throughout the EU, in order to eliminate these weaknesses, a new typology has been developed, following the EUROSTAT standard, based on the primary element, the so-called “grid”, which is a square with the side of the 1x1 km, set by the map grid lines.

Here, too, there is a subdivision into two types i.e. urban and rural, in which:

1. Urban areas are the “grids”, which fulfil two conditions
  - population density of over 300 people / km<sup>2</sup>,
  - minimum population exceeding 5 thousand persons to a square with the side of 3 km, created by grouping the centrally placed, classified “grid” with eight neighbouring “grids”.
2. Rural areas are those “grids” that do not meet the above criteria.

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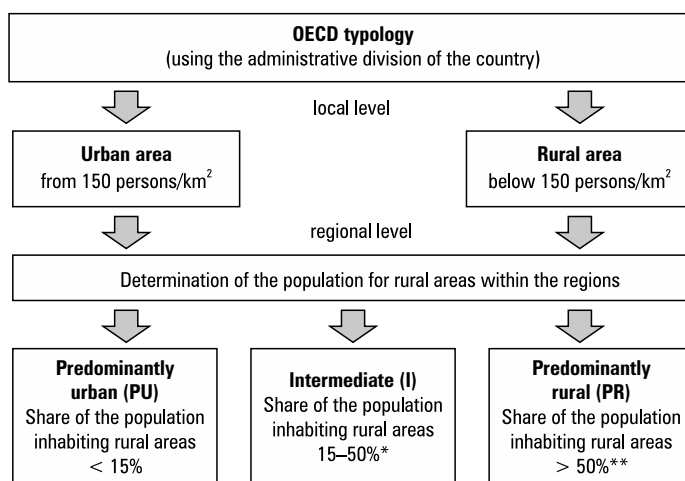
<sup>1</sup> Organization for Economic Cooperation and Development

<sup>2</sup> European Statistical Office

Due to the fact that at higher levels of aggregation, the territory of a country usually consists of a conglomerate of area types occurring at the local level, in order to maintain a conceptually similar subdivision into types, both in the OECD and EUROSTAT typologies, regions have been subdivided into 3 types, respectively named “predominantly rural – PR”, “intermediate – I”, and “predominantly urban – PU.” Classification under the given type of the region depends essentially on the percentage of the rural population.

When, in a given region, there is a city with a population of over 200 thousand or over 500 thousand respectively, it is possible to correct the classification and upgrade the region, assigning it a higher degree of urbanization, when the city’s population is at least 25% of the total population of the region.

Below are diagrams of both typologies (Figures 1, 2).



\* becomes predominantly urban, if it includes a city with the population above 500 thousand amounting to at least 25% of the total population of the region

\*\* becomes intermediate, if it includes a city with the population above 200 thousand amounting to at least 25% of the total population of the region

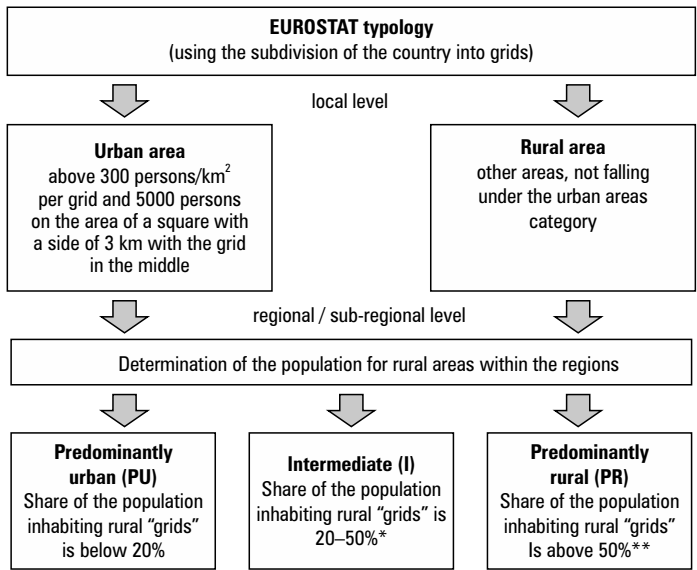
Source: author's study

Fig. 1. Outline of the OECD typology

Because – when using the OECD typology – too large functional variation occurred in the “predominantly rural” and “intermediate” types, a further differentiation was introduced for these types, by incorporating a parameter that defined the criterion of accessibility of rural areas to the nearest town, which is the distance from urban centres with the populations of over 50 thousand people, calculated according to the travel time to such cities, with a value of up to one hour, or more than an hour.

Within this division, intermediate type “I” was divided into “intermediate, located close to the city – IC” and “intermediate, located away from the city – IA” and the type

of predominantly rural “PR” was divided into “predominantly rural, located close to the city – PRC” and “predominantly rural, located away from the city – PRA.”



\* becomes predominantly urban, if it includes a city with the population above 500 thousand amounting to at least 25% of the total population of the region

\*\* becomes intermediate, if it includes a city with the population above 200 thousand amounting to at least 25% of the total population of the region

Source: author’s study

Fig. 2. Outline of the EUROSTAT typology

It should be noted, however, that situations may also arise, where the adopted methodology in the current methodological framework gives a result, in which areas at the local level, covering countryside and cities, are classified into the wrong type, that is to say, according to the typology, countryside is classified as a city, and the city is classified as a village.

For example, in the context of the paper on “A revised urban-rural typology” presented at the meeting of the Committee for the Structural Development of Agriculture and of Rural Areas (STAR) on 20 October 2010, it has been reported that within the OECD typology, if the population density threshold is set at 150 inhabitants per km<sup>2</sup> at the local level, then due to the variety of the size of administrative units, some areas will be incorrectly classified, and therefore:

- small villages such Aldea de Trujillo in Spain – due to the area which is strictly limited by the administrative boundaries, and a sufficiently high density of population – should be classified as urban areas, despite having a population of just 439 inhabitants;

- the type of the city such as Badajoz and Cáceres in Spain, or Uppsala in Sweden despite having the population of 150 000 inhabitants each or more, must be classified as rural, due to the low population density within the larger area subject to classification.

In Poland, the classification of rural areas results from the typology of the division of areas, which adopts the OECD standard, where at the local level, the criterion for identification and division was adopted as the degree of urbanization, expressed by the criteria arising from the population density, and subdivided into:

- urban areas (at least 150 people / km<sup>2</sup>) representing approx. 7% of Poland's territory;
- rural areas (up to 150 people / km<sup>2</sup>), that is, in connection with the division into only two types of areas, constituting the remaining part of Poland's territory, which does not qualify as urban areas, i.e. approx. 93% of the country's territory.

*Gmina* (municipality), that is, the unit of the country's territorial division, having its own representative (self-government) bodies of the local population, was adopted as an elementary unit of space (land) within the local level typology.

