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Series "Administratio Locorum" is concerned with the social, economic, geographic, legal, environmental and planning aspects of land administration. The aim of the journal is to provide an interdisciplinary platform for the exchange of ideas and information among scientists representing various disciplines, whose ideas and discoveries tribute to effective land administration. Thus, journal publishes both reviews and empirical studies presenting the results of surveys and laboratory works. Topics covered by our Authors include, i.e.: land administration, technical and social infrastructure, spatial economics, social-economic geography, land management, real estate management, rural areas, environmental protection, protection of historical buildings, spatial planning, local and regional development, sustainable development, urban studies, real estate market, transport systems, legal regulations for the land administration, and spatial management. The primary aim of the journal and its mission are to spread information and guidance relevant both for authorities responsible for the effective land administration (local, regional and central), scientists and teachers.

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ORIGINAL PAPER

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# THE REMEDY OF THE ACCUMULATED ENVIRONMENTAL DAMAGE: FROM LEGISLATIVE EXPERIENCE OF DIFFERENT COUNTRIES TO RUSSIAN LEGISLATIVE EXPERIENCE

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#### ABSTRACT

**Motives:** In all countries of the world there are objects of the accumulated environmental damage (AED), regardless of the recognition of their presence by the state itself or their legislative regulation. The legal mechanism for the development of this regulation is of significant interest from the point of view of both, science and practice.

**Aim:** The determination of the existence of regulation of the objects of the accumulated environmental damage, in most countries and its comparative characteristics became the aim of following study, to identify the positive experience in such regulation and to see whether it is suitable for Russian legislation, including the possibility of borrowing those norms of law and its incorporation into national legislation.

**Results:** Russian law has a determination of the accumulated environmental damage, as most of the European countries do (not the third-world ones), but there is no definition for the further AED-conception. The amount of damage has to be determined in a particular area or of a concrete natural resource. Unfortunately, in developing countries, such information regarding the objects of accumulated environmental damage is not so widely presented, although such a problem is acute in these countries. The AED is one of the market failures as been based on a permission for environmental pollution. The legal regulation of the Russian Federation: it is necessary to impose responsibility for the leveling and elimination of such an objects on the original owner who acquired the land plot with the AED-object (on the basis of an agreement or the law rules even if the legal entity liquidated). It is necessary to provide real access to information feather land users (the potential purchaser – about the features of the object). The legislator has to develop and detail more carefully the rules on public-private partnerships for liquidation AED-objects.

**Keywords:** accumulated environmental damage (AED), past environmental damage, negative impact on the environment, contaminated land

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#### INTRODUCTION

The remedy of the accumulated environmental damage (AED) is an acute problem not only in the Russian Federation, but it is an urgent problem all over the world. It is widespread in developed countries that have more potentials to finance the elimination of accumulated environmental damage more than the countries of the third world (many third world countries have lack of the economic capacity and flexibility to react in short term on such a problem instead of reacting to the current problems of the existing environmental harm). European countries are very active in this sector, including in the Arctic territories of the European Union. Mostly they have formed a concept of accumulated environmental damage and developed measures to eliminate it, established by implementation in law and consistently put into practice.

The undeniable presence of objects of accumulated harm, also undeniable their negative impact on the environment. Legal regulation clearly needs to be better to reduce the impact of such objects and eliminate the objects themselves.

This article is devoted to the experience of different countries in matters of synthesis and systematization of information on the accumulated environmental damage (AED), access to this information of land users (to inform the potential purchaser about the features of the acquired object), identification of the person responsible for the AED, imposition the obligations on compensation or reparation in kind for the AED, the issues of government programs for eliminating the AED-objects and public funding of such works in different countries, compensation of a remedy and collection of such funds, the implementation of these legal rules providing the AED-objects, as well as the possibility of their borrowing for inclusion in the legislation of the Russian Federation. This article also deals with such issues of AED in large agglomerations as legal regulation of inclusion of AED-objects and

elimination of such objects, issues of correlation of environmental legal regulation with urban planning regulation of AED-objects.

#### LITERATURE REVIEW

The scientific literature of the Russian Federation legislative consolidation of AED-objects has been considered repeatedly, but there is still no generalized research on most of the issues arising on this topic. The existing monographs consider outdated legislation. The available articles considered in separate scientific articles that are mostly fragmentary, incompletely, considering certain issues. Still some contain criticism of the procedure for entering objects in the register of AED-objects, as well as questions of the practical application of legislation, public private partnerships in this area, but there are mostly insufficient number of real proposals for changing legislation.

There is also no article combining legislative regulation in this area in various countries and their analysis based on modern legislation.

#### MATERIALS AND METHODS

In this study, we used general scientific methods. For comparing different characteristics of features of legal regulation of AED-objects it was used the method of comparative jurisprudence.

Methods of analysis and synthesis were used to analyze the experience of different countries.

A historical predictive method was used to determine the historical features of the development of countries and compare the possibilities of subsequent legal regulation on the issue under consideration.

Such methods as observation and description are an essential tools when considering scientific research, this work is no exception, they are necessary for subsequent country-by-country conclusions, as well as identifying specific features.

# CHARACTERISTICS AND COMPARATIVE ANALYSIS OF LEGISLATIVE REGULATION OF AED-ODJECTS

First formulated in 1972 by the Organization for Economic co-Operation and Development "The polluter pays principle" [OECD Analyses and Recommendations of Environment Directorate, 1992] (as a general principle of international environmental law based on preventive, precautionary and anticipatory approaches, adopted by OECD in 1972 as an economic principle for allocating the costs of pollution control) is applied by many countries for a remedy of AED [Adler, 1995].

The question arises about the possibility of extending this principle to AED and the answer is unequivocal: yes. It is confirmed by the practice of many countries, when a pollutant is known, he will be responsible not only for current pollution but also for an accumulated one. He will be obliged to eliminate pollution or to pay to the third party for its elimination.

What about the distribution of General and financial responsibility for the elimination of past environmental damage: mostly the legislation of different countries establishes that the main responsibility is on the current owner (operator) of the polluted object [Berman, 1983, Grossman, 2007]. But also the law provides the possibility of extending the liability to previous owners or any other person who have contributed to the formation of pollution and AED. In the USA the responsibility (a contaminated land) is assigned to an actual owner [Federal Superfund Law (CERCLA), 1980]. A similar act is Directive 2004/35/CE on environmental liability concerning to the prevention and remedying of environmental damage [Directive 2004/35/CE, 2004].

Though there is a point of view that this law does not remove AED, but rather, leads to a delay of a removing because the procedure takes too long (a point of view of a Chairman of the Post Public Works Community Robert Roy) [Administration of the Federal Superfund Program, 1991]. But still, it is a very powerful incentive for a responsible approach to current and past activities.

As an example, in Belgium the responsibility for AED is assigned on an actual owner, but if an object was purchased after 1995, then – only if the guilt has been proven. In Bulgaria the responsibility is also assigned on an owner but it also can be assigned on a manager of the property after privatization. If the AED is detected after privatization, the damage is compensated by the state for the period before privatization. In this regard, the experience of the United States is particularly valuable because under the legislation of USA the company or its successors can not be released under any circumstances from liability for AED the emergence of which they could contribute.

United Kingdom's legislation determines that the original polluter always pays for the accumulated environmental damage.

In Denmark, the polluter-pays principle applies regardless of when the pollution occurred. Thus, the law In Denmark became retroactive. Also, it depends on the type of the pollution in Denmark, it may be assigned to the owner in case of oil and chemical pollution after 1972 and in other cases after 2001, the liability may be assigned on the polluter. The owner and operator of the object are obliged to carry out soil remediation and clean up contaminated areas, including surface waters and groundwater.

In The Netherlands both pay, the polluter and the current owner. They are required to clean an object and repair the damage, as in Germany.

Russian legislation [The Civil Code, 1995, The Land Code, 2001] has norms providing compensation of harm by two ways – compensation for damages in cash and in kind. Also, the tortfeasor may be obliged by a court decision to perform reclamation work at the owner's or operator's object at the expense of the causer of harm. It seems that both methods are effective in the event of liquidation of the AED-object, meanwhile, the US experience shows that the contribution of funds to the Federal fund provided for by the Superfund Act is effective, despite the fact that the refund from this fund is a monetary one.

On the other hand, there are examples of another legislative experience: countries with laws determining time before which liability cannot be imposed on current owners, or rules to determine the nature of liability (strict liability or fault-based liability if found guilty), which are based on the rule that the situation was almost impossible to foresee. Such legislation is in Denmark and the Netherlands.

Regardless of the type of pollution, there are countries where liability is imposed on the owner, where the refund is the current owner's due, for example, in Canada.

However, the transfer of responsibility (in whole or in part) occurs together with the transfer of ownership mostly countries.

This approach is based on the assumption that the buyer was able to obtain information about the object he buys and AED. Since he purchased the property, he agreed to purchase it in a polluted form, and that did not affect the fact of purchase but could affect or affected only by paying a lower price (that may be reduced in accordance with the agreement and may be reflected in the value of the transaction).

Real estate transactions in the UK are based on the principle that quality at the risk of the buyer. This means that the buyer may be held liable for damage caused to the subject matter of the transaction because of hazardous activities unless the subject matter has been thoroughly examined prior to the transfer of ownership. In addition, the seller and the buyer have the right to determine the responsible person themselves by including terms in the contract.

In Germany, the person or its legal successor is responsible for the pollution of a particular piece of land. If the property was transferred to the new owner before 1 March 1999, the former owner was obliged to perform reclamation work at his own expense.

However, specific transactions may involve retaining responsibility for the seller or a third party (often the state) and/or paying compensation to limit the buyer's liability.

In Central European countries the state often retains some financial responsibility for damage caused by already closed or restructured industrial facilities, involving foreign investors while privatization transactions. It often happens when the previously used areas in the cities are re-building, when the government provides financing or guarantees supporting the solution of problems of AED, hindering the development of the land plots, which are of public interest. In Germany, for example, there is a compensation for partial or full funding under such contracts.

Thus, during the privatization of the former stateowned enterprises, the responsibility passes to the new owners, but the state retains responsibility for the liquidation of the object, as in Germany.

The environmental protection acts in the UK defines different regimes for the management of polluted areas with identifying and reducing environmental risks of harm to human health and to environment to a normative level in contaminated lands. The owner of contaminated land plot is obliged to eliminate the existing pollution at his own expense. Responsibility for accumulated environmental damage is imposed on the first polluter, the original one.

Particular attention should be paid to the experience of Germany, where the rehabilitation of abandoned polluted industrial zones has become an integral part of the urban planning process, the state has a precautionary approach to the implementation of rehabilitation measures as advanced one, seeking to attract necessary investment for the re-developing territories.

In accordance with the General institutional principles that apply to urban planning, the state allocates funds to finance a large part of the rehabilitation and training costs for areas of public interest. The state can create a public-private partnership with the alleged developer or become a temporary owner, acting through a local state organization that rehabilitates the object, and then can sell it.

It is an obligation of a polluter or those who may pollute the soil, as well as landowners, to take measures to reduce the risk of pollution, including actions to reduce the concentrations of pollutants in the soil. The state provides the development of special standards aimed at reducing pollution, rational use of

land and the elimination of present pollution, which is connected with AED.

There is a general rule in Russian legislation requiring compliance with environmental legislation to reduce harmful effects.

If the problem of AED is related to privatized enterprises, which continue to carry out previous activities, applying the same environmental practices, responsibility for AED legally can be assigned (partially or fully) to the current operator or the owner. However, the new owner could radically change the practice or technology, and then the responsibility for AED would be fairly divided between the current and the previous owner. Finally, if the AED is related to a situation that existed only before to the privatization, it refers to a past period and should be considered without any connection with the AED assigned to the current operator.

Poland's experience has a particular value as an international precedent in economic instrument concerning objects of AED. In Poland, the owners of privatized enterprises were given a one-time opportunity within three years after the introduction of the relevant law to apply for exemption from liability for past environmental damage that was occurred before the law came into force. Otherwise, it was considered that they took responsibility for all past environmental damage caused by objects that are in their ownership.

Recommendations on the possible functional use of land plots can be developed for economic activity, based on the results of soil analysis. Soil pollution data are also the basis for measures to protect the rights of landowners or tenants and investors.

However, it can be done only in the ratio of adopted legislative acts and other measures of authorities, such as monitoring, registration, entering into registers and others.

Authorities are obliged to carry out an analysis of the soils on which there are signs of the presence of pollutants or even a suspicion that such substances remained after industrial activity. The results of the studies are evaluated. Most European countries developed a national information system of the territories. And it is considered a mandatory element of any comprehensive government initiative and a starting point for the quantitative assessment and prioritization of practical measures which can be applied to the AED-objects. Such registries and lists may take many forms, varying degrees of complexity and practicability or feasibility.

In the United States, for example, there is a national list of priorities, which regards a set of legal regulatory and financial principles, as well as a supporting system of state-level registries and regional-level registries. It may contain a registration system also related to the transfer of the land right, such as in the UK.

In some countries, for example, Germany, if additional studies do not reveal contamination, the legislation provides the possibility of compensation of costs of the previous examination.

Thus, we conclude that it is practically correct when the results are collected in a single register, so it will contain all the necessary information about the AED-object, thus if it is on the land plot or the land plot itself, it would contain all necessary information, including its location, size, category of land, land rights, quality of the soil, degree of pollution and the pollutants in the soil, as well as landscape features, the presence of subsoil cavities, groundwater etc.

Germany law establishes the responsibility of the relevant Federal authorities for the registration, inspection and risk assessment of polluted or abandoned lands; there is the right of recovery of costs for the survey of territories with individuals whose activities have caused pollution. And it is the basis for deciding on the nature and scope of the remediation work on a case-by-case basis, depending on the current and future use of the land as well as on who or what has been affected by the pollution.

There is an example of Germany's approach, where the state allocates financial resources to support technological and methodological development, and in recent years, and in order to assist in the land reclamation of AED-objects, especially when it comes to achieving social objectives in rural areas.

In the countries of Central Europe, the system of financing the elimination of AED is not well developed, but it is developing in the same direction as in other European countries, stating that the private sector should fund works of elimination the AED-objects for which it is responsible. While recognizing the general acceptance of customary obligations by the state, they do not have a common strategy as in the Russian Federation or general funding for the systematic implementation of rehabilitation measures. There are examples of financing by of reclamation of the territory of a large chemical plant "Spolana" in the Czech Republic by other organization because it could cause a serious threat of transboundary pollution on the river Elbe [World Bank. Environmental Liability and Privatization in Central and Eastern Europe, 1993].

The positive the experience to be taken is the possibility of voluntary insurance against AED-object and harm caused to the environment, instead of imposing sanctions, and taxation.

# CHARACTERISTICS OF RUSSIAN LEGISLATIVE REGULATION OF AED-ODJECTS

The Civil Code of Russian Federation (Art. 1) provides as a right and opportunity of the parties of the contract to fix any provision in the contract which are not contradicting the legislation of the Russian Federation. However, in practice, such contracts do not contain provisions about the responsibility from AED and concerning objects of AED.

There is a discussion in the Russian Federation whether there is a need to analyze the subsoil for groundwater and cavities, which will be imputed to the owner's duties before the sale of land. And there is a sense in that because of the need to know not only the history of this land plot since its allocation from the common land and formation as an individual object, all prior transactions, but about its pollution, features of the landscape and subsoil use to make conclusions of the site itself and nearby object's features, especially of industrial use, which may affect the ecological situation in the region in whole and the land plot itself.

Such information, combined in a unified state register, should be opened and be in free access, to ensure its transparency, eliminate the possibility of double and "black holes" – the lack of information or even the absence of information about the land plot (Russian Federation has faced such a problem). The registry should collect federal, regional and municipal information, indicating the category of land, current owner and previous owners of the land and the degree, indicating the contaminants, thus it could be seen its AED also.

There is no possibility of compensation of costs of the previous examination in The Russian Federation because unfortunately there are two registers in the Russian Federation – land and real estate – were brought together not so long ago (2017) and now there is "The Unified State Register of Real Estate" [A State Registration of Real Estate Act, 2015] and a list (Register) of AED-objects, but they are not connected with each other.

For the possibility of the subsequent imposition of the obligation to liquidate the AED-object, it is necessary to include in the legislation the responsibility of the current owner, regardless of the time of the occurrence of the AED-object, since the person was entitled to be acquainted with the AED registry and the condition of the facility upon acquisition. But still there are peculiarities for the states that were part of the USSR when the AED-object were attributed to the responsibility of the state, since the right not to private but to state ownership prevailed (or did not prevail, but was the only form), in this case, liquidation of AED-object is to be entrusted on state. Another arising question - whether the state authorities that are currently acting as successors are legally responsible for the formation of such facilities as a signee. Anyway, the liquidation financing is to be carried out from the federal budget, thereby is laying on the shoulders of taxpayers.

Completion of works on carrying out an inventory of AED-objects in 2014, based on the execution of orders of Russian President and the Prime Minister

[The order of Rosprirodnadzor, 2014]. According to the On environmental protection Act [2002] the Government of the Russian Federation decided to approve the enclosed rules of maintaining the state register of objects of the AED. It was made only in April 2017 [The decree of the RF Government, 2017]. The state register of AED-objects is maintained by the Ministry of natural resources and ecology of the Russian Federation on the basis of materials for the identification and assessment of objects [The order of the Ministry of natural resources of Russia, 2017].

It is a positive practice in legislative consolidation of "The state register of AED-objects". It includes consideration of materials of identification and assessment of objects, making a decision on inclusion of objects in the state register or refusal in the inclusion of objects in the state register, categorization of objects, updating of information about an object and the exception from the state register. There is a Federal state register, it includes the list of objects which are included thereafter providing the relevant information by constituent entities of the Russian Federation, maintenance of a regional list of constituent entities of the Russian Federation seems rational – that is what should be done in the current legislation within fixation of objects of accumulated environmental damage.

The entities have to transmit the information compiled by the Federal level to the unified register available to all individuals and legal entities, including land users interested in acquiring the relevant land plot.

Further, it should be made an identification of the person (or persons) responsible for the accumulated environmental damage.

As already mentioned, an obvious drawback is that the registration of real estate, as well as the creation of a Unified state register of real estate and a unified system of accounting and registration (Unified State Register of Real Estate) does not have data from the state register of AED-objects and they are not linked. This is a minus for a possible buyer or the current owner or another user of the object.

Therefore, a common feature of international experience in solving the problem of AED is the

development of the accounting and ranking system of AED-objects (database), which usually exists in the form of a register of contaminated sites.

There is such a legal experience in different countries. A national information system of the territories allows to collect quickly, present and analyze data on the use of soils, their quality, degree of pollution and chemicals. For example, in Germany, this system consists of three information subsystems, including the information system for contaminated areas and the information system for soil conditions. The German environmental information network including the sites of Federal agencies and Federal governments allows users to search all information network, you can see information about the necessary land.

The study draws the conclusions about the development of the legislation of the Russian Federation and the minuses it has now and could be imroved, for example, it considers the issues of bringing AED-objects and information about them into the register for thither availability of this information to the buyer with the possibility of laying responsibility on him for the liquidation of AED-object.

However, the identification of the owner is not always possible (if owner is a natural person and he died, or the entity is bankrupt or was defunct), as well as accumulated environmental damage refers to the time when the land was in the state ownership, so the recovery is impossible due to historical peculiarities of the Russian Federation).

At identification of the owner it is necessary to establish, whether he was the causer of a AED caused to the land and the cause of accumulated environmental damage in general, or it was the preceding owner or other land user (in case if land was rented or in another form of tenure – a term one, indefinite in a term, onerous or gratuitous).

Some countries enshrined in law that it is necessary to establish a causal link (for example, Russian Federation), some countries do not have a legal requirement to establish a causal link. Meanwhile, there are another requirements fixed in legislation and been applied in a situation when accumulated

environmental damage is identified. There are rules of law establish that the current owner is responsible by virtue of the acquisition of ownership of the relevant object, compensation for the damage is the responsibility of the current owner.

After acquisition of the land plot the responsibility for AED could be assigned to the person who purchased the land plot, as that person could and had to check AED-information of the land in the information system.

The financing of remediation (clean up) of contaminated areas has to be laid on the private sector. Thus, such norms should be worked out in the Russian Federation. State funds should be used only for the rehabilitation of territories whose pollutants are either impossible to identify or insolvent.

In most high-income countries, the government often commits itself to allocate significant financial resources for land rehabilitation over a long period of time.

Usually, such funds are used to settle situations where the responsible party is the state and where there are no real responsible parties (ownerless objects) or where the intervention of the state serves the interests of society.

In addition, it would be a good initiative if a state assumed the initial costs of cleaning up the territory if the situation requires immediate action and then attempted to recover those costs through a court by a claim and the court's decision on the recovery of funds in recourse.

The role of the Federal government in the remediation of such territories should be limited by law within the organization of measures to clean up areas from buried hazardous waste until a certain period.

For Russian legislation, this period should be determined up to the USSR-historical period because land had been in a state property at that period. Afterwards, the remediation of contaminated areas with AED should be laid on the private sector. In the case of the elimination of AED, the liability for the costs of remediation and the applicability of the various laws depends on when the disposal of hazardous (harmful) substances has ceased. Despite this, public authorities have the right to invest in cleaning up the area or to suspend or completely stop work at such facilities and oblige the operator to pay the costs of the land reclamation.

Mostly by the legislation (and in the Russian Federation also) the responsibility in whole can be individual or joint, just the same in liability for the current environmental damage responsibility that can be shared and individual. If the share of participation in the violation can be identified, the compensation will correspond to the degree of violation, if it is impossible to prove the degree of participation of the person, they participate in equal shares of monetary compensation for the caused damage and AED.

At the same time, the Executive authorities can attract other persons and impose a duty of partial reimbursement or to speed up the reclamation of the territory and ensure its effectiveness if, after causing damage by some persons, the object was in other person's usage whose actions led to the increasing of AED.

Here is a problem we face – the possibility of proving the damage is problematic because of its latency as well as the complexity of causation; there is a difficulty in establishing and proving a causal link between the offence and the consequences. It could be hard to calculate the damage caused by the offender for the correct imposition of liability (compensation and remedy).

Russian legislation should consolidate the rule of law providing that in the absence of the owner occurred the contamination; the responsibility would go to the current owner or operator. Currently, there is a rule of law providing the liability of a causer of harm (current environmental damage).

If the perpetrators of the pollution were several, the responsibility for eliminating the pollution can be assigned to the one who initiated the dangerous activities. An alternative would be to allocate responsibility among all pollutants.

In addition, currently, the Russian Federation's legislative regulation provides the permissive order of emissions and payments for them with a notification order of the level of the pollutants, thus, the legislator fixes the fact of the resolution of emissions (named

maximum permissible concentrations and maximum permissible levels), which is the basis of a permissive order, what is fundamentally wrong.

The absence of an integrated conception of the AED and its remedy in Russian Federation at the moment predetermined the situation when there are individual laws including several legal institutions, but they are not integrated into a unified conception, which only begins to form and the conception of AED is still in process of being formulated; instead of that, there is an institute of the remedy of the past or accumulated environmental damage in Russian legislation, but it does not work, as it should.

Earlier the legislation of the Russian Federation did not have even a definition of AED, it was legislatively fixed in December 2016. First, Russian legislation establishes norms-definitions of key terms that determine the importance of the institution of environmental harm - "accumulated environmental damage" and "objects of accumulated environmental damage", and introduces a new Chapter XIV.1 into the structure of the Federal law "On environmental protection" in order to regulate the general procedure for the elimination of accumulated environmental damage. It is noteworthy that there was no Federal law regulating this issue before. Federal law implements the broadest possible approach to the definition of accumulated environmental damage, which made important legal emphasis on the restoration of the environment but not on determining for the elimination of negative environmental consequences of past economic activities.

That is why the text of the act does not use the term "accumulated environmental harm" for the designation of environmental contamination by past economic and other activities.

### CONCLUSIONS

The research provides examples of legislative regulation of AED in different legislative systems for the possibility of comparing and raising the question of the possibility of borrowing positive experience from other countries, despite the differences of country development. The study draws the conclusions about the development of the legislation of the Russian Federation and the minuses it has now and could be imroved, for example, it considers the issues of bringing AED-objects and information about them into the register for thither availability of this information to the buyer with the possibility of laying responsibility on him for the liquidation of AED-object.

The possibility of borrowing from other legal systems of norms concerning the elimination of objects of accumulated environmental damage is impossible due to the peculiarities of the historical development of the social characteristics of the economy of a particular country.

Borrowing is possible only in some elements that need to be enshrined in legislation at the national level, based on the specifics of this legislation. For example, the other economic methods have to be implemented, including those based on voluntary participation, rather than raise sanctions for what has already been done, the positive experience of the voluntary insurance against AED-object and harm caused to the environment, instead of imposing sanctions, and taxation. It is better to provide rather than to improve.

AED-objects are an acute problem because the AED is one of the market failures as been based on a permission for environmental pollution (in Russian Federation).

Russian law has a determination of the accumulated environmental damage, as most of the European countries do (not the third-world ones), but it is necessary to consolidate the definition for the further conception and to know what we should protect ourselves from. This legislation should be divided into laws including a particular sector where the damage is caused to determine the amount of damage, its specificity is in the regulation of AED mostly by by-laws providing (for methods of calculation of environmental damage).

The existing problems arise from the territorial characteristics, considerable length and shortcomings of interaction of the interdepartmental. In The Russian Federation, it is necessary to identify objects as quickly as possible and enter them by submitting information from local governments of constituent entities,

from constituent entities of the Russian Federation for inclusion in the registers. Thus, not all real AED-objects are recognized as such objects by registering in the register.

The legislator has to develop and detail more carefully the rules on public-private partnerships to accelerate the process of leveling the impact of such objects and their liquidation. For this country is characterized by the need of acceleration from the moment of filing an application in the field of public private partnership to the moment of liquidation of the accumulated object of environmental damage (which now can take more than 2 years).

The legislative acts have to be better even perfectly secured, widely disseminated, although it is a widespread problem in other countries of the world, the Russian Federation and constituent entities of the Russian Federation. There is a need to develop laws, prescribing sanctions and a mechanism for imposing liability with enforcement and observance of the principles of the irreversibility of punishment. Punishment should be not only as a sanction itself but it must compensate the damage in full and if it is money, then in addition to the fine, they should be enough to restore the object, or the recovery should be in kind. So the mechanism providing the real imposition of sanctions on the offender should not be declarative, but really punishing a violator and recovering the AED-object.

The need for eliminating AED-objects reduces the efficiency of the national economy, which has to be taken into account in macroeconomic calculations. Eventually, thereby, the elimination of an AED-object will prevent spending budgetary funds to eliminate its impact on the environment.

It is concluded that it is necessary to impose responsibility for the leveling and elimination of such an objects on the original owner who acquired the land plot with the AED-object on the basis of an agreement or include the law rules on the imposition of responsibility on the owner or the person in charge, even if the legal entity is declared bankrupt and liquidated. It is ensured not by declaration of the right, but by providing real access to information feather land users (to inform the potential purchaser about the features of the acquired object).

The further development of the best available technologies and their legislative inclusion as and technical methods based on a science for the elimination of objects of accumulated harm is the next step in the development of legal regulation.

Unfortunately, developed countries do not want to share its best available technologies with less developed countries, as the acceleration of their development (of less developed countries) is potentially dangerous by their subsequent competition and the negative effect on the economy of a developed country as a result.

However, this "greedy" leads to an ever-increasing level of pollution of the country and transboundary pollution, ultimately, thereby harming the environment of many countries and by reducing the environmental quality of a country that has refused to provide the best available technology to other countries itself.

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ORIGINAL PAPER

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# LAND LAW PRINCIPLES IN THE POST-SOVIET STATES

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# ABSTRACT

The purpose of the article is to conduct a comparative analysis of the legal technique of enshrining the principle of land law in a number of post-Soviet states. The study sources are the Constitutions and Land Codes of the post-Soviet states enshrining the land law principles. The methodological basis of the study consists of the formal-legal analysis (interpretation method) of normative legal acts and the comparative-legal method. The authors consider the land law principles as the initial, basic normatively fixed ideas underlying the legal regulation of land relations. In Armenia, Belarus, Kazakhstan, Kyrgyzstan, Russia, Tajikistan, Uzbekistan, and Ukraine, the primary land law principles are enshrined in Constitutions and Land Codes. The minimum number of land law principles enshrined in the Land Codes of post-Soviet states ranges from five to twelve. Simultaneously, in the legislation of any state, there is no exhaustive list of land law principles.

Keywords: land law, principles of law, classification of law principles, post-Soviet space, positivism

# **INTRODUCTION**

The land legislation of any state is based on ideas that define the essence and nature of land legal relations and the entire corresponding sphere of legal regulation as a whole. Such ideas are commonly called principles of law. The authors proceed from the positivist understanding of the principles of law [Hart, 1961, Raz, 1972, Alexandrov, 1957, Lukasheva, 1970, Demichev & Iliukhina, 2019a], which implies that the land law principles are not any, but only the basic ideas that underlie land law, which are enshrined in the

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texts of normative legal acts. This article investigates the land law principles of the states located in the territories that were formerly part of the Soviet Union and now have the geopolitical name of "post-Soviet space".

All post-Soviet space states are currently part of the Romano-Germanic legal family (the continental law family). As is known, the family of continental law is characterized by the primacy of normative legal acts in the system of legal sources, the presence of written constitutions with supreme legal force, the division of law into branches, and some other features [David, 1964, Zweigert & Koetz, 2000, Seregin, 2020].

The purpose of the article is to conduct a comparative analysis of the legal technique of enshrining the principle of land law in a number of post-Soviet states. The authors do not consider the very content of the land law principles since this is a topic for special research. Besides, the content of many land law principles in the Russian Federation was well studied earlier [Volkov, 2005, Burov, 2011, Khotko, 2014, Tyutyunik, 2017].