#### 4. The concept for modifying the typology of regions according to OECD and EUROSTAT, based on distinguishing, among the rural areas, of a new type of zero-population density areas, retaining the character of natural habitats

Methodologies adopted in both typologies cause the situation that both the OECD typology and the EUROSTAT typology suffer a significant deficiency, namely: the concept of rural areas covers both some densely populated areas, extensively used in the context of human activities, and some totally unpopulated areas or zero population density with natural features subjected to minimal human interference. This also applies when such areas are a significant part or even the vast majority of the rural areas of the given country.

Furthermore, under both adopted typologies, despite the introduction of additional criteria on the regional level – such as existence in rural areas of towns with populations of hundreds of thousands people, or travel time to the cities – still not included in these typologies are the issues related to the existence and protection of natural environment habitats, which in the era of rapid acceleration of urbanization and the continuing process of economic exploitation of natural type environments also should have a significant impact on the methodology of developing area types, including those areas currently considered rural.

The postulate of including in the typology the issue of the occurrence of natural environment habitats becomes all the more significant, as due to the disappearance of such habitats, they only exist as compact, still non-urbanized areas and remain fairly unexploited economically, and therefore they in fact become priceless assets.

Assuming ultimately the need for a high level of protection of natural environments, it would be advisable to consider distinguishing them in these typologies already at the stage of the subdivision of space into elementary parts, that is, at the local level.

This would provide better opportunities for the protection of such areas, already at the initial stage of the validation, and at further stages of spatial planning activities.

The solution to the above problems can be the modification of the OECD typology and the Eurostat typology, as proposed in the present study, according to the principle (common for both these typologies) of distinguishing from among the rural areas, of a new type of areas (already at the local level), characterized by:

- essentially zero population density;
- existence of the natural (or very close to natural) state of the environment/habitat;
- the lack of interference of human economic activity, or minimum level of such interference.

At the same time, it would be sensible to introduce the modification in such a way, that the changes would not fundamentally affect other principles and criteria contained in the OECD and the Eurostat typologies.

Distinguishing, at the local level, of rural areas of the new type, characterized by zero population density, taking into account the conditions described above, should be carried out so that it is also possible to seamlessly create a new type of regions at the regional level, characterized by a dominant share of environment of natural type.

## 5. Methodology for the assessment of expediency of distinguishing the new type of areas among the rural areas

In order to establish the expediency of the proposed concept for the modification of the discussed typologies, it is proposed that we analyse the functional cohesion in terms of space and utility, of the land types occurring in both typologies.

Performing such analysis is based on the proposition of basic functional features, characterizing the types of areas within the OECD typology and the EUROSTAT typology, followed by the evaluation of the functions of these areas, in terms of homogeneity. For the assessment of these features, we shall employ parameters describing the economic and social usefulness as well as the visual features thereof. Within the scope of these parameters, the evaluation will be performed with the view to simplified gradation of the occurrence of a given parameter in relation to the given function. Collating together the degrees of compliance of gradation will facilitate the assessment of functional and usable uniformity, of the current allocation of land into area types, as adopted within the European Union. The occurrence of homogeneity or heterogeneity of functional use of respective area types will be the premise testifying to the expediency of distinguishing the given type as a new type of area.

On the basis of a similar analysis, we will also assess the homogeneity of the two types of areas, resulting from the further subdivision of the given area type. If the assessment of functional cohesion under both newly established types of areas, resulting from the further subdivision of the area, brings a considerably improved result, then it will testify to the desirability of the proposed modifications to the typology of the division of the country based on the standards of the OECD and Eurostat.

As part of the present study, in relation to the Polish territory, we also propose to establish the approximate area (size) of the proposed new area type that could arise from distinguishing it from among rural areas according to their current definition.

Another important issue is also the feasibility of practical application of the division into three types of areas to replace the current two, along with determining the conditions related thereto, and checking the compatibility of the proposed modifications to the typology of both the existing EU legislation and Polish regulations.

## 6. Analysis of spatial and land use functions for the types of areas present in regional typologies according to OECD and to EUROSTAT

Analysis of the spatial and land use functions of the areas in question should be the starting point for demonstrating the expediency of the proposal for creating a new type of areas.

### 6.1. Spatial and land use functions present within the area types distinguished in the OECD and EUROSTAT regional typologies

When analysing the previously existing division into two types of land, i.e. rural areas and urban areas, it would be advisable to establish and to consider, in the context of this division resulting from the degree of urbanization / population density, the basic functions of spatial utility (land use), hereinafter referred to as “functions”, describing these areas in terms of community functioning.

Within rural areas, there are four basic land use functions:

- agriculture;
- housing, including residential housing;
- forests, which usually also include land that is functionally integrated with forests, located above the upper limit of forest, land covered with shrub and mountain vegetation, and rocky terrain;
- water: lakes, bed of large rivers, artificial lakes.

Within the urban space, we can distinguish two basic, major functions:

- housing, including integrated functional areas of communication and leisure;
- industrial function.

In order to characterize the influence of these basic functions on the types of areas, their description was adopted using several standardized basic parameters relating to their economic and social utility, and visual properties.

The following parameters, proposed in the framework of the present study, meet the conditions of economic and social utility and visual properties:

- 1) population density;
- 2) the degree of transformation of the natural environment;



- 3) the intensity of land use by man (human activity);
- 4) the homogeneity of the landscape within the given function;
- 5) “friendliness” to human inhabitation;
- 6) “friendliness” to animal existence;
- 7) the existence of specific social and cultural ties;
- 8) the size – compared to the scale of the country.

We could multiply the number of parameters, but given that the ones listed above are the parameters that are generally understood, that the evaluation thereof is simple, and that simplicity has its advantages, we have decided to confine ourselves to the parameters mentioned above.

In order to evaluate the occurrence/presence of the above listed parameters, in respective functions, we have decided to adopt simple and generally understandable terms: high, medium, low – defining a consequence of the occurrence, in other words, the degree of intensity or gradation (grade).

Where a given parameter in the analysed type of area (land, space) is not present, such a situation is described by the symbol “n/a” – not applicable.

Taking into account the argument of simplicity and understanding at every intellectual level, it can be assumed that both the quantity and factual content of the parameters, as well as the adopted “gradations” or grades at the level of the evaluation remain sufficient for the purpose of determining the cohesion of the functional types of area (land, space) in the OECD and EUROSTAT typologies.

## 6.2. Functional assessment of cohesion for two types of areas present in the OECD and EUROSTAT typologies of regions

Rating the functional homogeneity (cohesion) for the types of areas – i.e. rural and urban – found in the regional typologies of OECD and EUROSTAT, will be done by identifying in the specific type of areas, the frequency of occurrence for all the functions within each given parameter: one kind of grade; the immediate neighbourhood gradation of the “low-medium” or “medium-high” type; or the occurrence of all types of grades for a given parameter. The functional homogeneity assessment takes into account also those cases in which – within the given parameter – a function parameter that is not applicable (“n/a”) occurs next to the given type of grade.