For comparison, the authors do not take all post-Soviet states, but only those with regulations codifying land laws and establishing the land law principles. Accordingly, Georgia's land law principles, since there is no codified land act in this state, are not considered. Besides, the article does not explore the land law principles of the Republic of Azerbaijan and the Republic of Moldova since neither the Constitution of the Republic of Azerbaijan nor the Land Code of the Republic of Azerbaijan dated June 25, 1999, No. 695-IQ have a place for the land law principles, as well as the Constitution of the Republic of Moldova dated July 29, 1994, and the Land Code of the Republic of Moldova dated December 25, 1991, No. 828-XII.

The Land Code of Turkmenistan of October 25, 2004, the Land Code of the Republic of Azerbaijan, and the Land Code of the Republic of Moldova do not contain the land law principles. However, unlike Azerbaijan and Moldova, Article 12 of the Constitution of Turkmenistan found space for one but the globally fundamental principle of land law: the principle of securing the right of private land ownership. The paper also does not consider the Baltic states' land law principles (Latvia, Lithuania, and Estonia) since this issue requires special study due to the specific position they occupied in the Soviet Union and the rapid integration into the European Union.

Thus, the authors focus on the land law principles of post-Soviet states like Armenia, Belarus, Kazakhstan, Kyrgyzstan, Russia, Tajikistan, Uzbekistan, and Ukraine.

### MATERIALS AND METHODS

The authors have noted earlier that in states belonging to the continental legal family, the essential normative legal act is the written constitution. This is also wholly characteristic of the states of the post-Soviet space. Moreover, the relevant documents' texts expressly enshrine the rule that the Constitution has supreme legal force. Thus, part 1 of Article 15 of the Russian Federation's Constitution [1993] contains the following norm: "The Constitution of the Russian Federation has the highest legal force, direct effect and is applied throughout the Russian Federation's territory. Laws and other legal acts adopted in the Russian Federation must not contradict the Russian Federation's Constitution". Part 1 of Article 5 of the Constitution of the Republic of Armenia [1995] enshrines the following provision: "The Constitution has supreme legal force"; Article 7 of the Constitution of the Republic of Belarus [1995]: "The state, all its bodies, and officials shall act within the limits of the Constitution and the legislative acts adopted in compliance with it. Legal acts or their provisions, which are recognized following the procedure established by law as contradicting the provisions of the Constitution, have no legal force". Similar norms are contained in Article 4 of the Constitution of the Republic of Kazakhstan [1995], Article 6 of the Constitution of the Republic of Kyrgyzstan [2010], Article 10 of the Constitution of the Republic of Tajikistan [1994], Articles 15 and 16 of the Constitution of the Republic of Uzbekistan [1992], Article 7 of the Constitution of Ukraine [1996].

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Since the authors proceed from a positivist understanding of the principles of law, the sources underlying the study are the codified normative legal acts in the field of the land law of the eight countries under study and the Constitutions of these states.

The methodological basis of the study is the formal legal analysis (interpretation method) of normative legal acts and the comparative-legal method. The first of these methods allows identifying the land law principles in the legislation of the studied states, and the comparative-legal method allows conducting a comparative study of these principles and methods of consolidation.

#### **RESULTS AND DISCUSSION**

Within the comparative study of the land law principles, the authors focus on three issues: 1) ways of enshrining the land law principles in the texts of normative legal acts; 2) the number of land law principles; and 3) the application of law principle classifications to the land law principles.

## Ways of enshrining the land law principles in the texts of normative legal acts

There are three main ways to consolidate law principles in the text of a normative legal act [Demichev & Iliukhina, 2019b]. First, when a codified act highlights a chapter that uses the word "principle" in its title. Second, when the codified act highlights an article in the title of which the word "principle" is used. Third, when the text of the code does not contain a structural element with the word "principle" in its title, but in the text of individual articles, the legislator sets forth the main ideas of the relevant branch of law, using or not using the word "principle" at the same time.

An analysis of the Land Codes of Armenia, Belarus, Kazakhstan, Kyrgyzstan, Russia, Tajikistan, Uzbekistan, and Ukraine concludes that in all of them, except for the Land Code of the Republic of Armenia, the land law principles are enshrined in a separate article. Thus, in the three Land Codes, the corresponding articles are called "Basic Principles of Land Legislation" [Article 1 of the Land Code of the Russian Federation, 2001, Article 1.3 of the Land Code of the Republic of Tajikistan, 1996, Article 2 of the Land Code of the Republic of Uzbekistan, 1998]. In the three Land Codes, the articles enshrining the land law principles are called "land law principles" [Article 3 of the Land Code of the Kyrgyz Republic, 1999, Article 4 of the Land Code of the Republic of Kazakhstan, 2003, Article 5 of the Land Code of Ukraine, 2001]. Only in the Land Code of the Republic of Belarus [2008], the land law principles are set out in an article with a different title: "Basic Principles of Land Relations" [Article 5].

Having studied the content of the above norms of land legislation of the above states, the authors argue that, despite some differences in the names, the legislator in all cases meant the same thing – the basic ideas regulating land legal relations. Simultaneously, adhering to the positivist legal understanding, the concepts of "land law principles" and "principles of land legislation" are considered synonyms since law cannot exist outside of legislation. Also, the relationship between the principles of law and the principles of legislation can be seen "as the content (principles of law) and form (principles of legislation)" [Sumenkov, 2009, p. 23].

The legislator did not allocate any special chapters devoted to the land law principles in the Land Codes of the post-Soviet states. The third way of stating the law principles in the text of a codified act is used only in Armenian legislation. The Land Code of the Republic of Armenia does not contain a structural element with the word "principle" in its name; however, Article 4 of this normative legal act contains the following wording "Regulation of land relations is based on..." and further lists the main ideas determining the regulation of land relations, that is, the land law principles. One more point to note: the Armenian legislator uses the word "principle" in the Land Code text. For instance, Clause 15 of Part 1 of Article 2 mentions the principle of payment, and Clause 3 of Part 1 of Article 4 mentions the equality principle of property subjects in land relations.

# The number of land law principles

Determining the number of land law principles is not as simple as it seems at first glance. There are at least two reasons for this.

First, as noted earlier, the land law principles (as well as any branch) are enshrined not only in sectoral legislation but also at the constitutional level. Simultaneously, there is a problem of distinguishing the constitutional law principles, which will be considered later.

Second, the list of land law principles, enshrined in the Land Codes of the post-Soviet states, is open; that is, it is assumed that there may be others in addition to the principles mentioned. This is evidenced by the wording "Basic Land Law Principles" in the titles of articles in the Land Codes of the Russian Federation, the Republic of Tajikistan, and the Republic of Uzbekistan and "Basic Principles of Land Relations" in the Code of the Republic of Belarus "On Land". Obviously, using the combination of "basic principles", the legislator assumes the presence of other "non-basic" principles.

The authors also note that Part 2 of Article 1 of the Land Code of the Russian Federation contains a norm according to which it is permitted to establish the principles of land legislation by other (except for the Land Code) federal laws.

In countries where the list of land legislation principles in the Land Codes looks closed (Kyrgyz Republic, Republic of Kazakhstan, Ukraine) due to the use of the wording "Land Law Principles", in reality is also open. This is evidenced by the fact that, for example, Part 1 of Article 3 and Part 1 of Article 4 of the Land Code of Ukraine state that land relations are regulated by the Constitution of Ukraine, the Land Code of Ukraine, and regulations adopted following them. Naturally, other normative acts may also contain ideas that are important for regulating land relations. Similarly, Article 6 of the Land Code of the Republic of Kazakhstan stipulates that the land legislation of this state is based on the Constitution of the Republic of Kazakhstan and consists, apart from the Land Code, of normative legal acts adopted under it, and Part 1 of Article 2 of the Land Code

of the Kyrgyz Republic stipulates that land relations are regulated by the Constitution of the Kyrgyz Republic, the Civil Code of the Kyrgyz Republic, the Land Code, the laws of the Kyrgyz Republic, as well as decrees of the President of the Kyrgyz Republic issued under them, resolutions of the Jogorku Kenesh of the Kyrgyz Republic and resolutions of the Government of the Kyrgyz Republic.

Based on the above, the question of the number of land law principles in each post-Soviet states understudy will always be debatable. At the same time, it can be stated with absolute certainty that at least a certain number of land law principles are currently enshrined in post-Soviet states' land legislation.

Thus, the Land Code of the Republic of Belarus enshrines at least eleven principles: 1) state regulation and management in the field of land use and protection, including the establishment of a unified procedure for withdrawal and granting of land plots, transfer of land from one category and type to another; 2) mandatory state registration of land plots, rights and transactions; 3) unity of fate of a land plot and capital structures (buildings, structures) located on it, unless otherwise provided for by the present Code and other legislative acts; 4) use of land plots according to their designation; 5) priority of agricultural, nature protection, recreational, historical, and cultural lands, and forest lands of the forest fund with the designated purpose of the land; 6) effective use of lands; 7) protection of lands and improvement of their valuable qualities; 8) payment for land use; 9) establishment of limitations (encumbrances) on rights to land plots including land servitudes; 10) openness and consideration of public opinion during decision-making on withdrawal and allocation of land plots, changing their designation, establishment of limitations (encumbrances) on rights to land plots, including land servitudes, which affect the rights and legally protected interests of citizens; 11) protection of the rights of land users [Article 5 of the Code of the Republic of Belarus "On Land", 2008].

The legislation of Kazakhstan establishes at least ten principles of land law: 1) integrity, inviolability, and inalienability of the territory of the Republic of Kazakhstan; 2) preservation of land as a natural resource, the basis of life and activity of the people of the Republic of Kazakhstan; 3) protection and rational use of lands; 4) ensuring environmental safety; 5) purposeful use of lands; 6) priority of agricultural lands; 7) providing information on the condition of lands and their accessibility; 8) state support of measures on use and protection of lands; 9) prevention of damage to land or elimination of its consequences; 10) payment for land use [Article 4 of the Land Code of the Republic of Kazakhstan, 2003].

There are at least twelve principles of land law enshrined in Kyrgyz law: 1) preservation of land as a natural object, the basis of life, development, and activities of the people of the Kyrgyz Republic; 2) ensuring state and environmental safety; 3) formation of the land market and its effective functioning; 4) observance and protection of rights and legitimate interests of landowners and land users; 5) effective use of land; 6) purposeful use of land; 7) priority of agricultural land; 8) accessibility of information on land rights; 9) state support of land use and protection activities; 10) prevention of land damage or elimination of its consequences; 11) payment for land; 12) equality of all forms of land ownership [Article 3 of the Land Code of the Kyrgyz Republic, 1999].

There are at least eleven principles of land law enshrined in Russian legislation: 1) consideration of the significance of land as the basis of human life and activity, according to which the regulation of relations on the use and protection of land is based on ideas of land as a natural object protected as the most important component of nature, a natural resource used as a means of production in agriculture and forestry and the basis for economic and other activities in the Russian Federation, and simultaneously as real property, the object of ownership and other rights; 2) priority of protection of land as an essential component of the environment and means of production in agriculture and forestry over the land use as immovable property, according to which possession, use and disposal of land shall be carried out freely by owners of land plots if it does not cause damage to the environment; 3) priority of protection of human life and health, according

to which when carrying out activities involving the use and protection of lands such decisions shall be made and such activities shall be carried out which would allow preserving human life or preventing negative (harmful) impact on human health, even if it requires considerable expenses; 4) participation of citizens, public organizations (associations), and religious organizations in resolving issues concerning their rights to land, according to which citizens of the Russian Federation, public organizations (associations), and religious organizations have the right to participate in preparing decisions, the implementation of which may have an impact on the condition of the land in its use and protection, and the state authorities, local authorities, and entities involved in economic and other activities are required to provide the possibility of participation in the procedure and in the forms established by law; 5) unity of fate of land plots and integral objects, according to which all objects integral to land plots follow the fate of land plots, except for cases established by federal laws; 6) priority of preservation of especially valuable lands and lands of specially protected territories, according to which any change of designation of valuable lands of agricultural purpose, lands occupied by protective forests, lands of specially protected natural territories and facilities, lands occupied by cultural heritage sites, other especially valuable lands and lands of specially protected territories for other purposes shall be limited or prohibited in an order established by federal laws; 8) categorization of lands according to their designation, according to which the legal regime of lands is determined based on their belonging to a certain category and permitted use in accordance with territorial zoning and legal requirements; 9) differentiation of state ownership of land into ownership of the Russian Federation, ownership of subjects of the Russian Federation and ownership of municipalities, according to which the legal basis and procedure for such differentiation shall be established by federal laws; 10) differentiated approach to the establishment of a legal regime for lands, according to which natural, social, economic, and other factors shall be taken into consideration when establishing the legal regime for

lands; 11) combination of public interests and legal interests of citizens, according to which regulation of the use and protection of lands shall be performed in the interests of the entire society while ensuring guarantees for each citizen for free possession, use, and disposal of the land plots owned by him [Article 1 of the Land Code of the Russian Federation, 2001].

Note that, unlike in all other states under consideration, only in the Russian Federation's legislation, land law principles are not merely named, but an attempt is made to disclose their content. The authors believe that this approach is the most optimal for law enforcement, as a law enforcer in the practical activity must understand to the maximum extent what the legislator meant when formulating a principle of law.

The legislation of Tajikistan enshrines, as in Russia, no less than eleven principles of land law: 1) preservation of the Unified state land fund, improving the quality and fertility of soils as the most important natural resource; 2) ensuring the effective use of land; 3) ensuring the superior protection, expansion, and strict purposeful use of agricultural land; 4) organization of the land use rights market, its effective functioning and prevention of monopoly activities in the land use rights market; 5) providing state support in carrying out measures to increase the fertility of agricultural land, improve the reclamation condition, and protect land; 6) non-interference by state bodies in the activities of private individuals and legal entities in the acquisition, use, and disposal of the right to use land plots, except in cases envisaged by the Land Code and legislation of the Republic of Tajikistan; 7) prevention of damage to land, the environment and ensuring environmental safety; 8) diversity of management forms, ensuring the equality of land users, protection of their legal rights and interests; 9) ensuring equal rights of participants in land relations, protection of their legitimate rights and interests; 10) payment for land use; 11) accessibility of information about land plots [Article 1.3 of the Land Code of the Republic of Tajikistan, 1996].

The Land Code of the Republic of Uzbekistan establishes at least eight principles of land law: 1) pres-

ervation of land fund, improving the quality and fertility of soils as the most essential natural resource, the basis of life activity of citizens; 2) ensuring the rational, effective, and purposeful use of lands; 3) ensuring the special protection, expansion, and strictly purposeful use of agricultural lands, especially irrigated lands; 4) providing state and other support in realization of measures aimed at increasing the fertility of agricultural lands, improving the meliorative condition and land protection; 5) preventing damage to land and the environment, ensuring environmental safety; 6) diversity of forms of land possession and use, ensuring equality of participants in land relations, protection of their legal rights and interests; 7) payment for land use; 8) ensuring completeness and accessibility of information on land conditions [Article 2 of the Land Code of the Republic of Uzbekistan, 1998].

Ukrainian legislation contains at least six principles of land law: 1) combination of peculiarities of land use as a territorial basis, natural resource, and primary means of production; 2) ensuring equality of land ownership by citizens, legal entities, territorial communities, and the state; 3) non-interference by the state in the exercise by citizens, legal entities, and territorial communities of their rights to own, use, and dispose of land, except as provided by law; 4) ensuring the rational use of land; 5) ensuring guarantees of land rights; 6) priority of environmental safety requirements [Article 5 of the Land Code of Ukraine, 2001].

As for the number of land law principles of the Republic of Armenia, despite the previously noted specifics of their consolidation in the Land Code of the Republic of Armenia, at least five principles of land law may be singled out: 1) combining the use of land as a natural object and object of immovable property, the primary means of production, as well as the territorial basis; 2) diversity of subjects of ownership and land use, on establishing the powers of state administration bodies and local self-government in the regulation of land relations in the Republic of Armenia; 3) equality of ownership subjects in land relations; 4) unacceptability of state interference, contradicting the law, in the activity of citizens and legal entities in disposing and using the land [Clauses 1–4 of Part 1 of Article 4 of the Land Code of the Republic of Armenia, 2001]; 5) principle of payment [Clause 15 of Part 1 of Article 2 of the Land Code of the Republic of Armenia, 2001].

For all the diversity of the land law principles in the post-Soviet states under study, there are apparent similarities among many of them. The authors emphasize one such principle, namely the principle of payment for land use. The legislators of all the states of the post-Soviet space (except for Ukraine), whose land legislation is analyzed in this article, have fixed the provision on land use payment as a principle, the fundamental idea of land legislation. In Ukraine, the land use is paid – Article 206 of the Land Code of Ukraine is called "Land Fee".

In the authors' opinion, legislators' special attention in different countries to the land use payment is because, in the Soviet Union, the land use for citizens was free or almost free. However, with the introduction of a market economy and the collapse of the Soviet Union, the economic and value priorities in this area have changed. The consequence of this was not just a normative regulation of fee-based land use but the elevation of this idea to the rank of a law principle.

# Application of the classifications of the law principles to the land law principles

In the Soviet and post-Soviet legal literature, the law principles are traditionally divided into general legal, intersectoral and sectoral [Alekseev, 1972, pp. 105–106, Marchenko, 1998, pp. 24–26]. The classification criterion, in this case, is the scope of the principle: principles underlie all legal regulation (general or general legal principles), the same principles are characteristic of several branches of law (intersectoral principles), the principle is characteristic of only one branch of law (sectoral principles). This classification was successfully adapted by G.A. Volkov concerning the principles of land law in Russia [Volkov, 2005, p. 66]. In turn, A.Ya. Ryzhenkov, without analyzing the general law principles, explores the legally established intersectoral, sectoral, and institutional land law principles [Ryzhenkov, 2017].

A specific classification of the land law principles was proposed by E.V. Syrykh. Based only on the analysis of Article 1 of the Land Code of the Russian Federation, it distinguishes: 1) principles of land protection and use; 2) principles related to the right of citizens and their associations to land; 3) principles of state land management; 4) differentiated approach to the establishment of the legal regime of land; 5) principles related to land as a real estate object [Syrykh, 2006, p. 11]. This classification has a particular cognitive potential, but it is not focused on the law enforcement officer and has no practical significance. Another drawback is its narrowness there is an attempt to classify only the normative provisions enshrined in the Land Code of the Russian Federation. For example, the constitutional principles of Russia's land law, which are not duplicated in the Land Code of the Russian Federation, remain without attention.

Commenting on the Land Code of the Russian Federation G.A. Volkov, A.K. Golichenkov and O.M. Kozyr, without specifying the classification criteria, combine all the principles of land law into four groups: a) environmental, b) social, c) economic, d) legal [Volkov, Golichenkov, Kozyr, 2002, p. 10], and then reveal their content [Volkov, Golichenkov, Kozyr, 2002, pp. 10–21]. Please note that within the framework of this classification, the authors systematize only the Russian land legislation principles specified in Article 1 of the Land Code of the Russian Federation and do not affect other land law principles.

Based on the above classification, A.S. Tyutyunik proposed to divide the land law principles into the environmental, social, property, and managerial based on such criteria as the type of land relations regulated by the principles [Tyutyunik, 2017, p. 49]. However, this classification has the same disadvantage as the previous one.

Unlike all previously considered classifications, the positivist classification of the law principles implies the separation of the law principles based on such a criterion as the source of law principles. Accordingly, the law principles can be divided into three groups: 1) constitutional law principles, not duplicated in the industry code; 2) constitutional law principles that are duplicated in the sector code; 3) sectoral law principles enshrined in the sectoral legislation.

The above classifications do not contradict but complement each other. At the same time, the positivist classification has an essential advantage over others: it allows determining the place of each principle in the system of principles of the law branch and its role in the system of legal regulation as a whole; it allows to identify the nature, advantages, and disadvantages of ways to consolidate the principles in the texts of normative legal acts, to unify and optimize these methods.

In this context, the question of the relationship between general legal and constitutional principles is essential. G.A. Volkov believes that "the general law principles are manifested in the constitutional principles, which in turn act as the constitutional basis for the principles and norms of land law" [Volkov, 2005, pp. 34–35]. In our opinion, all general legal principles are constitutional because they are the basis of all legal regulation, the basis of each branch of law (for example, the principle of legality). However, not all constitutional principles can be attributed to general legal ones. Thus, the principle of the presumption of innocence is enshrined in the Constitutions of many states. Therefore, in these countries, the presumption of innocence is a constitutional principle. However, the presumption of innocence is not a general legal principle, as its scope of application is limited to proceedings in criminal, administrative, and tax cases. In the authors' opinion, the principle of independence of judges (as the court is a party to legal relations not in all branches of law), the principle of adversarial proceedings (this is the principle of procedural branches of law), the language of proceedings (this principle is also exclusively procedural), which are enshrined at the constitutional level in different countries, are not general legal principles. These principles are intersectoral in nature. Some constitutional principles may be exclusively sectoral. Thus, the existing principle of freedom of labor

in Russian law, enshrined in Parts 1 and 2 of Article 37 of the Russian Federation's Constitution, is only a labor law principle.

When highlighting the constitutional principles of law, there is a serious problem: the legislator does not name the articles in the text of the Constitution. This legal technique of setting forth constitutional norms makes it difficult to perceive provisions of a constitutional act to be considered a law principle. The exception is the Republic of Armenia's Constitution's current version, the articles of which have titles. Furthermore, some of them contain the word "principle" (for example, Article 6 "Principle of legality", Article 71 "Principle of guilt and principle of proportionality of punishment", Article 79 "Principle of certainty", and others).

To not "overload" the reader with the same type of specific material relating to different countries, the authors will further provide a classification of land law principles, based on an analysis of the legislation of the Russian Federation. As necessary, the regulations of other post-Soviet states also will be involved.

From the point of view of dividing the law principles into general legal, intersectoral, and sectoral, principles of the land law of the Russian Federation can be classified as follows:

1. General legal principles:

- the principle of legality [Article 15 of the Constitution of the Russian Federation, 1993];
- the principle of the guaranteed protection of human and civil rights and freedoms [Articles 17, 18, and Part 1, Article 45 of the Constitution of the Russian Federation, 1993];
- the principle of equality before the law and the court [Part 1, Article 19 of the Constitution of the Russian Federation, 1993];
- the principle of respect for the honor and dignity of the individual [Article 21 of the Constitution of the Russian Federation, 1993];
- the principle of inviolability of private life [Part 1 of Article 23, Part 1 of Article 24 of the Constitution of the Russian Federation, 1993];
- the principle of secrecy of correspondence, telephone and other conversations, postal, telegraph

and other communications [Part 2, Article 23 of the Constitution of the Russian Federation, 1993];

- the principle of inviolability of the home [Article 25 of the Constitution of the Russian Federation, 1993];
- the principle of protection of rights and freedoms by all means not prohibited by law [Part 2, Article 45 of the Constitution of the Russian Federation, 1993];
- the principle of guaranteed judicial protection of rights and freedoms [Article 46 of the Constitution of the Russian Federation, 1993];
- the principle of guaranteeing the right to qualified legal assistance [Article 48 of the Constitution of the Russian Federation, 1993].

2. Intersectoral principles. The specificity of regulation of land legal relations determined the originality of the land law principles. For this reason, no single intersectoral principle of land law can be named. Note that A.Ya. Ryzhenkov calls most of the principles enshrined in Article 1 of the Land Code of the Russian Federation intersectoral [Ryzhenkov, 2017]. The authors cannot agree with this approach and believe that all the land law principles are either general legal or narrowly sectoral in nature.

3. Sectoral principles. This group includes the eleven previously mentioned principles enshrined in Article 1 of the Land Code of the Russian Federation. It should be reminded that this list is open and can be expanded by the principles of land law enshrined in other normative legal acts.

The authors classify the principles of the land law of the Russian Federation, based on the source of the law principles:

1. Constitutional land law principles not duplicated in the Land Code of the Russian Federation:

- general legal principles mentioned in the previous classification (the principle of legality, the principle of guaranteeing the protection of human and civil rights and freedoms, and others);
- the principle of state protection of land and other natural resources as the basis of life and activity of the peoples living in the corresponding territory [Part 1 of Article 9 of the Constitution of the Russian Federation, 1993];
- land and other natural resources may be in private,

state, municipal, and other forms of ownership [Part 2 of Article 9 of the Russian Federation's Constitution]. In Russia, in reality, there is only a private, state, and municipal form of ownership. No "other forms of ownership", although they are mentioned in the Russian Federation's Constitution, have existed. Article 36 of the Constitution of the Russian Federation specifies the right of private ownership of land. It is specified that citizens and their associations may have the corresponding right, and "possession, use, and disposal of land and other natural resources shall be carried out freely by their owners if it does not cause damage to the environment and does not violate the rights and legitimate interests of other persons".

Also, Part 3 of Article 35 of the Russian Federation's Constitution contains a norm that concerns property in general but extends its effect to land ownership. At the same time, it is guaranteed that "no one can be deprived of their property except by a court decision", and "forced alienation of property for state needs can be made only on the condition of preliminary and equivalent compensation". Such guarantees are a common global practice, but their implementation remains theoretical and practical in many states [Źróbek, 2010].

The principle of state protection of land and other natural resources and the principle of recognition of various forms of land ownership are, although constitutional, specific sectoral land law principles.

Other post-Soviet countries also have specific constitutional land law principles. As a rule, they also relate to the right of land ownership, state protection, and rational use of land resources.

2. Constitutional land law principles, duplicated in the Land Code of the Russian Federation. Unlike most other Russian law branches [Demichev & Iliukhina, 2019a], Russian land law does not have constitutional principles of law duplicated in the sectoral legislation.

3. Sectoral land law principles enshrined in the Land Code of the Russian Federation. As noted earlier, the primary land law principles are listed in Part 1 of Article 1 of the Land Code of the Russian Federation. They have already been named.

# CONCLUSIONS

After analyzing the Constitutions and sectoral codes regulating land relations in the post-Soviet states, the authors came to the following conclusions:

1. The land law principles of the post-Soviet space states are the initial, basic normative ideas that underlie the legal regulation of land relations. Under their normative nature, these ideas are normative prescriptions imperative and binding on all law subjects.

2. In such post-Soviet states as Armenia, Belarus, Kazakhstan, Kyrgyzstan, Russia, Tajikistan, Uzbekistan, and Ukraine, the primary land law principles are enshrined in Constitutions and Land Codes. Simultaneously, in the legislation of any state, there is no exhaustive list of land law principles. A certain minimum number of principles and other ideas that do not contradict the principles of land law enshrined in the Constitution and the Land Code may be enshrined in other normative acts.

3. In seven of the eight states studied, of the various ways of enshrining the law principles in the text of a normative act, the legislator chose such a way as enshrining the principles in a separate article of the Land Code. Only in the Land Code of the Republic of Armenia there is no separate article directly devoted to the statement of the land law principles, but the law principles are enshrined there as well.

4. The number of land law principles enshrined in the Land Codes of the post-Soviet states ranges from five in the Republic of Armenia to twelve in the Kyrgyz Republic. At the same time, all Land Codes simply list the principles. The exception is the Land Code of the Russian Federation, in which the land law principles are not only listed but also their content is disclosed.

5. The application of various classifications to the land law principles allowed identifying the latter's specific features. Using the classification, within which the principles of law are divided into general legal, intersectoral, and sectoral principles, the authors concluded that the regulation of land legal relations was based only on general legal and sectoral principles of land law. Intersectoral principles characteristic of land law have not been found in any laws of the post-Soviet states.

6. When applying classification to the land law principles (using the example of the Russian Federation), the criterion of which is the source of the law principles, it turned out that there were constitutional land law principles not duplicated in the Land Code and sectoral land law principles enshrined in the Land Code. However, the constitutional land law principles, duplicated in the Land Code, were not found. Among the constitutional land law principles, the majority are general legal principles characteristic of all law branches, and only two constitutional principles directly relate to land legal relations.

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ORIGINAL PAPER

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# SPATIAL VARIATIONS IN THE SOCIOECONOMIC DEVELOPMENT OF RURAL MUNICIPALITIES IN PODKARPACKIE VOIVODESHIP

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### ABSTRACT

The main goal of all territorial administration units, including municipalities, is to promote socioeconomic development. The implemented actions address a broad range of economic, social, spatial and environmental issues. Therefore, socioeconomic development is a complex and multi-dimensional concept that is difficult to evaluate in an unambiguous and objective manner. Statistical methods in object-based multidimensional modeling support such evaluations by considering numerous attributes/variables, which increases the efficiency of the analytical process. In this article, Hellwig's development pattern method was applied to classify rural municipalities in Podkarpackie Voivodeship based on their socioeconomic development. Twenty-seven indicators were designed for the needs of the analysis with the use of Statistics Poland data for 2018. Based on the results, the municipalities were grouped into four classes with different levels of socioeconomic development. Class III was the largest group, and it was composed of 39 municipalities with a medium-low level of socioeconomic development. The smallest groups were Class I containing 18 municipalities with a high level of socioeconomic development, and class IV containing 14 municipalities with a low level of development.