The occurrence of each grade, and neighbourhood (adjacent) grades, evaluating the functions within both land typologies existing in the European Union, is presented in Table 1.

Table 2 presents the report on the occurrence of: full compliance grades within particular parameters, immediate neighbourhood within the grades such as “low-medium” or “medium-high”, total diversity of grades within a single parameter, as well as the occurrence of the given grade within the neighbourhood where the parameter is not present – for each type of area.

**Table 1.** Types of areas in the functional aspect, in reference to parameters described in section 6.1, with respective gradations (grades)

Area type (according to OECD, EUROSTAT)	Basic functions performed by the given type of area	Gradation values in relation to parameters 1–8 (described in section 6.1)							
		1	2	3	4	5	6	7	8
1	2	3	4	5	5	6	7	8	9
Rural	housing	medium	medium	medium	medium	high	medium	medium	low
	agricultural	n/a	medium	medium	medium	n/a	medium	n/a	high
	forest	n/a	low	low	low	n/a	high	n/a	medium
	water	n/a	low	low	low	n/a	high	n/a	low
Urban	housing	high	high	high	high	medium	low	low	low
	industry	n/a	high	high	high	n/a	low	medium	low

**Table 2.** Report on the cohesive/adjacent occurrence of “grids” within each parameter (as described in section 6.1) for the give type of area

Area type	Number of “grids” occurring within each parameter			
	With identical values	With neighboring values (low-medium, medium-high)	With all values	With any value including the n/a (“not applicable”)
1	2	3	4	5
Rural	0	4	1	3
Urban	5	1	0	2

The results presented in Table 1 and Table 2 indicate that under the rural type of area, there is a very significant **internal functional differentiation**, as evidenced by: zero incidence of grades which are wholly cohesive / uniform; four cases of adjacent grades; one case of all kinds of grades occurring within the given parameter; and three cases where next to any kind of grade the situation arises where the given function does not occur under the given parameter.

For urban areas, the results were just the opposite, that is, we meet with almost total **functional cohesion**, as evidenced by: the five cases of cohesive / uniform grades; one case of adjacent grade; zero cases when all kinds of grades occur within one parameter; and two cases where next to any kind grade, situation arises that the function does not exist under the given parameter.

The results presented above indicate that in the OECD and Eurostat typologies, the principles for determining the types of areas are not methodologically comparable in terms of uniform parameters (for both types of areas) describing the functions of these area types. It can therefore be concluded that the above classification, adopted in the

European Union, into just two types of areas – i.e. rural areas and urban areas – already at the local level, is too general and that distinguishing an additional type of area is justified.

Due to the very significant internal functional diversity of the current type of rural areas (see the analysis above), it would be advisable to consider the subdivision of this type of area, in order to provide the rural area/space with the functional homogeneity analogous to that found within the urban area/space category. The existence of the uniformity (cohesion) of functional utility for all three types of areas can allow for a more rational and efficient use of these areas, both in economic and social terms, and in the aspect of environmental protection.

#### 7. Proposal for achieving functional cohesion of the types of areas within the OECD and EUROSTAT typologies of regions, by distinguishing a separate area type within the rural area type

With a view to achieving the internal functional uniformity (cohesion) within the subdivision into the basic types of areas, where the basic criterion of division within the European Union is the population density, and the borderline (threshold) dividing the two types of areas is 150 or 300 people / km<sup>2</sup> respectively; combined with the **occurrence of significant, compact unpopulated areas** i.e. areas with population density of 0 (zero) persons / km<sup>2</sup> or areas with population practically oscillating around this value (these representing a total of approx. 1/3 of Europe's territory), it seems pertinent to consider adopting precisely this parameter i.e. 0 people / km<sup>2</sup>, as the basis for a new type of area in the proposed modification to the OECD and Eurostat typology of regions.

The proposed zero population density, in the framework of the functions under consideration, may only apply to rural areas, and to relate to the functions of the forest, water and agriculture, as within the urban typologies of the OECD and EUROSTAT, in principle the possibility of zero population density is ruled out. It should also be noted that the currently accepted divisions between types of areas also allow the existence of parallel conditions in the socio-economic framework of subdivision into basic types of areas, however, in the era of accelerated and even violent changes to the environment, presently there is no additional requirement that would apply to the issue of protecting the existing natural environment.

Following the rapid acceleration of urbanization, and the progressive process of economic exploitation of **unoccupied** habitats of natural type, **compact sections of areas**, remaining in their natural or close-to-natural condition become a virtually invaluable asset, and because of the need for their increased protection, they must necessarily be distinguished already at the stage of subdivision of space (areas) into elementary parts, that is, linked to the local level in both existing typologies.

Due to the very high multi-functionality of space (areas) previously classified as rural, it seems feasible to distinguish compact areas, preferably linked by a common feature, and based on zero or close-to-zero degree of urbanization, which shall translate to zero or close-to-zero population density. In the era of environmental protection,

with zero population, for instance the preservation of the natural features of the area's natural environment may serve as such a common feature, within the given function.

In the context of the discussed functions of rural areas (residential, agricultural, forest, water), the condition of **zero** population density while preserving the natural features of the environment is met only by the functions of forest and water. The agricultural function, despite having zero population density, does not meet the condition of the preservation of the natural features of the environment – due to the intense, increasingly industrial exploitation by man, on annual basis – while the housing function by definition can not be characterized by zero population density.

#### 8. Analysis of the solution aimed at ensuring functional uniformity (cohesion) of both types of areas already existing in the OECD and EUROSTAT regional typologies, and the proposed third area type with zero or close-to-zero population density, created from the subdivision of the rural land type

In conducting functional analysis similar to that presented in Table 1, when distinguishing – from the rural areas – the functions of forest and water as an area type under the working name of “natural area”, we obtain the results shown in Table 3.

**Table 3.** Types of areas, according to functional approach, in relation to parameters described in section 6.1, when applying three types of areas (land/spaces)

Area type	Basic functions performed by the given type of area	Gradation values in relation to parameters 1–8 (described in section 6.1)							
		1	2	3	4	5	6	7	8
1	2	3	4	5	5	6	7	8	9
Rural	housing	medium	medium	medium	medium	high	medium	medium	low
	agriculture	n/a	medium	medium	medium	n/a	medium	n/a	high
Natural	forest	n/a	low	low	low	n/a	high	n/a	medium
	water	n/a	low	low	low	n/a	high	n/a	low
Urban	housing	high	high	high	high	medium	low	low	low
	industry	n/a	high	high	high	n/a	low	medium	low

When we compare the occurrence of variation between different parameters for particular types of areas, within the above listed pairs of functions (excluding the situations where the given parameters does not apply to either of the functions), we shall obtain the result presented in Table 4.

As shown in the table above, the introduction of an additional type of areas tentatively called “natural areas” brings the classification of space into three types of areas into an almost complete functional compatibility, as testified by almost equal number

of “grades” of identical value, for the parameters of the functions performed by these areas. It can therefore be concluded that these areas, described by the above pairs of functions, are almost comparable in terms of homogeneity within the given area type, while the types become functionally homogeneous in practical terms – if we define homogeneity as the presence of the greatest number of grades of the same value, combined with minimising situations described by other settings of grade values, linked to land functions within the given type of area.

**Table 4.** List of cohesion/neighbourhood of “grids” within each parameter (as described in section 6.1) when applying three types of areas

Area type	Number of “grids” occurring within each parameter			
	With identical values	With neighboring values low-medium, medium-high	With all values	With any value including the n/a (“not applicable”)
1	2	3	4	5
<b>Rural</b>	4	0	1	3
<b>Natural</b>	4	1	0	3
<b>Urban</b>	5	1	0	2
Below, score for the type of rural areas when we distinguish just two types of areas (rural and urban) – for a better visual comparison of the proposed solution				
Rural	0	4	1	3

When we divide the space into three types of areas, i.e.: natural areas (characterized by zero or close-to-zero population density), rural areas, and urban areas, we obtain a very high internal functional homogeneity for each of these three types of areas, which is not possible with the previously existing classification into two types of areas i.e. rural and urban.

Furthermore, subsequent isolation of the area type – provisionally named the “natural areas” is achieved, which, in principle, might be subjected to a homogeneous regime of environmental protection, due to its significantly less intense economic exploitation than in the case of the other two types of areas.

### 9. Determination, in the context of Polish conditions, of the estimated size of the proposed area type (i.e. natural areas)

In order to illustrate the scale of area changes that would occur if Poland’s territory were to be subdivided into three types of areas, instead of two, in reference to the accepted assumption that the type of natural areas should include those areas that are uninhabited and those areas having the features of the natural environment or much similar, with a minimum human interference with economic activity, in the context of Polish conditions, natural areas could include, primarily and in principle: forests understood

as compact complexes, watercourses, lakes and large rivers, mountainous areas above the boundary of forest, as well as compact swamp and desert areas.

Due to the illustrative character of the “size of the natural areas” term, adopted for the purpose of the present study, combined with the availability of partial data, and the impact of the data on determining the size of natural areas within Poland’s territory, in the following table we have included only: forests without wooded land and lakes, while excluding the surface of large rivers. Mountainous areas above the boundary of forest were also omitted, due to their overall area being relatively insignificant in relation to the size of forest and lake areas.

In order to illustrate the size of the proposed type of natural areas in the context of Poland’s territory, taking into account the position of such areas within the regions/voivodships (in the framework of the OECD typology, one of the levels of regional sub-division of space), the above approximation is sufficient, as testified by the relative proportions of surface data, presented in Table 5.

**Table 5.** Estimated size of the proposed type of “natural areas” in the scale of Poland’s territory, with subdivision into regions (voivodships)

Region voivodship	Size of “natural areas” [km <sup>2</sup> ]			Size of the region *** [km <sup>2</sup> ]	Share of the “natural area” type in the total area of the region [%]
	Forests*	Lakes**	Total		
1	2	3	4 = 2 + 3	5	6
<b>Poland</b>	<b>91980</b>	<b>2 328</b>	<b>94 308</b>	<b>312 679</b>	<b>30</b>
including					
Dolnośląskie	5 928	2	5 930	19 947	30
Kujawsko-pomorskie	4 212	168	4 380	17 972	24
Lubelskie	5 830	16	5 846	25 122	23
Lubuskie	6 881	80	6 961	13 988	50
Łódzkie	3 878	–	3 878	18 219	21
Małopolskie	4 353	–	4 353	15 183	29
Mazowieckie	8 219	11	8 230	35 558	23
Opolskie	2 504	–	2 504	9 412	27
Podkarpackie	6 780	–	6 780	17 846	38
Podlaskie	6 201	136	6 337	20 187	31
Pomorskie	6 655	344	6 999	18 310	38
Śląskie	3 939	–	3 939	12 333	32
Świętokrzyskie	3 301	–	3 301	11 711	28

Warmińsko-mazurskie	7 505	978	8 483	24 173	35
Wielkopolskie	7 675	189	7 864	29 826	26
Zachodnio-pomorskie	8 119	404	8 523	22 892	37

\* [Leśnictwo 2015, p. 36]

\*\* [Sobolewski et al. 2014, p. 54]

\*\*\* [Powierzchnia i ludność... 2015, p. 17]

The above presentation indicates that even with this very approximate definition of the size of “natural areas”, they constitute approx. 30% of Poland’s territory, and according to the subdivision by voivodships/regions, they total between 21% in the Łódź region to 50% in the Lubuskie region.

Such significant (i.e. amounting to approximately 1/3) surface share of “natural areas” in the country’s and regions’ territory also points to the desirability of creating a distinct area type within the typology that sub-divide and classify space/land within the country.

#### 10. Assessing the impact of the introduction of “natural area” type upon the change in the value of sample statistical data, linked to the area size and population, using Poland’s example

The following are the examples of possible impact of adopting the solution of dividing the country, at the local level, into three types of areas, i.e.: natural, rural and urban areas – impact in terms of changing the spatial data pertaining to Poland’s territory, within the OECD typology, in relation to: the size of respective area types, the population, including population density, and the average area of towns and villages.

Within statistical data, the basic parameters describing the given country include data on its area size and population numbers, including the representation of population density (approximating the actual population density) on a predefined part or all of the territory of the country.

Table 6 shows the changes in the size of area types throughout Poland, and changes in the population density of rural areas that would occur when adopting the new type of the subdivision of areas – by distinguishing areas of zero population density – as well as changes in the statistical average area of towns / villages resulting from the introduction of the concept of natural areas.

When analysing the data on rural areas, in the case of division into three types of areas, i.e. natural, rural and urban, rather than dividing two types of areas, i.e. rural and urban, we can conclude that the surface of rural areas in the new type will be reduced by 32%, the population density will increase by 48%, while the average size of the village in these areas will be reduced by 32%.