**Keywords:** socioeconomic development, indicators of socioeconomic development, Hellwig's method, Podkarpackie Voivodeship

# INTRODUCTION

Rural areas cover 93.2% of Poland's territory and are inhabited by nearly 40% of the Polish population [www.stat.gov.pl]. Therefore, rural areas play a very important role in the social, economic and environmental development of the country. Socioeconomic development induces dynamic changes in rural areas [Pawlewicz, 2017, Kryk, 2019]. For this reason, social and economic measures implemented at the local level should aim to improve the inhabitants' welfare, living standards and quality of life [Janusz, 2020]. These goals are achieved primarily by promoting housing construction, protecting the natural environment, improving the availability of technical and social infrastructure, designing policy frameworks that support investment, and promoting social and economic mobilization of local communities. Measures and strategies that are implemented in a rational and conscientious manner contribute to the socioeconomic

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advancement of local inhabitants and territorial units [Bański & Czapiewski, 2008, Stanny, 2013].

Socioeconomic development is a multi-faceted concept that cannot be measured or expressed by a single indicator. Therefore, complex phenomena are characterized with the use of synthetic (composite) variables that replace a high number of individual indicators [Holgado Molina et al., 2015, Kuropka, 2001, Pérez et al., 2015]. The search of effective metrics for monitoring local development indicates that official statistics are still the most reliable sources of data for designing development indicators, despite their numerous flaws. The attributes used in comparisons of territorial units are most suitable for monitoring changes, and they can constitute input data. These include benchmark values for gauging changes in successive periods of the analysis, and they provide basic information about the socioeconomic status of a given area [Brodziński, 2011].

The aim of this study was to classify rural municipalities in Podkarpackie Voivodeship based on their socioeconomic development. The analysis relied on 34 indicators that were selected based on Statistics Poland data for 2018. A total of 109 rural municipalities were analyzed. Local development is an inseparable element of the socioeconomic development of both regions and entire countries. Local resources and factors influence local communities as well as entire societies on a macroeconomic scale. Local development should be monitored to assess the effectiveness of social and economic policies at different levels of territorial administration. The proposed composite measure of socioeconomic development could be an effective tool for diagnosing local problems, adjusting regional policies, minimizing inequalities and promoting regional growth.

#### **MATERIALS AND METHODS**

### **Study Area**

Podkarpackie Voivodeship is the south-easternmost Polish region. It neighbors Lublin, Świętokrzyskie and Małopolska Voivodeships in the north and west. Podkarpackie borders Ukraine (Lviv District and, along a small section of the border, Zakarppatia District) in the east, and Slovakia (Prešov District) in the south [Development strategy of Podkarpackie Voivodeship 2030. Draft, 2019] (Fig. 1).

Rural areas span 16,646 km<sup>2</sup> in Podkarpackie and occupy more than 93% of the voivodeship's territory. Rural municipalities cover 73% of that territory and are inhabited by 912,982 people, i.e. around 43% of the voivodeship's total population [www.stat.gov. pl, date: 20.11.2020]. Podkarpackie is characterized by significant variations in natural conditions, socioeconomic development, infrastructure availability, ecological factors and history, which is why local land management strategies differ considerably from those implemented in other Polish voivodeships. The physiographic features of Podkarpackie include mountains, hills, valleys and lowlands. Natural resources and favorable soil and climate conditions play an important role in the region's economic growth. In a synthetic approach, Podkarpackie is characterized by a low level of development, low economic performance, low infrastructure availability and a low standard of living. The three main sectors of the local economy are industry, agriculture, and tourism and recreation. The accompanying areas of economic activity include transport, construction, community and cultural services, national parks and nature reserves that protect valuable ecosystems. Industry plays an important role in the development of Podkarpackie [Development strategy of Podkarpackie Voivodeship for 2007-2020, 2006].



**Fig. 1.** Location of Poland and Podkarpackie Voivodeship *Source:* own elaboration.

### Methods

The socioeconomic development of rural municipalities in Podkarpackie Voivodeship was determined with the use of Hellwig's development pattern model, which is one of the oldest [Wysocki, 2010] and the most popular pattern methods [Panek & Zwierzchowski, 2013]. Data for analysis were acquired from Statistics Poland. The study was conducted according to the following procedure:

1. The literature was analyzed [Bański & Czapiewski, 2008, Brodziński, 2011, Dziekański, 2015, Heffner & Stanny, 2007, Kamińska & Janulewicz, 2009, Knapik & Kowalska, 2014, Ossowska, 2016, Pawlewicz et al., 2015, Ziemiańczyk, 2010] to select variables corresponding to different components (social, economic, infrastructural, environmental) of socioeconomic development in rural municipalities. The variables were chosen based on their availability and completeness. A total of 34 indicators were selected for the study.

2. Diagnostic attributes (indicators) were eliminated in a statistical analysis. A set of diagnostic attributes should be selected by analyzing the variation and correlation between potential attributes. The selected attributes (indicators) should be characterized by high variation in the set of the evaluated objects, and they should be weakly correlated with one another [Wysocki, 2010]. The variability of diagnostic attributes (indicators) was determined by calculating their coefficients of variation [Panek & Zwierzchowski, 2013]: Pawlewicz, K., Flasińska, J. (2021). Spatial variations in the socioeconomic development of rural municipalities in Podkarpackie Voivodeship. Acta Sci. Pol. Administratio Locorum 20(2), 101–110.

$$V_j = \frac{s_{s_j}}{\bar{x}_j}, \quad j = 1, 2, ..., n,$$
 (1)

where:  $\bar{x}_j$  is the arithmetic mean, and  $s_{s_j}$  is the standard deviation of the j<sup>th</sup> attribute (indicator).

Attributes characterized by low values of the coefficient of variation weakly discriminate the analyzed objects, and, therefore, have low information value. Indicators for which the coefficient of variation does not exceed a low and arbitrarily determined threshold value of  $V^*$ , where  $Vj \leq V^*$ , are eliminated from the set of diagnostic attributes. In most cases,  $V^* = 0.1$ [Panek & Zwierzchowski, 2013].

Highly correlated attributes were eliminated by analyzing the diagonal elements of the inverse correlation matrix. The variables whose value on the main diagonal exceeded 10 were not considered in the study [Malina & Zeliaś, 1997]. The indicators were arranged in a decision matrix  $X_{mxn}$ , where rows correspond to the analyzed objects (municipalities) and columns represent diagnostic attributes (indicators of socioeconomic development). In the decision matrix,  $x_{ij}$  is value of the  $j^{\text{th}}$  attribute (j = 1, ..., n) of the  $i^{\text{th}}$ object (i = 1, ..., m). The list of the variables (indicators) selected for the study is presented in Table 1.

Table 1. Indicators of socioeconomic development

No.	Social indicators
1	x <sub>1</sub> – Birth rate per 1000 population (S)
2	x <sub>2</sub> – Number of outpatient clinics per 10,000 population (S)
3	$x_3$ – Average floor area per person in residential buildings (S)
4	$x_4$ – Percentage of dwellings with central heating (S)
5	$x_5$ – Gross enrollment rate in primary schools (S)
6	$x_6$ – Number of children enrolled in kindergartens per 1,000 children aged 3–5 years (S)
7	x <sub>7</sub> – Number of books in public libraries per 1000 population (S)
8	x <sub>8</sub> – Number of welfare recipients per 10,000 population (D)
9	$x_9$ – Total public welfare expenditure per capita (S)
	Economic indicators
10	$x_{10}$ – Number of employed adults per 1000 population (S)
11	$x_{11}$ – Unemployment rate in the working-age population (D)
12	$x_{12}$ – Number of businesses entered into the REGON business register per 10,000 population (S)
13	x <sub>13</sub> – Municipal own-source revenues per capita (S)

cont. Table 1

14	$x_{14}$ – Proportion of investment expenditures in total ex-
	penditures (S)

	Infrastructure indicators
15	$\rm x_{15}$ – Coverage of the water supply network per 100 $\rm km^2$ (S)
16	$\rm x_{16}$ – Coverage of the gas supply network per 100 km² (S)
17	$\rm x^{}_{17}$ – Coverage of the sewerage network per 100 $\rm km^2(S)$
18	$\mathbf{x}_{18}$ – Percentage of the population with access to the water supply network (S)
19	$\mathbf{x}_{19}$ – Percentage of the population with access to the gas supply network (S)
20	$\mathbf{x}_{20}$ – Percentage of the population with access to the sewerage network (S)
21	$\mathrm{x}_{21}$ – Total number of hotel beds per 1000 population (S)
	Environmental indicators
22	$x_{22}$ – Percentage of nature conservation areas in the total area of the municipality (S)
23	x <sub>23</sub> – Green areas per 1000 ha (S)
24	x <sub>24</sub> – Forest cover in % (S)
25	x <sub>25</sub> – Mixed waste collected per capita per year (D)
26	$x_{26}$ – Industrial and municipal was tewater requiring treatment that is evacuated to water bodies or the ground per capita per year (D)
27	x <sub>27</sub> – Number of natural monuments per 1000 ha (S)
5 – s	timulant, D – destimulant

Source: own elaboration.

3. The composite (synthetic) measure of socioeconomic development was calculated with the use of Hellwig's development pattern method.

The composite measure of socioeconomic development was designed based on the following observation matrix [Hellwig, 1968]:

$$X = \begin{bmatrix} x_{11} & x_{12} & \dots & x_{1m} \\ x_{21} & x_{22} & \dots & x_{2m} \\ \dots & \dots & \dots & \dots \\ x_{n1} & x_{n2} & \dots & x_{nm} \end{bmatrix},$$
 (2)

where:  $x_{ij}$  (*i* = 1,2, ..., *m*) is the value of the *j*<sup>th</sup> attribute of the *i*<sup>th</sup> object.

The selected diagnostic variables are expressed in different units of measurement, and they have to be normalized for comparative purposes. The aim of the normalization procedure is to standardize data and eliminate units of measurement. Data were normalized with the use of the following formula: Pawlewicz, K., Flasińska, J. (2021). Spatial variations in the socioeconomic development of rural municipalities in Podkarpackie Voivodeship. Acta Sci. Pol. Administratio Locorum 20(2), 101–110.

$$z_{ij} = \frac{(x_{ij} - \bar{x}_j)}{S_j}, \quad (j = 1, 2, ..., m),$$
 (3)

where:

$$\bar{x}_j = \frac{1}{n} \sum_{i=1}^n x_{ij} \quad s_j = \sqrt{\frac{1}{n} \sum_{i=1}^n (x_{ij} - \bar{x}_j)^2}$$
(4)

The above procedure produced matrix Z of the standardized values of attributes.

$$Z = \begin{bmatrix} z_{11} & z_{12} & \dots & z_{1m} \\ z_{21} & z_{22} & \dots & z_{2m} \\ \dots & \dots & \dots & \dots \\ z_{n1} & z_{n_2} & \dots & z_{nm} \end{bmatrix},$$
 (5)

The matrix was used to establish the development pattern, namely an abstract object  $P_0$  with the most desirable values of the analyzed variables, i.e. the highest values of stimulants and the lowest values of destimulants [Hellwig, 1968]:

$$P_0 = [z_{01}, z_{02}, \dots, z_{0k}],$$
(6)

where:  $z_{0k} = \max \{z_{ik}\}$ , when  $z_k$  is a stimulant, and  $z_{0k} = \min \{z_{ik}\}$ , when  $z_k$  is a destimulant.

In the next step, Euclidean distances were calculated between each analyzed object, i.e. a rural municipality ( $P_i$ ), and the identified development pattern ( $P_0$ ):

$$q_i = \sqrt{\sum_{j=1}^m (z_{ij} - z_{0j})^2}$$
(7)

The calculated Euclidean distances were used to compute Hellwig's composite (synthetic) measure of development:

$$S_i = 1 - \frac{q_i}{q_0}$$
 (*i* = 1, 2, ..., *n*), (8)

where:

$$q_0 = \bar{q}_0 + 2S_0, \quad \bar{q}_0 = \frac{1}{n} \sum_{i=1}^n q_i, \quad s_0 = \sqrt{\frac{1}{n} \sum_{i=1}^n (q_i - \bar{q}_0)^2}$$
(9)

The socioeconomic development of the analyzed municipalities was assessed based on the values of Hellwig's composite measure of development. The described measure generally assumes values in the range of [0,1]. Values closer to 1 represent higher levels of development in the evaluated municipalities. However, Hellwig's composite measure can take on negative values when the value of one attribute is significantly lower relative to the remaining parameters, and when numerous objects are analyzed [Wysocki, 2010].

4. The analyzed objects (municipalities) were arranged in a linear order, and the studied municipalities were grouped into four classes of socioeconomic development based on the arithmetic mean and standard deviation of Hellwig's composite measure. The classes were established with the use of the following procedure [Wysocki, 2010]:

- Class I - high level of socioeconomic development:

$$S_i \ge \bar{S}_i + s_{s_i}$$

Class II – medium-high level of socioeconomic development:

$$\bar{S}_i \le S_i < \bar{S}_i + s_{s_i},$$

 Class III – medium-low level of socioeconomic development:

$$\bar{S}_i - s_{s_i} \le S_i < \bar{S}_i,$$

- Class IV - low level of socioeconomic development:

$$S_i < \bar{S}_i - s_{s_i},$$

where:

 $S_i$  – value of the composite measure,

 $\bar{S}_i$  – arithmetic mean of the composite measure,

 $S_{s_i}$  – standard deviation of the composite measure.

### **RESULTS AND DISCUSSION**

The calculated values of Hellwig's composite measure were used to evaluate the socioeconomic development of rural municipalities in Podkarpackie Voivodeship. Based on the results, the municipalities were divided into four classes in line with the adopted procedure, and they are presented in Table 2.

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Level No.	
development of municipalit	ies
I Medium-high 0.136-0.247 18 (17%)	
II High 0.090-0.135 38 (35%)	
III         Medium-low         0.045-0.089         39 (36%)	
IV Low -0.003-0.044 14 (13%)	

 
 Table 2. Rural municipalities in Podkarpackie Voivodeship divided into four classes of socioeconomic develop

Source: own elaboration.

The values of the composite measure of socioeconomic development ranged from -0.003 to 0.247. The highest value was noted in Lutowiska municipality, and the lowest value was determined in Gawłuszowice municipality.

The largest number of municipalities were allocated to class III with a medium-low level of socioeconomic development. Class III was composed of 39 municipalities, i.e. 36% of the total number of the analyzed objects. Class II denoted a medium-high level of socioeconomic development, and it grouped 38 municipalities (35%). It should be noted that the classes representing the highest and lowest levels of development were least numerous. Class I contained 18 municipalities (17%), and class IV was composed of 14 municipalities (13%). The spatial variations in the socioeconomic development of rural municipalities in Podkarpackie Voivodeship are illustrated in a map in Figure 2.

The development of class I and II municipalities is fueled mainly by the proximity of urban centers and major transport routes. Cities stimulate the development of the adjacent areas, in particular the performance of non-agricultural sectors of the local economy [Chodkowska-Miszczuk, 2004] which receive an additional boost from good transport links to other parts of the region [Ferens, 2013]. It should also be noted that many urban dwellers relocate to the adjacent rural areas [Harasimowicz, 2018]. This trend was observed in the municipalities of Świlcza, Trzebownisko and Krasne. Urban residents escape from the hustle and bustle of cities, and they can quickly and conveniently commute to work from the surrounding rural areas [Palej, 2008]. In many cases, rural municipalities with high and medium-high levels of socioeconomic development have well-developed technical infrastructure and are situated in the vicinity of national and regional roads. Poland's longest motorway, A4, intersects 12 class I municipalities (Trzebownisko, Krasne, Miejsce Piastowe, Świlcza, Czudec, Ostrów, Gorzyce, Dębica, Jasienica Rosielna, Besko, Zaleszany, Czarna) and one class II municipality (Żyraków). These municipalities are also characterized by a high number of employed adults per 1000 population, high gross enrollment index for primary schools, high birth rate, and high average floor area per person in residential buildings.