**Table 6.** Area and population of Poland and the number of towns/villages, subdivided into regions/voivodships, according to the current OECD typology (with the division into two types of areas, i.e. rural and urban areas), and according to the modified typology (with the division into three types of areas, i.e. rural, natural and urban areas)

Area type (functions)	Area size [km <sup>2</sup> ]	All land of the country [%]	Population [thousands]	Population density [per km <sup>2</sup> ]	Number of towns/villages/cities	Average area of towns/villages/cities [km <sup>2</sup> ]	Number of municipalities <sup>1</sup>	Comments
1	2	3	4	5	6	7	8	9
<b>CURRENT SUBDIVISION – into rural areas and urban areas (2 types)</b>								
Rural <sup>2</sup> (housing, agriculture, forests and water)	291 109	93.1	15 238	52	52 543	5.54	2 174*	* 1566 rural municipalities and 608 mixed rural-urban municipalities
Urban <sup>3</sup> (housing and industry)	21 571	6.9	23 241	1077	911*	23.67*	303	* 608 towns located within mixed rural-urban municipalities
Poland – total <sup>4</sup>	312 680	100	38 479	123	53 464	–	2477	
<b>NEW SUBDIVISION – into rural areas, natural areas and urban areas (3 types)</b>								
Rural (housing and agriculture)	196 801	62.9	15 238	77	52 543	3.75	2 174	
Natural <sup>5</sup> (forests and water)	94 308	30.2	–	–	–	–*		
Urban (housing and industry)	21 571	6.9	23 241	1065	911	23.67	303	
Poland – total	312 680	100	38 479	123	53 444	–	2477	

<sup>1</sup> [Powierzchnia i ludność... 2015]

<sup>2</sup> [Rocznik statystyczny... 2014, p. 142]

<sup>3</sup> Data pertaining to the size of urban areas is obtained as a result of subtracting the area of rural areas from the total territory of Poland

<sup>4</sup> [Rocznik statystyczny... 2014, p. 83]

<sup>5</sup> Geodesic reports and directions of land use within the territory of the country

<sup>6</sup> data on the size of natural areas based on Table 5

\* there are no towns/villages/cities in natural areas



Much larger discrepancies would occur in relation to the voivodships/regions. The relevant calculations were carried out by the author (in aggregate tables), but due to limited space of this presentation, the tables themselves were not included; instead, we only listed the basic data describing the numbers and percentage of the scale of changes.

For example, change in the size of the new type of rural areas, as compared to the size under the previous classification, would amount to 52% for the Lubuskie region, to 23% in the Łódź region, with the country-wide average of 32%.

The actual population density of the areas which are “truly rural”, i.e. defined as the areas which perform agricultural function (including habitats/residential) as well as residential function for the population not connected with agriculture, calculated as a percentage in the country-wide scale, is 48%, with an increase in the national average from 52 to 77 people per km<sup>2</sup>, or by 25 people per km<sup>2</sup>. In the regional scale, the largest increase in performance will be noted in Lubuskie region, as much as by 111% – calculated as the number of persons per km<sup>2</sup> that would amount to 31 people per km<sup>2</sup>, i.e. from 28 people per km<sup>2</sup> to 59 people per km<sup>2</sup>, while the smallest increase would be noted in the Łódź region – only 30%, i.e. from 54 to 70 inhabitants per km<sup>2</sup>.

In real numbers, i.e. number of persons per km<sup>2</sup>, the largest increase would occur in the region of Silesia, as many as 104 people per km<sup>2</sup>, i.e. from 122 to 226 persons per km<sup>2</sup> (this is 85% increase), while the smallest change expressed in the number of persons would occur in the region of Podlasie – namely, only approx. 12 persons per km<sup>2</sup>, i.e. from 25 to about 32 persons per km<sup>2</sup>, which is 48% increase.

The above quoted increases in population density for the new type of rural areas, in relation to the provinces, are informative in terms of the scale of actual differences, related to the value of the primary statistical indicator, when we eliminate from the calculation those areas that by definition are characterized by zero or close-to-zero population.

Another very characteristic feature of rural areas is an average surface per capita of these areas, linked to the fact that this surface (area) is the basis of existence i.e. the agricultural use within the given settlement unit (locality) for the majority of its inhabitants. In the context of the national average, this would mean the reduction in the size of rural areas per one inhabitant of Poland by approx. 35%, i.e. from 1.91 hectares to 1.29 hectares, that is, as much as 0.62 ha less.

In the scale of regions (voivodships), the discrepancies are even greater in comparison to the current calculation methodology. The largest reduction – calculated both as percentage, and in real numbers – in the rural area per one inhabitant would occur in the Lubuskie voivodship, by as much as 52%, or about 1.85 ha, i.e. from 3.54 hectares down to 1.69 hectares. The smallest percentage decrease in the average size of rural areas per capita, i.e. per inhabitant of a rural town / village, would occur in the Łódź voivodship, with the reduction of about 23%, that is, about 0.42 ha, i.e. from 1.85 hectares down to 1.43 hectares. The smallest decrease in real terms, i.e. in hectares per capita (per inhabitant of a rural town/village) would occur in the Małopolska region, namely about 0.25 ha, that is, from 0.78 hectares down to 0.53 hectares, which signifies reduction rate of 32%.

It should also be noted that, for example, for the currently assumed subdivision into two types of areas, in relation to the countryside, we obtain lowered results that deviate

from the facts (from the actual status), when the ratios are calculated with respect to the unit area such as 1 km<sup>2</sup> or 100 km<sup>2</sup> (for instance example for the infrastructure such as water, sewage and gas networks). The reason for this is that we divide the total length of the given network by the size of rural areas covering also forests and lakes (where that type of infrastructure, in principle, does not exist or is only minimally present, as directly linked to the residential function). If we apply this in the calculation of indicators computed per capita, it also distorts the image of the spatial occurrence of the phenomenon, because the areas understood in this paper as a “natural type” (forests, lakes, etc.) are, in principle, uninhabited.

An analogous situation occurs also in connection to rural areas, e.g. when calculating the spatial image for the level of air pollution, sewage, waste, including municipal waste, etc. For the rural areas, these indicators also include the forests, where air pollution, generation of wastewater and other waste are absent. In the Polish context, the relevant indicators should be approx. 30% lower than they would have been if they related to the actual rural space, which in principle should be bound with agriculture. The more favourable “statistics” results from including, for example, forests in the rural areas – forests that do not produce waste, wastewater, air pollution, etc.

The above sample analyses indicate that for rural areas currently defined as incorporating areas with zero population density, such as forests, lakes, etc., the spatial data for this type of areas under the currently adopted OECD and EUROSTAT typologies are subject to significant disparities with regard to the facts, usually as much as several dozen per cent, and in extreme cases even more than 100 per cent, both on the higher levels of the typologies, i.e. at the national level, and on local i.e. regional level.

The proposed modification, adopted as part of the change in typology, involving the separation of a new type of areas, tentatively named “natural areas” with zero population density, would bring the data indicators related to space, both in statistical and in other terms, much closer to the truth (to the actual situation) – because in fact, only the areas of agricultural and residential functions are truly functionally linked to rural localities/villages.