The majority of class III and IV municipalities are situated in the peripheral parts of the studied voivodeship. These municipalities are characterized by low availability of transport services due to their peripheral location, low quality of transport infrastructure, high transport costs, and remote location from regional hubs of economic activity [Miszczuk, 2010]. The study also revealed that the level of socioeconomic development decreased over distance from the regional capital. Three class III municipalities (Wielkie Oczy, Stubno and Medyka) and two class IV municipalities (Fredropol and Radymno) are situated along the Polish-Ukrainian border. Two class III municipalities (Komańcza and Krempna) and one class IV municipality (Jaśliska) border Slovakia. In these municipalities, low and medium-low levels of development can be largely attributed to poorly developed technical infrastructure and remote location from the major roads. An analysis of the selected indicators revealed that the development of class III and class IV municipalities was also compromised by a high number of welfare recipients, high unemployment and low birth rates relative to other municipalities.

The presented analysis supported the identification of the main problems in the rural municipalities of Podkarpackie Voivodeship. The most pressing social problems were a low number of outpatient clinics per 10,000 population and low public welfare Pawlewicz, K., Flasińska, J. (2021). Spatial variations in the socioeconomic development of rural municipalities in Podkarpackie Voivodeship. Acta Sci. Pol. Administratio Locorum 20(2), 101–110.



**Figure 2.** Spatial variations in the socioeconomic development of rural municipalities in Podkarpackie Voivodeship in 2018 *Source:* own elaboration based on Statistics Poland data.

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expenditure. In the group of economic indicators, many municipalities were characterized by a low number of employed adults per 1000 population and a relatively high unemployment rate in the workingage population. These findings give cause for concern because undesirable values of the analyzed indicators exacerbate poverty in rural areas [Błaszczyk, 2006]. The majority of the studied municipalities also had low own-source revenues per capita and a low number of businesses listed in the REGON register per 10,000 population. An analysis of infrastructure indicators revealed that similarly to most rural municipalities in Poland [Bański & Czapiewski, 2008], the municipalities in Podkarpackie Voivodeship are characterized by low availability of public utilities, in particular gas supply networks. The evaluated environmental indicators do not pose risks for the development of rural municipalities in Podkarpackie Voivodeship. The quality of the natural environment is high, and the most valuable animal and plant species and their habitats are legally protected in various ways. Nature conservation areas are an important element of Polish and European ecological networks. Bieszczady National Park, Cisna-Wetlina Landscape Park and San Valley Landscape Park belong to the East Carpathians Biosphere Reserve, a transboundary protected area. Podkarpackie ranks fourth in Poland in terms of the highest proportion of nature conservation areas in the voivodeship's territory [Development strategy of Podkarpackie Voivodeship 2030. Draft, 2019]. The only environmental indicators that require significant improvement were mixed waste collected per capita per year, and industrial and municipal wastewater requiring treatment that is evacuated to water bodies or the ground per capita per year. Undesirable values of these indicators were noted mainly in municipalities with a well-developed tourist infrastructure.

# CONCLUSIONS

The results of this study revealed considerable variations in the socioeconomic development of rural municipalities in Podkarpackie Voivodeship. Class III was the largest group of 39 municipalities with a medium-low level of socioeconomic development. Class II was a similarly sized group of 38 municipalities with a medium-high level of development. The smallest groups were Class I (18 municipalities) with a high level of socioeconomic development, and Class IV (14 municipalities) with a low level of development. Rural municipalities in Podkarpackie Voivodeship face numerous challenges, mostly in social and economic domains. Above all, low municipal own-source revenues considerably limit public spending in various areas, including social welfare. Inhabitants of the analyzed municipalities are also characterized by low levels of professional and economic activity, which is reflected in a low number of employed adults per 1000 population, a relatively high unemployment rate in the working-age population, and a small number of businesses entered into the REGON business register per 10,000 population. Podkarpackie is also deficient in technical infrastructure, mainly gas supply networks. Environmental indicators were generally satisfactory, and the only parameters that required improvement were mixed waste collected per capita per year, and industrial and municipal wastewater requiring treatment that is evacuated to water bodies or the ground per capita per year, mainly in municipalities with a well-developed tourist sector.

Spatial factors such as the proximity of urban centers and major transport routes play a very important role in the development of the studied municipalities. Classes I and II grouped municipalities situated in the direct vicinity of cities: Rzeszów, Przemyśl, Stalowa Wola, Mielec and Sanok, with good access to major transport routes. In turn, municipalities with medium-low and low levels of socioeconomic development are situated remotely from urban hubs and transport routes, mostly in peripheral areas of Podkarpackie Voivodeship.

Author contributions: The authors have approved the final version of the manuscript. The authors have contributed to the paper as follows: K.P. developed the concept and designed the study, J.F. collected the
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data, J.F. and K.P. analyzed and interpreted the data, J.F. prepared the draft of the article, K.P. revised the article critically for important intellectual content.

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ORIGINAL PAPER

# SPATIAL PLANNING SYSTEMS IN POLAND AND ITALY – COMPARATIVE ANALYSIS ON THE EXAMPLE OF OLSZTYN AND BARI

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# ABSTRACT

The article discusses several aspects of spatial planning systems in Poland and in Italy. The analysis included the legal basis for the functioning of both systems, planning levels and documents developed at each level. The planning status of both countries is presented based on the statistical data obtained. This is shown on the cartodiagrams prepared with the use of ArcGIS and QGIS software as well as tabular lists containing statistical data. Detailed research was also done as a case study for two cities: Olsztyn in Poland and Bari in Italy. The data collected and the analyses carried out made it possible to compare the planning systems in both countries tested. The results show similarities and differences, as well as the positive and negative features of both analyzed systems. Conclusions can be used as a basis for proposing changes to the planning systems in both countries, based on good practices from the other country.

**Keywords:** spatial planning, spatial planning system in Poland, spatial planning system in Italy, comparative analysis, legal basis for planning

# INTRODUCTION

The space in which we live belongs to so-called "rare goods". We have to use it in a rational way, according to certain rules, because it is not a subject of production. These objectives are served, among others, by spatial planning. Spatial planning determines the way in which space is used (space is a limited good both in terms of quality and quantity). It aims at ensuring proper management of individual spaces, taking into account their unique features, mutual relations and local interests. The use of space defined in this way must be subject to certain limitations, e.g. through legal regulations concerning spatial development [Koreleski, 2009, pp. 27–42, Markiewicz, 2020].

Spatial planning is of interest of different sciences [Brzezicki et al., 2013]. Spatial planning is part of the overall social and economic planning system. It concerns both economic [Harrison, 2017, Cheshire & Sheppard, 2002, Ihlanfeldt, 2007], environmental

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[Fijałkowski, 2019, Fleming, 2005, Pauleit et al., 2005], social [Barton, 2009, Marull et al., 2010, FAO, 1993] and e.g. cultural aspects [Ciski & Rząsa, 2018, Rząsa et al., 2016]. Spatial planning most often concerns urbanized areas [Bieda et al., 2020, Hersperger et al., 2018, Chapin, 1965, Luque, 2015], but is also carried out in rural areas [Erickson, 1995, De Montis et al., 2016, Rząsa et al., 2019]. Its role is to determine the ways of use for particular areas and to establish management rules for them [Gawroński et al., 2010]. Spatial planning is one of the most important instruments for implementing sustainable development, understood as socio-economic development integrating political, economic and social actions, balanced with environmental protection and a permanence of basic natural processes in order to ensure the possibility of satisfying the basic needs of individual communities or citizens in both the present generation and future generations [Rząsa & Ogryzek, 2018]. Spatial planning decides on the possibility of a specific investment, it also shapes the content and method of exercising the ownership right to land property [Brzezicki et al., 2013]. Spatial planning can have different meanings in different countries. In almost all countries that are members of the United Nations Economic Commission for Europe (UNECE), spatial planning is a key instrument for creating a periodic framework for spatial development, promoting sustainable spatial organization of land use and balancing competing policy objectives. It aims to reconcile development needs with environmental protection and to achieve social and economic objectives. It is an instrument which aims to maintain a balance between the rights of owners or the so-called private and public interest [Krajewska et al., 2014]. Spatial planning is often defined as the coordination of policies and actions affecting land use [Niedziałkowski & Beunen, 2019, Roy, 2009].

The basic act regulating the issue of spatial planning in Poland is the Act of 23th March 2003 on Spatial Planning and Management [Act of 27th of March, 2003]. The system of spatial planning in Poland has changed significantly after the fall of socialism. Like many other areas of the economy, it was based on centralization, planning decisions were made centrally, municipalities, at the local level did not have much influence on the development of space. The changes initiated in 1989 transferred the responsibility for managing spatial processes to the municipalities in 1994. The main change brought about by this transition was the annulment of spatial development plans, which were in force before the political breakthrough of 1989. This decision was made by the Polish Parliament in 1994. The final wording of the regulations, valid to this day, was created in 2003 [Wagner, 2016].

Spatial planning practice in Italy has changed over the last three decades under the influence of the EU territorial governance agenda [Cotella & Rivolin, 2011]. Italian spatial planning is based on a stratified system, which consists of national, regional and provincial spatial coordination plans and general policy and municipal development plans. With the exception of the national level, any other level must prepare a spatial plan [Bragagnolo et al., 2012]. Compared to the rest of Europe, Italy has witnessed a slow diffusion of strategic planning practice. It has taken place in few cities towards the end of the 1990s in northern Italy [Grassini et al., 2018].

The main aim of the article is a detailed comparision of the spatial planning systems in Poland and Italy, as a result of which both systems were analyzed, showing the similarities and differences between procedures, methods and assumptions in and of these systems. The authors also try to determine the effectiveness of both systems by analyzing their impact on changes in the way of land use and try to find the strengths and weaknesses of the analyzed planning systems. In the end the Authors try reflect on the possibilities for both countries, and both systems, to learn from each other, to use the other as a source of inspiration and innovation. This article is an attempt to fill a gap in research in this area. The available scientific databases contain comparative analyses of various planning systems [Granath Hansson, 2017, Nadin & Stead, 2008], but there is no comparison between the Polish and Italian systems. Analyzing different systems in different countries, by pointing

out the good solutions, but also the weaknesses and problems, it is possible to arrive at the proposal of a model system, which would be so universal that it could be proposed for implementation, for example, in EU countries, with local minor modifications, resulting from local conditions.

The method of comparative analysis applied in the article is widely used in various scientific research on the comparison of different functioning systems and topics [Wiedmann & Barrett, 2010, Peng, 2020, Mahoney & Rueschemeyer, 2012, Smircich, 2017, Allan et al., 2002, Baycan-Levent & Nijjkamp, 2009, Nguyen et al., 2018, Kim et al., 2020, Ma et al., 2020, Xu et al., 2019]. Its application to the objective set out in the article is therefore most justified.

# MATERIALS AND METHODS

The main aim of the article, concerning the comparison of spatial planning systems in Poland and Italy, was realized according to the following research methodology. In the first step, the administrative division of the two countries was analyzed to show the basis on which the decision-making levels in the planning system are based. In both countries, the different administrative levels are briefly described, indicating the authorities managing them.

In the next stage, an analysis of the legal basis for the functioning of each system was carried out. The regulations in force in both countries concerning spatial planning were indicated. Their evolution was also briefly analyzed.

As a result of the analyses, the specificity of the functioning of planning systems in Poland and Italy was presented. The levels of planning and formal planning documents performed on each of them were described. The most important characteristics, structure and influence on spatial development were indicated.

Based on reliable, public statistical data, obtained in the case of Poland from the Central Statistical Office (CSO) in Poland (as of the end of 2018) [www.bdl.stat. gov.pl] and in the case of Italy from National Institute



**Fig. 1.** The location of Olsztyn and Bari *Source*: own preparation with the use of ArcGIS software.

of Urban Planning (INU) (as of the beginning of 2019) [www.inu.it] and the National Institute of Statistics (ISTAT) [www.dati.istat.it], the state of spatial planning in both countries is presented. Using ArcGIS software (ArcMap component of ArcGIS 10.6) and QGIS cartograms showing quantitative, spatial and area distribution of the planning documents were prepared.

In the next step, as a case study, analyses of the planning state of two cities were carried out: Olsztyn in Poland and Bari in Italy. The location of both countries and both analyzed cities is presented in Figure 1.

These cities were selected because they perform similar administrative functions in both countries studied. Olsztyn is the capital city of Warmińsko--Mazurskie Voivodeship, located in north-eastern Poland. Bari is the capital city of the Metropolitan City of Bari and of the Apulia region, on the Adriatic Sea, in southern Italy. Both analysed cities have a rich history and perform similar functions in their countries. Bari is slightly larger than Olsztyn in terms of area and population and its density, but they are similar in terms of land use structure and administrative functions, so the analysis of the planning state has allowed to obtain objective and comparable results.

The conducted analyses made it possible to realize the main objective of the article, i.e. to compare spatial planning systems in Poland and Italy. The conclusions from the research were presented in the discussion.

# RESULTS

# Spatial planning system in Poland

In the historical aspect of spatial planning in Poland after World War I the following periods can be distinguished [Niedziałkowski & Beunen, 2019]: – Advocating land use planning (1918–1939) – all land use decisions should be based on land use plans and opposed land speculation indicating that while profits were distributed among private investors, public authorities had to finance public infrastructure of new developments;

- Establishing land use planning (1945–1949) new authorities needed spatial planners to reconstruct the country after the war and to transform social structures. From the outset spatial planners and architects actively cooperated with the communist government. They produced long-term land use studies to a large extent disconnected from economic reality. Economic planners, dealing with day-to-day challenges of a major reconstruction, often treated these plans as harmless fantasies;
- Land use planning in the socialist context (1949– 1975) – strong centralization of planning and obligatory doctrine of Socialist Realism;
- Dealing with the crisis (1975–1989) the government located major investments ignoring land use plans and planning often boiled down to registering such investments;
- The new paradigm (1989–1994) the socio-political transformations of the late 1980s and early 1990s involved decentralization, recognition of political pluralism and private sector's role in the economy. These changes dramatically altered the context of land use planning, associated by many with lack of freedom, poor economic government and false promises of authorities, and undermined its sources of legitimacy;
- Deinstitutionalization of land use planning (1994–) new decentralized planning system, based on local planning.