Included in the framework of the existing typology, areas such as forests, lakes, etc. with zero population, in fact represent distinct environmental-spatial and functional entities, as indicated in section 6 of the present study. Therefore, in principle, there is no rational or clear justification for their inclusion within the category of rural areas – also because the natural areas are equally used by the residents of urban, and of rural areas.

These considerations are also relevant for other Member States of the European Union, in relation to the rural areas in their current definition – with the reservation that the percentage over- or lower rates depend on the occurrence of forest land and water areas, of which for instance Sweden and Finland have a disproportionately larger territorial share (about 80%) than, say, France, Germany or the countries of the “Benelux” (between 10 and 20%).

Analogous results would also be obtained for the rural areas defined within the typology of EUROSTAT, since this typology also applies the principle of including rural areas with a population of zero.

It should be noted that the above-described discrepancies, associated with the problem of unbundling the zero population density areas under the new typology, in no way apply to urban areas, as the rate for these areas amounts to at least 150 or 300 people per km<sup>2</sup>.

#### 11. Assessment of the feasibility of practical application of the subdivision of space into three types of areas, in relation to the typologies assumed in the Member States of the European Union

Any proposed modification to the already implemented solutions, in order to be justified and not merely substantively correct, should also be conceptually consistent with the solution that is being modified. Moreover, the chances of implementing the modifications in practice increase substantially if at the start there exists appropriate databases, preferably in digital format, and the application of these databases is easy and does not require major financial investments.

It should be noted that the proposed solution is very simple to implement in practice, both in the OECD typology and the EUROSTAT typology.

Within the OECD typology, distinguishing the third type of areas at local level would not pose any major difficulties – this is true for almost all of the EU Member States. The reason for this is because, as a part of the existing typology, the classification into the two types of areas did not adopt the lowest levels of administrative divisions, but their aggregated areas instead – for instance, based on the existence of joint organs of self-government at the local level. This results in a situation where the existing territorial division at the lowest level may be used in order to extract the new, so-called “natural” type of areas from the previous type of rural areas.

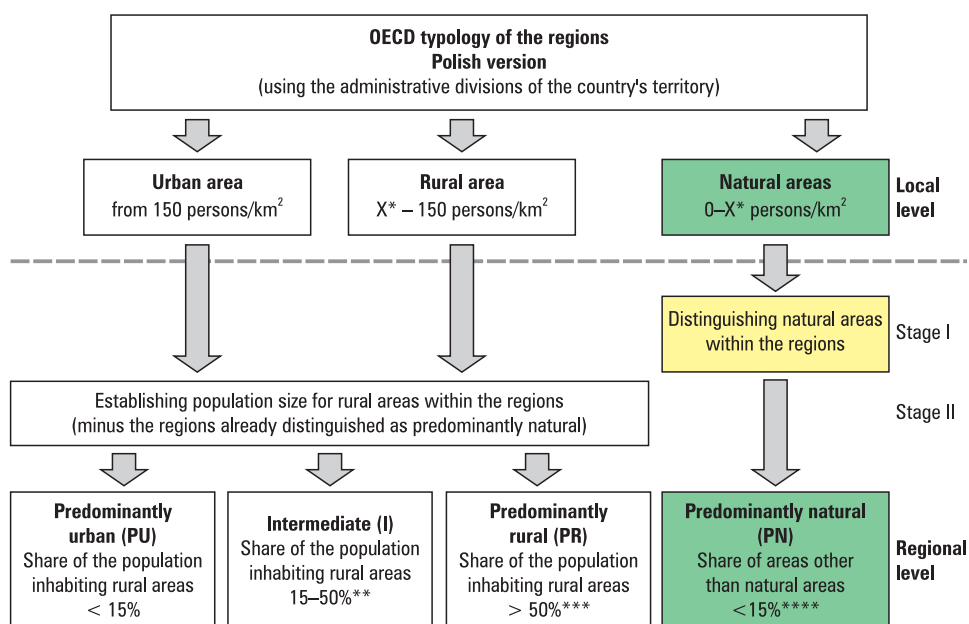
It greatly simplifies the situation – indeed, it provides the basis for this type of operation, that digital systems exist in all EU member states, related to the payments for agriculture under the Common Agricultural Policy. Namely, we refer to the IACS (Integrated Administration and Control Systems) and other GIS digital systems, for example, of cadastral kind.

As part of the EUROSTAT typology, extraction at the local level of a third type of area is even easier, because it is enough to segregate the existing rural-type “grids” with the view to inclusion in the range of zero or close-to-zero population; and performing the analysis for these grids for a maximum population within eight neighbouring (adjoining) “grids”. The maximum number of people for 8 adjacent “grids”, representing the second criterion alongside the population size in the middle (central) “grid”, would be advisable also at a lower level, in connection with the issues of environmental protection.

As a consequence of distinguishing the type of natural areas at the local level with **zero** population density, or – for practical reasons – with a close-to-zero value, we would see the separation at the regional level of a new type of region / sub-region called “predominantly natural” or “including natural areas” such as those arising from the assumed degree of environmental protection pertaining to the areas of natural type. In order not to disrupt, in any substantial way, the methodology for classifying regions

/ sub-regions within the framework of the existing solutions, based on the share of the rural population in determining the type of the region / sub-region, the proposed solution is to carry out classification of the regions / sub-regions in the context of two sets of activities. In the first, the level of the share of natural areas within the classified area would be agreed. If this share reached the assumed value, for instance 85/80% (or another, lower level, determined as a result of scientific research), then the given region would be qualified as “predominantly natural.”