Today, the basic act regulating the issue of spatial planning in Poland is the Act of 23th March 2003 on Spatial Planning and Management. According to it in spatial planning in Poland takes into account: spatial order requirements, architectural and landscape values, environmental protection requirements, cultural heritage protection requirements, health and safety of people and property, economic values of space, property rights, needs of state defense and security, needs of public interest, needs of technical infrastructure development, ensuring public participation in planning works, maintaining openness and transparency of planning procedures and the need to ensure adequate quantity and quality of water, for the purpose of supplying the population, taking

spatial order and sustainable development as a basis for all activities in space.

The levels of spatial planning in Poland are closely linked to the administrative division of the country. The administrative division of Poland since 1999 has been based on three levels of subdivision. The territory of Poland is divided into voivodeships (pol. *województwo*) these are further divided into districts (pol. *powiat*), and these in turn are divided into communes (pol. *gmina*). Major cities normally have the status of both commune and district. Poland currently has 16 voivodeships, 380 districts (including 66 cities with district status), and 2477 communes.

Forming and implementing spatial policy:

- in the State, expressed in National Spatial Management Concept (pol. *Koncepcja przestrzennego zagospodarowania kraju*), belongs to the tasks of the Council of Ministers;
- in the voivodship, including the adoption of the Voivodeship land-use plan (pol. *Plan zagospodarowania przestrzennego województwa*), is the responsibility of the voivodeship self-government;
- on the territory of the commune, including the preparation of a Study on the conditions and directions of commune spatial development (pol. *Studium uwarunkowań i kierunków zagospodarowania przestrzennego gminy*) and Local land-use plans (pol. *Miejscowy plan zagospodarowania przestrzennego*), is the commune's own task. The municipal authorities can also issue Decision about conditions of spatial development (pol. *Decyzja o warunkach zabudowy i zagospodarowania terenu*), when there is no local land-use plan for the area.

On the territory of the district, only analyses and studies in the field of spatial development, relating to the district area and the issues of its development, are conducted by the district government.

All the levels described above are interconnected and form a spatial planning system in Poland. The minister in charge of construction, spatial planning and development and housing shall coordinate the compliance of voivodeship land-use plans with the National Spatial Management Concept (NSMC). The findings of the voivodeship's land-use plans shall be entered into the local land-use plans after prior agreement on the date of implementation of a public purpose investment of supra-local importance and the conditions for their entry into the local land-use plans. The commune head prepares a study containing a textual and graphical part, taking into account the principles set out in the National Spatial Management Concept and the voivodeship land-use plan. The arrangements of the study are binding on the commune authorities when drawing up local plans Figure 2 presents a scheme of the spatial planning system in Poland.

The National Spatial Management Concept defines the conditions, objectives and directions of sustainable development of the country and activities necessary to achieve it, in particular: basic elements of the national settlement network, requirements in the field of environmental protection and monuments, including areas under protection, distribution of social infrastructure of international and national importance, distribution of technical and transport infrastructure objects, strategic water resources and water management objects of international and national importance, functional areas. The National Spatial Management Concept takes into account the objectives and directions included in the long-term national development strategy and covers the period consistent with its duration. The National Spatial Management Concept 2030, adopted by the Council of Ministers in 2011 [Council of Ministers, 2011], is currently not in force. On 13 November 2020, the NSMC has been cancelled. Today there is no new document at central level. The NSMC is no longer used, its place is to be taken by the National Development Concept (NDC), which is to perform similar functions.

The voivodeship land-use plan defines in particular: basic elements of the voivodeship's settlement network and their communication and infrastructure links, including the directions of cross-border links, the system of protected areas, the distribution of public purpose investments with a supra-local designation, the boundaries and rules for the development



Fig. 2. The spatial planning system in Poland

Source: own elaboration based on Act of 27th of March, 2003.

\*On 13 November 2020, the NSMC has been cancelled. Its place is to be taken by the National Development Concept, which is to perform similar functions.

of functional areas of supra-regional importance, areas of particular flood risk, the boundaries of closed areas and their protection zones, areas of documented mineral deposits and documented complexes of underground carbon dioxide storage. Currently, all 16 voivodeships in Poland have passed the voivodeship land-use plans.

Spatial planning at the level of a commune has a double role. On the one hand, it is supposed to formulate the commune's spatial policy, that is objectives and directions concerning spatial development. On the other hand, the role of local spatial planning is to establish forms of land use and principles of land development and management [Gawroński et al., 2010]. The process of local spatial planning, which plays a major role in the shaping of space, consists of three basic elements: Study on the conditions and directions of commune spatial development, which is the commune's spatial policy; Local land-use plans in which the land use is determined, the location of the public purpose investment and the determination of development methods and conditions of land development; Decision about conditions of spatial development, when there is no local land-use plan for the area.

The study is obligatory for the area within the administrative boundaries of the commune. It is not a local law. The study includes a textual and graphical part. The study is prepared by the Commune Head, adopted by the Commune Council. The costs of preparing the study are mostly borne by the municipality budget. The costs of preparing or modifying the study resulting from the distribution of a public purpose investment in a supra-local or metropolitan designation are charged to the state budget, voivodeship budget, metropolitan association budget or district budget respectively.

In order to determine the purpose of land use, including public purpose investments, and to determine the methods of their development and building, the municipal council shall adopt a resolution to proceed with the preparation of a local land-use plan. The Local land-use plan is mandatory if required by separate regulations. It is an act of local law. The local land-use plan includes a textual and graphical part. The text part is a resolution of the commune council, the graphic part is a drawing of the plan being an annex to the resolution. The local plan shall be drawn up at a scale of 1:1000, using official copies of basic maps or, in their absence, cadastral maps,

collected in the state surveying and cartographic resource. In particularly justified cases, it is permitted to use maps at a scale of 1:500 or 1:2000, and in the case of local plans which are drawn up solely for the purpose of assigning land for afforestation or prohibiting development, it is permitted to use maps at a scale of 1:5000.

Both documents are prepared with public participation. Every citizen has the right to contribute to the project of both the study and the plan being prepared. Public participation is a very important element of spatial planning in Poland [Kryk, 2019].

As indicated earlier the Local land-use plan is mandatory if required by separate regulations. This results in great diversity in the preparation of plans in Poland. The spatial and quantitative diversity of plans in the arrangement of voivodeships is shown in cartodiagram in Figure 3.

As can be seen in the figure above, the spatial distribution and quantitative diversity of local

land-use plans is very large in the communes in different voivodeships. In terms of quantity, the average number of plans in the voivodship for Poland is about 3351. Meanwhile, e.g. in the communes of Wielkopolskie Voivodeship there are 8430 plans, and on the other hand, in the communes of Świętokrzyskie Voivodeship - 781. This gives a standard deviation of about 2087. With the given average it is a large value, indicating a strong diversity of analyzed data. A similar diversity of results occurs when we analyze the areas of communes in voivodeships covered by the existing plans. Here, with the average for Poland - 602133 ha (which is about 32% of the total area), the standard deviation is about 408293 ha. The largest area is covered by plans in the Lublin Voivodeship – 1420289 ha, the smallest, in the Kujawsko-Pomorskie Voivodeship - only 125072 ha. In percentage terms, plans for Poland cover 32% of the country's area, from about 7% in Kujawsko-Pomorskie to about 68% in Małopolskie Voivodeship. The standard deviation



**Fig. 3.** Local land-use plans in voivodeships in Poland *Source*: own elaboration with the use of ArcMap component of ArcGIS 10.6 based on data obtained from CSO.

in this case is about 21%. The number of draft plans is similarly diverse in Poland. On average, there are 570 draft plans in the voivodeship. This gives a standard deviation of about 361. Most plans are prepared in Mazowieckie Voivodeship (1438) and Wielkopolskie Voivodeship (1286), the least – in Świętokrzyskie Voivodeship (166) and Lubuskie Voivodeship (211). These results are partly correlated with the number of adopted plans, although some deviations can be identified here, e.g. Podkarpackie Voivodeship with relatively large number of plans and low number of draft plans.

Local land-use plans have a very large impact on changes in land use. Table 1 below contains data on the type of land use in individual voivodeships and in the whole country, for three functions: residential, industrial and transport areas, for the years 2009 and 2019. The surface data were compared with the area covered by the local plans in force in individual voivodeships.

Changes in the area of land covered by particular types of development, between 2009 and 2019, are closely related to changes in the area covered by local land-use plans. The correlation with the area covered by the plans in a given voivodeship is very high for the changes in all three analyzed land development types, for the changes between years 2009 and 2019. The correlation coefficient with the area covered by the plans in a given voivodeship is very high for the changes in all three analyzed land development types and is in each case over 0.98. This is a direct confirmation of the effectiveness of the spatial planning system in Poland. For areas where more local land-use plans are adopted, the increase in the area of intensively managed areas is clearly visible.

Table 1. Changes in land use compared to the area covered by local land-use plans in Poland and individual voivodeships

	resid	dential ar	eas	indu	ıstrial ar	eas	trar	nsport are	eas	area cove	red by exist	ing plans
Poland/Voivodeship	2009	2019	change	2009	2019	change	2009	2019	change	2009	2019	change
							[ha]					
POLAND	268 510	358 693	90 183	110 041	124 861	14 820	773 204	815 715	42 511	8 003 374	9 771 146	1 767 772
DOLNOŚLĄSKIE	19 525	23 708	4 183	13 734	14 752	1 018	61 225	64 496	3 271	1 031 008	1 293 283	262 275
KUJAWSKO- -POMORSKIE	15 329	21 529	6 200	5 783	6 950	1 167	41 220	44 050	2 830	61 265	130 766	69 501
LUBELSKIE	8 161	11 589	3 428	3 752	4 268	516	59 236	61 453	2 217	1 406 368	1 423 983	17 615
LUBUSKIE	7 992	10 188	2 196	2 947	3 397	450	32 234	34 357	2 1 2 3	49 177	132 889	83 712
ŁÓDZKIE	17 927	23 545	5 618	5 786	7 458	1 672	44 824	49 911	5 087	509 519	601 588	92 069
MAŁOPOLSKIE	15 511	26 954	11 443	6 954	8 2 4 2	1 288	40 277	42 700	2 423	911 250	1 032 185	120 935
MAZOWIECKIE	40 506	55 470	14 964	10 752	12 589	1 837	89 134	94 088	4 954	1 013 087	1 186 913	173 826
OPOLSKIE	9 059	10 840	1 781	4 814	4 920	106	26 667	27 019	352	323 276	389 943	66 667
PODKARPACKIE	10 269	17 229	6 960	4 675	5 591	916	42 626	46 910	4 284	131 774	162 661	30 887
PODLASKIE	7 277	8 721	1 4 4 4	2 357	2 993	636	49 113	51 277	2 164	306 088	329 218	23 130
POMORSKIE	16 931	22 254	5 323	5 126	6 048	922	43 265	44 950	1 685	238 584	384 918	146 334
ŚLĄSKIE	42 955	52 272	9 317	20 917	22 158	1 241	39 568	43 037	3 469	731 973	881 743	149 770
ŚWIĘTOKRZYSKIE	7 399	9 497	2 098	3 553	4 017	464	26 471	27 839	1 368	233 727	364 683	130 956
WARMIŃSKO- -MAZURSKIE	11 763	14 803	3 040	2 937	3 663	726	52 208	54 552	2 344	274 790	353 543	78 753
WIELKOPOLSKIE	27 209	36 618	9 409	8 503	10 614	2 111	76 361	78 881	2 520	465 310	627 918	162 608
ZACHODNIO- POMORSKIE	10 697	13 476	2 779	7 450	7 201	-249	48 775	50 195	1 420	316 178	474 912	158 734

Source: own elaboration based on CSO data.

In the absence of a local spatial development plan, the determination of land development methods and conditions of land development is made by means of the Decision about conditions of spatial development, whereby: the location of a public purpose investment is determined by means of a Decision on the location of a public purpose investment (pol. Decyzja o ustaleniu lokalizacji inwestycji celu publicznego); the land development method and development conditions for other investments are determined by means of a Decision on development conditions (pol. Decyzja o warunkach zabudowy). The Decision about conditions of spatial development was supposed to be a supplement to the plans. however, due to the much lower cost of issuing it and the faster procedure of preparation, it became a convenient and often abused planning instrument for many communes in Poland. The cartodiagram in Figure 4 presents the quantitative and spatial distribution of decisions issued by voivodeships in Poland.

The analysis of spatial and quantitative distribution of issued Decisions about conditions of spatial development in Poland gives similarly differentiated results as in the case of local land-use plans. The average number of issued decisions in the voivodeship is 9158 for Poland. The standard deviation here is as much as about 5511, with the lowest number of decisions issued – 2084 in the Opole Province and the highest number – 23 436 in the Wielkopolska Province. For both types of Decisions about conditions of spatial development, the difference in results is similar.

The obtained results indicate a large variety of spatial planning system implementation in different parts of Poland. This is undoubtedly influenced by the attractiveness of the location of a given municipality, but certainly also by the efficiency of local authorities. The influence of the location has also been partially eliminated in the above data by performing an analysis for the data at the level of voivodeship and not



**Fig. 4**. The number of Decisions about conditions of spatial development (both types) in Poland *Source*: own elaboration with the use of ArcMap component of ArcGIS 10.6 based on data obtained from CSO.

of individual municipalities. This activity resulted in a certain averaging of results anyway, which are nevertheless very diverse.

Planning documents created at the municipality level have a great influence on the value of the area. With a classical change of land use (from agricultural to investment function), the value of the land may increase even by several hundred percent. Average prices of agricultural land in Poland are at the level of 4-10 PLN/m<sup>2</sup>, while e.g. prices of building plots reach 800–900 PLN/m<sup>2</sup> in cities, and of industrial and warehousing investment plots about 200 PLN/m<sup>2</sup>. If, as a result of the plan, the value of the property has increased and its owner wants to sell it within 5 years from the approval of the plan, the municipality may demand the so-called planning fee of up to 30% of the property value increase. The amount of the fee is specified in the local land-use plan. If, as a result of the plan, the value of the property has decreased (e.g. if the property is located in the neighbourhood of the planned areas of annoying use, e.g. a waste dump) and its owner wants to sell the property within 5 years from the approval of the plan, the municipality may demand compensation equal to the decrease of the property value.

All planning levels in Poland and the documents created on them are interconnected. Municipalities adopting local land-use plans have to take into account the provisions of voivodeship's plans. These, in turn, are the records of the solutions adopted at the national level in The National Spatial Management Concept for individual voivodeships. This creates a hierarchical system. The municipalities decide on the designation of the land, but they must take into account the solutions developed at the regional and national level.

# Spatial planning system in Italy

Urban development in Italy has evident roots already in Roman times given the need to regulate rural areas and give order to the towns that were born during the period of expansion of the Empire [Patterson, 2006]. Even during the medieval period it appears to be characterized by specific urban structures of the territory [Piccinato, 1993]. Renaissance town planning is the distinctive feature of many Italian cities such as Florence, Venice and many others [Calabi, 2001]. The unification of Italy took place on March 17, 1861; the following are the significant laws and Decrees of the President of the Republic (D.P.R.) issued from this moment onwards.