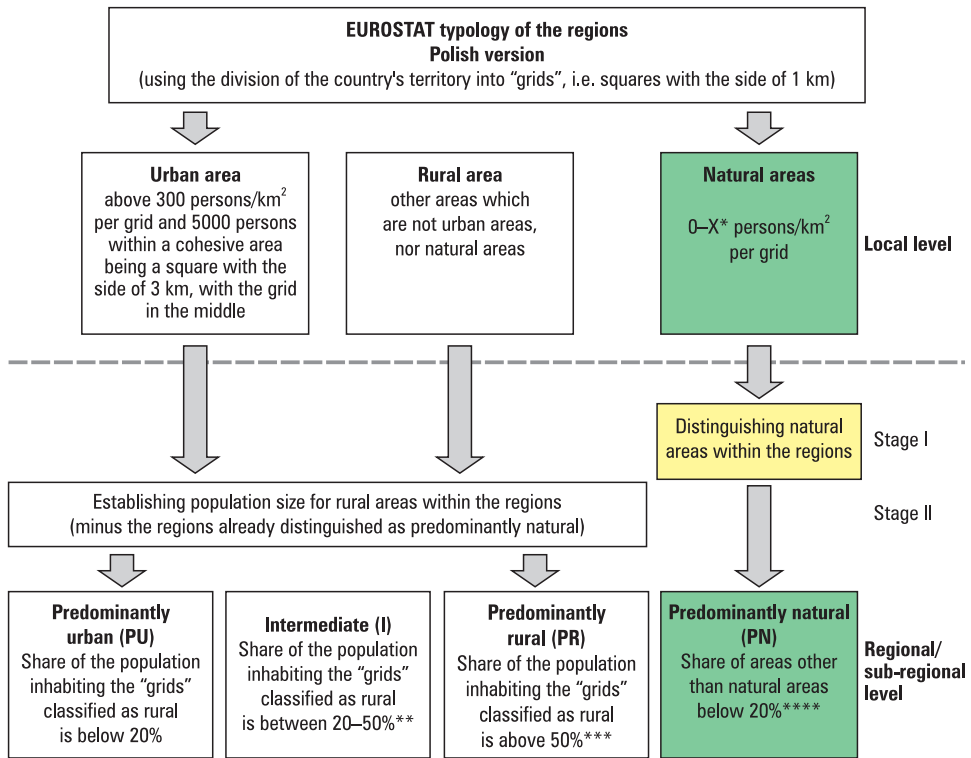
In the second step, the classification for all the remaining regions / sub-regions would be left unchanged, i.e. it would remain the same, based on the share of the rural population. This way of achieving the diversification of regions / sub-regions would take into account the fact of distinguishing areas with zero (or virtually zero) population at the local level, and the creation of “predominantly natural” regions / sub-regions while retaining the current methodology for all other regions / sub-regions.



- \* approaches zero, the threshold value of population density defines the practical threshold of treating the given area as unpopulated, to be determined during further research and studies aimed at the modification of typologies.
- \*\* becomes predominantly urban when there exists a city with the population of > 500 thousand, amounting to at least 25% of the total population of the given region.
- \*\*\* becomes intermediate when there exists a city with the population of > 200 thousand, amounting to at least 25% of the total population of the given region.
- \*\*\*\* proposition of the numerical value, analogous to the predominantly urban areas; higher threshold value should be fixed as a result of further research and studies aimed at the modification of typologies.

Source: author's study

Fig. 3. Diagram of the modified OECD typology, titled: Typology of regions OECD. Polish version



\* the threshold value of population density approaches zero; defines the practical threshold of treating the given area as unpopulated, to be determined during further research and studies aimed at the modification of typologies.  
 \*\* becomes predominantly urban when there exists a city with the population of > 500 thousand, amounting to at least 25% of the total population of the given region.  
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 \*\*\*\* proposition of the numerical value, analogous to the predominantly urban areas; higher threshold value should be fixed as a result of further research and studies aimed at the modification of typologies.

Source: author's study

Fig. 4. Diagram of the modified EUROSTAT – typology, titled: Typology of regions EUROSTAT – Polish version

Diagrams of the modified OECD and EUROSTAT typologies are shown in the Figures 3 and 4.

## 12. Assessment of the feasibility of application in relation to Poland's territory

Also in Poland, where the classification of areas and regions basically uses the OECD typology, the application of considerations described in the proposed modification should not pose much difficulty, because the current classification of rural areas employs

the level of territorial division with municipality (Polish: *gmina*) as the basic unit, which is the level resulting from the aggregation of spatial data found in the National Register of the Territorial Administrative Division of the country – the so-called TERYT. The aforementioned register, however, includes detailed data brought to a lower level, i.e. at least to the level of towns and villages and village councils (Polish: *sołectwo*), which are auxiliary units of the territorial division of Poland. These units, as defined in TERYT, are closely related in terms of borders and area sizes with other public and mutually compatible official records, including:

- The national system of records of farms operated by the ARMA (IACS) related to payments for agriculture under the Common Agricultural Policy,
- Records of Land and Buildings (EGiB), maintained and constantly updated by the mayors and supervised by the Surveyor General of Poland.

All of the above are systems in full digital format, and they are compatible in terms of data exchange, which – when using the GIS-type digital applications – facilitates the operation of extracting the new type of areas with zero or close-to-zero population density within the current type of rural areas, making it relatively simple in technical terms, and basically almost automatic.

The discussed extraction, from the current rural areas, of a new area type named here tentatively the “natural areas” is basically possible/available already, because the public forests that account for over 80% of the total forest, are already distinguished as forest sections within the precincts (counterparts of auxiliary units).

In a similar manner, in the framework of public records, the following are distinguished: lakes, beds of large rivers (as category of watercourses), large bodies of water, and marshlands.

Also in the framework of the existing legislation, introducing the new type of natural areas should not be difficult, since the existing regulations on the territorial division of the country under TERYT and EGiB provide for the division of rural localities into new units of the same legal status. This allows for the new units defined within the natural areas to exist in the official records and registers, kept by the public administration.

Furthermore, it would be a great and useful simplification if the boundaries of these units ran along the actual, existing borders, as registered in the IACS System, whose status would change from the internal border, existing and recorded in the information systems of official records, into the border of a village/village council or precinct.

The proposed name of “natural areas” – in a manner understandable also to the general public – well describes the nature and characteristics of these areas, and clearly distinguishes them within the country’s territory as such areas where economic activity is not present, or where it is minimal. This, in turn, creates very favourable conditions for the practical implementation of the proposed modifications to the OECD typology.

### 13. Compliance of the proposed modifications to the OECD and EUROSTAT typologies with the EU and Poland's legislation pertaining to the regionalization of the country's territory

The issue of regionalization within the EU, and more precisely the legal aspect of regionalization, is governed by the Regulation (EC) No 1059/2003 of the European Parliament and of the Council of 26 May 2003. The aforementioned Regulation does not apply directly to the definition of types of areas and of regions / sub-regions; instead, it introduces restrictions as to the population size within various levels of the NUTS (Nomenclature of Territorial Units for Statistics) of the EU.

In article 5, paragraph 2 of the abovementioned Regulation, it is stated that in order to establish the relevant NUTS level, which is to include a particular class of administrative units in a Member State, the average size of this class of administrative units in the given country will be within the limits of the population status, as set by the Regulation.

This provision would result in the need for substantive changes, in the case of practical application of the proposed modifications to the OECD and EUROSTAT typologies, if there were no provisions for exemptions. However, because such provisions do exist, the change of the Regulation is not necessary, in view of the article, 3 paragraphs 5, where the third sentence reads: "Some non-administrative units may deviate from these thresholds because of particular geographical, socio-economic, historical, cultural or environmental circumstances, especially in the islands and the most remote regions. Those measures, designed to amend the non-essential elements of this Regulation by supplementing it, shall be adopted in accordance with the regulatory procedure with scrutiny referred to in Article 7, paragraph 2."

This opens the possibility for creating within the EU, at all levels, of the "predominantly natural" regions / sub-regions, due to the environmental conditions, and even due to the socio-economic conditions. Many EU Member States, including Poland, took advantage of this opportunity, even though it did not concern islands or most remote regions. In the case of Poland, this procedure was used, among others, for dividing the Warsaw Region (Voivodship) into Warsaw City and the surrounding counties as one unit, and the remaining part of the region as another.

It should be noted that:

- the division of a separate part within an area/region, as natural environment, is environmentally conditioned,
- zero population density is socially conditioned,
- minimal human interference in the natural environment is economically conditioned.

Therefore, the existence of the new type of region / sub-region will remain in accordance with the present EU Regulation. Also the statement that that provision applies in particular to the islands and outermost regions, does not preclude its application, because

it includes the expression “in particular” – if those words were missing, only that would prevent us from applying the structures based on Article 3, paragraphs 5, sentence 3.

Taking the above provisions as our basis, it is therefore possible to implement the proposed modifications in practice, throughout the EU.

Within the Polish legislation, the issue of regionalization is governed by the Regulation of the Council of Ministers of 13 July 2000, on the introduction of the Nomenclature of Territorial Units for Statistics (NUTS). The Regulation governs, in principle, the technical issues pertaining to the assignment of administrative units to different levels of regions / sub-regions – at regional level (3 levels), as well as areas at local level (2 levels).

Due to the increased amount of detail associated with the local level, the Regulation would require a minor update, but in relation to the direct validity of the EU law in the area of Poland, and the related principle of the annual update of the Regulation following the changes in the boundaries of administrative units, this would not constitute a major problem. It would, however, pose a problem that is basically just technical, because it would simply entail the implementation of the EU law, even without the need to amend the Law on official statistics which is the basis for issuing a Regulation – as the statutory delegation covers a wide range of classifications and nomenclatures, the relationship between them and their interpretation relating to the conduct and description of economic and social processes, without listing them more specifically.

Taking into account the above comments upon the introduction of the proposed modifications to the OECD and EUROSTAT typologies, in principle, no substantive changes to EU legislation or to Polish legislation will be required at statutory level. Within the Polish legislation, changes shall be required only at the level of the implementing regulation, regarding some technical issues at the local level, related to the correction of the nomenclature of the rural versus natural areas.

## 14. Conclusions

The presented solution is proposing to replace the existing division of the country, based in part on the OECD or EUROSTAT typologies and two basic types of spatial areas, with another division, based on three basic types, with regard to identifying and subdividing “natural” from the “rural” areas. It is taking into account the actual spatial and socio-economic conditions, existing within the geo-economic territory of the country, and the changes taking place in these conditions. The situation in which one area type (of combined areas) covers more than 9/10 the country, of which almost 1/3 of the total area of the country possesses radically different natural, functional and economic characteristics, seems to point to a legacy from the period when growth and profit were prioritised over environmental protection. In the current socio-economic and economic context, we seek to reevaluate and replace these priorities.



The creation of a third type of areas, tentatively called “natural” areas:

- 1) would not be inconsistent with the current basic principles adopted in the typologies of the OECD and Eurostat, based on the population density parameter – with the reservation that in the case of a new area, this parameter would in practice equal zero;
- 2) would provide the possibility of calculating the actual (or approximating the actual) values for a large number of statistical indicators based on unit areas;
- 3) would be feasible to use within the entire European Union, both in the framework of the EUROSTAT or OECD typology of regions, because it is based on those typologies with the indicator of “population density”; and only provides, within the framework of the methodology for identifying and creating regions, the creation of two area types within the rural areas;
- 4) would be simple to apply under the EUROSTAT typology of regions, as it does not require any re-determination of “grids”; while under the OECD it provides for the use of the existing territorial divisions, cadastral systems and mandatory digital system of IACS, maintained in all EU countries for direct payments under the Common Agricultural Policy;
- 5) would refer to the historical classification space, which for millennia had included the division into: forest that also included related bodies of water and watercourses; villages covering the areas functionally associated with the notion of farming; and cities, including heavily urbanized areas with functionally related places of work and production;
- 6) would introduce the issues of environmental protection directly into both typologies.

## References

- Dijkstra L., Poelman H.** 2008. Remote Rural Regions: How the proximity to a city influences the performances of rural regions. *Regional Focus*, 1/08. The paper defines remote rural regions in European countries [GOV/TDPC/TI/RD(2008)4. Materiał z posiedzenia Komitetu ds. Rozwoju Strukturalnego Rolnictwa i Obszarów Wiejskich (STAR) i Komitetu Obszarów Wiejskich w dniu 20 października 2010 r.
- Leśnictwo. 2015. Informacje i opracowania statystyczne. Wydawnictwo Głównego Urzędu Statystycznego (GUS), Warszawa.
- Powierzchnia i ludność w przekroju terytorialnym w 2015 roku. 2015. Wydawnictwo Głównego Urzędu Statystycznego (GUS), Warszawa.
- Powszechny Spis Rolny 2010 – Obszary wiejskie. 2013. Wydawnictwo Głównego Urzędu Statystycznego, Olsztyn.
- Rocznik statystyczny rolnictwa. 2014. Roczniki branżowe. Wydawnictwo Głównego Urzędu Statystycznego (GUS), Warszawa.
- Sobolewski W., Borowiak D., Borowiak M., Skowron R.** 2014. Baza danych jezior Polski i jej wykorzystanie w badaniach limnologicznych. Wydawnictwo Uniwersytetu Marii Curie-Skłodowskiej w Lublinie, Lublin.

- Powierzchnia i ludność w przekroju terytorialnym w 2014 roku. 2014. Informacje i opracowania statystyczne. Wydawnictwo Głównego Urzędu Statystycznego (GUS), Warszawa.
- Rozporządzenie (WE) nr 1059/2003 Parlamentu Europejskiego i Rady z dnia 26 maja 2003 r. w sprawie ustalenia wspólnej klasyfikacji jednostek terytorialnych do celów statystycznych – NUTS (Dz. Urz. UE, L 154, 21/06/2003 P. 0001–0041, EUR-Lex – 32003R1059) z późn. zm.
- Rozporządzenie Rady Ministrów z dnia 13 lipca 2000 r. w sprawie wprowadzenia Nomenklatury Jednostek Terytorialnych do Celów Statystycznych – NTS (Dz. U. z 2000 r. Nr 58, poz. 685 z późn. zm.

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Marian Skorupka  
Departament Baz Referencyjnych i Kontroli Terenowych  
02-822 Warszawa, ul. Poleczki 33  
e-mail: marian.skorupka@arimr.gov.pl