- Law of 25 June 1865, n. 2359 according to which municipalities with more than 10000 inhabitants had the right to draw up a master plan for the already urbanized areas. The law recognized the public administration the right to expropriate the land of private individuals on which the works under the responsibility of public bodies must be carried out: this is the expropriation for public utility;
- Law of 15 January 1885, n. 2892 (called "Naples Law") issued to deal with the health emergency of cholera. It provided for the possibility of rehabilitation of the town following the declaration of public utility (unhealthy houses, wells, waters, sewers). The expropriation system;
- Laws of 1939: various laws concerned the protection of environmental, cultural, historical, artistic and archaeological heritage;
- Law of 17 August 1942, n. 1150 established the formation of the General Regulatory Plans (PRG) which had to affect the entire municipal area;
- D.P.R. January 15, 1972, n. 8: transfer to the regions with ordinary statute of the state administrative functions in the field of urban planning and viability, aqueducts and public works of regional interest and the related personnel and offices;
- Law of 28 January 1977, n. 10 ("Bucalossi law"): provided for the separation of the property right from the right to build realizable through the onerous building permit, as a result of which the public authority had the power to grant the owner the use of the land by means of concession. The adaptation to these norms was slow and uneven. These were years in which unauthorized building was rampant and the authorities, unable to repress the offenses, deemed it appropriate to resort to amnesties to regularize the differences;

- Law of 8 August 1985, n. 431 ("Galasso law"): containing urgent provisions for the protection of areas of particular environmental interest (obligation for the Regions to adopt territorial landscape plans);
- D.P.R. 6 June 2001, n. 380: has grouped the building regulations in a single text;
- The law of 7 April 2014, n. 56 ("Delrio law"): establishes metropolitan cities, redefines the system of provinces, and defines the criteria for merging small municipalities.

The State is only vested with the responsibilities relating to the direction and coordination of regional administrative activities, highways, national railways, ports, hydraulic works and inland navigation of national importance, state buildings, state-owned building and university buildings.

The hierarchical levels of urban planning tools have as a reference the constitutional organization of the national territory. Article 114 of the Italian Constitution assumes that "The Republic is made up of Municipalities, Provinces, Metropolitan Cities, Regions and the State. Municipalities, Provinces, Metropolitan Cities and Regions are autonomous bodies with their own statutes, powers and functions according to the principles established by the Constitution" [Costituzione della Repubblica Italiana, 2012]. According to the ISTAT data, currently the Italian territory is now divided as follows:

- 20 Regions;
- 107 supra-municipal units of which 76 provinces in the regions with ordinary statute, 10 metropolitan cities in the regions with ordinary statute, 6 free consortia and 3 metropolitan cities in Sicily, 4 provinces and 1 metropolitan city in Sardinia, 4 provinces at a statistical level in Friuli-Venezia Giulia, 1 Autonomous Region in Valle d'Aosta, 2 Autonomous Provinces in Bolzano and Trento;
  - 7903 municipalities.

Article 118 of the Constitution also adds that: "Administrative functions are attributed to Municipalities unless, to ensure their unitary exercise, they are conferred on Provinces, Metropolitan Cities, Regions and the State, on the basis of the principles of subsidiarity, differentiation and adequacy". The principle of subsidiarity means a relationship modality between entities according to which if a specific entity, while occupying a lower position in the hierarchical scale of the entities themselves, intends to carry out its own intervention having the capacity and means to carry it out satisfactorily, the entity and/or entities that occupy higher positions in the same hierarchical scale must not only allow the entity that initiated the intervention to complete it, but are also required to cooperate in order to allow its successful conclusion [Amerio et al., 2015]. In general, the law of 17 August 1642, n. 1150 is the basis of inspiration for Italian urban planning as it gives rise to the urban planning tools that can be distinguished by hierarchical level, type and functionality. The rigidly hierarchical "cascade" model proposed by law 1150/42 has now been superseded by a planning method aimed at cooperation between different administrators, preferring the integration of objectives, shortcomings and interventions in order to overcome the classical hierarchy. Therefore, on the one hand, it is possible to identify three levels of planning related to the territorial scale, on the other, a "dimension" of the planning tools can be defined, based on the contents of the individual plans.

The Plans can therefore be distinguished:

- General Plans: with a guiding function, strictly connected to economic forecasts and plans and provide programmatic ideas for the development of a territory;
- Sector Plans: govern the use of the territory with reference to specific sectors;
- Mixed Plans: with characteristics common to the two previous categories;
- Figure 5 schematizes the above and gives examples of the various types of plan.

The urban planning tools provided for by Law 1150/42 were based on the culture of urban expansion and land use without considering the effects on economic development, the quality of urban life and the unconditional consumption of the land. In recent decades, the need has also matured to take into account the ecological and environmental aspects and the enhancement and recovery of existing assets



**Fig. 5.** The Italian planning system *Source*: own elaboration.

through the application of the Strategic Environmental Assessment (SEA) to planning.

All municipalities can form a general regulatory plan, but its formation is mandatory for those municipalities indicated in special lists to be approved by the region, just as its formation is mandatory regardless of their inclusion in the lists for municipalities declare health care, residence and tourism. In principle, it indicates the subdivision into zones (the so-called zoning) of the municipal territory in relation to the functions (services, residence, production facilities, etc.) to which they are mainly intended with the determination of the constraints and characteristics to be observed in each zone; the location of specific areas intended for public works and installations of public and general interest; the historical, environmental, landscape areas with an indication of the related constraints and the implementation rules of the plan; the regulation of the intended use of the properties. Various effects derive from the general regulatory plan which can be identified in the immediate discipline of urban planning requirements for public and private works to be carried out and in the prerequisite of the landscape plans (see urban plan, general territorial landscape master plan) of execution. Among the immediate effects produced by the general land use plan are identified the inability to build for five years from the completion of the restriction of land

subject to restrictions even before their expropriation (see expropriation for public utility), the temporariness of the restrictions themselves in the event that it is not date them to be executed within the legal term.

Formation of the general regulatory plan. The first phase is the deliberation, compulsory or optional, depending on whether the municipality is included in the lists approved by regional decree by council. The obliged municipalities must appoint planners for the general regulatory plan who will work together with the offices and bodies of the municipality itself. Once formed, the general regulatory plan is adopted by resolution of the municipal council. The primary effect of the resolution to adopt the general regulatory plan is represented by the so-called safeguard period during which the mayor (see) can suspend any determination on the building permit applications received when these are in contrast with the general regulatory plan already adopted. This period cannot last for more than five years from the date of adoption of the general land use plan if the municipality has submitted it within one year of the expiry of the deadline for publication of the plan adopted for approval and for no more than three years from the date of adoption where the municipality has not promptly submitted the general regulatory plan for approval. The adoption of the master plan is followed by the filing of the master plan project in the municipal secretariat for a period of 30 consecutive days. Notice of the deposit must be made public so that anyone can view it. During this period, observations may be submitted by trade unions and other public bodies and institutions concerned and also by private individuals. The master plan is approved by the region. The approval process is divided into three phases: the preliminary phase, the introduction of any changes and the decision-making phase. The preliminary phase begins with the transmission of the plan, with the counter-arguments of the municipality to any comments submitted, to the region that examines it and issues its opinion. The modifying phase of the general land use plan is characterized by the possibility that the region changes the general land use plan, resulting in a conflict with

the municipality. The decision-making phase is that in which the general land use plan is approved with the changes accepted by the municipality and shared by the region and with the other changes that the latter has determined. The act of approval of the general land use plan is published in the Official Gazette and filed with the municipality. From the moment of filing, the general regulatory plan becomes fully effective.

Variations to the general regulatory plan: these are changes to the prescriptions, including regulations, of the master plan. The content of the amendments is very varied and may concern both the technical documents and the implementation rules of the general master plan. In the cases provided for by law, the procedure for approving the variants may differ according to the content and therefore involve approval by the region. The variants are generally distinguished, as the general regulatory plan is subject to periodic, specific reviews, when they concern parts of the municipal area and regulations relating to the implementation rules of the master plan and not to the urban planning of the territory [Santini, 2017].

Municipalities without general urban planning tools or without implementing urban planning tools comply with the provisions of art. 9 of the Consolidated Law on construction of Presidential Decree No. 380/01. This article allows regional legislations to set more restrictive limits; any building interventions admissible in limited cases must comply with the sector regulations, in particular the landscape one [Santini, 2017].

The owner of the land subject to expropriation is paid a variable economic compensation depending on the state of the soil. For uncultivated soils the market value of the soil is paid while for cultivated soils the criterion of market value is adopted based on the crop actually practiced; the farmer is also entitled to an additional indemnity defined as the average agricultural value.

For land that could be built before 2007 an indemnity was paid equal to about 50% of the market value. The European Court of Human Rights has repeatedly invited Italy to correct the criterion for estimating building areas since the compensation is far below

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the market value. With the Finance Law 244/2007 today establishes that the allowance for building areas is determined to the extent equal to the market value of the property and is reduced by 25% when the expropriation is aimed at implementing economic and social reform measures. In Italy the average value of agricultural land is about 21000 EUR/hectare with wide margins of variation depending on the region and the orography while the average values of building land in Italy vary from north to south between 600 and 480 EUR/m<sup>2</sup>. Through the data made available by ISTAT and the "Report to the INU Territory 2016" [INU, 2016] it was possible to conduct the analysis of the planning status of the Italian territory.

Table 2 shows the data relating to the number of approved municipal plans, the number of munici-

palities without a plan, the total area, the area covered by the plans and the area not covered by the plans, with respect to each Italian region and the entire nation.

The following figures allow a better interpretation of the data. Figure 6 shows the percentage of the area covered by the current municipal plans and that not covered by any plan with respect to each Italian region and to the entire nation.

Figure 7a shows the number of approved municipal plans for each Italian region in the form of a green histogram and the area covered by them in terms of blue gradation from lowest to highest. Figure 7b shows in each Italian region the number of municipalities without a PLAN in the form of a yellow histogram and the area they represent in terms of blue gradation from the lowest to the highest.

Table 2. Regional and national data with respect to the	ne state of planning
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		N. Municipalities	Area	Planned area	Planned area
Region	N. plans	without plans	(ha)	(ha)	(%)
Abruzzo	305	8	108300	1067700	98.58
Basilicata	131	16	1007300	890000	88.36
Calabria	409	2	1522200	1511400	99.29
Campania	550	39	1367100	1280600	93.67
Emilia-Romagna	340	5	2245200	2205500	98.23
Friuli-Venezia Giulia	216	0	786100	786100	100.00
Lazio	378	22	1723200	1657500	96.19
Liguria	235	1	541600	540200	99.74
Lombardia	1529	7	2386200	2367300	99.21
Marche	236	1	940200	936200	99.57
Molise	136	0	446000	446000	100.00
Piemonte	1206	0	2538400	2538400	100.00
Puglia	258	3	1954100	1929300	98.73
Sardegna	377	0	2409800	2409800	100.00
Sicilia	390	1	2583000	2579100	99.85
Toscana	279	0	2298700	2298700	100.00
Trentino-Alto Adige	326	0	1360300	1360300	100.00
Umbria	92	0	846400	846400	100.00
Valle d'Aosta	74	0	326100	326100	100.00
Veneto	579	3	1840600	1831200	99.49
ITALY	8046	108	30205600	29807800	98.68

Source: own elaboration obtained from the data contained in the 2016 INU Territory Report [INU, 2016].



**Fig. 6.** Percentages of planned and unplanned area for each Italian region and for the entire nation *Source*: own processing obtained from the data contained in the 2016 INU Territory Report [INU, 2016].



Fig. 7. a) Number of approved municipal plans and area covered in each Italian region, b) Number of municipalities without plan
 and surface area occupied in each Italian region
 Source: own processing obtained through the QGIS software from the data contained in the 2016 INU Territory Report [INU, 2016].

Figure 8 shows a pie diagram corresponding to each Italian region representing the relationship between the area covered by approved municipal plans and the area of the municipalities without a plan with a radius proportional to the regional area.



Fig. 8. Ratio between area covered by municipal plans and area without plans in each Italian region

*Source*: own elaboration obtained through the QGIS software from the data contained in the 2016 INU Territory Report [INU, 2016].

The analysis of the data makes it possible to learn that in Italy there is an average number of municipal plans per region of 402 with a maximum of 1529 in Lombardy, a minimum of 74 in the Aosta Valley and a standard deviation of about 351 indicating the fact that there is a significant difference in the allocation of municipal plans between the various Italian regions. The average regional area covered by the municipal plans is 1490390 ha with a maximum of 2 579100 ha in Sicily, a minimum of 326100 ha in Valle d'Aosta and a standard deviation of about 726875 ha indicative of a significant difference in the area covered by municipal plans between the various Italian regions. The average percentage of the regional area covered by the municipal plans is 98.55% with a maximum of 100% reached in Friuli-Venezia Giulia, Molise, Piedmont, Sardinia, Tuscany, Trentino-Alto Adige, Umbria and Valle d'Aosta, minimum 88.36% assumed by Basilicata and standard deviation of 2.8%. Before 2016, there were 8046 Italian municipalities of which 108 did not have an approved municipal plan. The problem of the absence of a municipal plan was most noticeable in the central-southern regions (39 municipalities in Campania, 22 municipalities in Lazio, 16 municipalities in Basilicata and 8 in Abruzzo). In 2020 the Italian municipalities became 7903 as a result of various mergers and it is therefore possible that the municipalities without a plan have further decreased.

# Spatial planning system in Olsztyn

Olsztyn is the capital of the Warmińko-Mazurskie Voivodeship and its largest city. It is located in north-eastern Poland, with a population of approx. 175000 people. The current city border has been in place since 1st January, 1988 and covers an area of 88.33 km<sup>2</sup>. Olsztyn is divided into 23 estates. They are the lowest, auxiliary, level of city government. Their scope of activity includes public matters of local range.

Since its foundation in 1362, the history of Olsztyn spans more than 650 years. Even as the biggest city and the capital of the voivodeship, Olsztyn is still a city which perfectly integrates with the natural environment. No matter in what part of Olsztyn you will find yourself, you will always feel the closeness of nature. Within the borders of Olsztyn lie 11 lakes and 4 smaller water reservoirs. They are mainly situated in the western part of the city. Between the eastern and the western part of the city, the City Forest expands along its northern border. It has approx. 1300 ha, which makes it one of the largest municipality forest complexes in Europe. The landscape of the city is formed by an immense network of lakes surrounded by a ring of forests. These forests, together with other greenery, cover as much as 27.5% of the whole area of the region's capital, while lakes (725 ha) stand for

another 8%. The rich history of the town combined with its natural values gives Olsztyn a touristic character. We will not find many large industrial ones here.

The most important data showing the state of spatial planning in Olsztyn, taking into account the variability in the years 2010–2018, are presented in Table 3.

The elements		Year					
of planning system in Olsztyn	Unit	2010	2012	2014	2016	2018	
The local land-use plans	units	48	58	65	67	76	
The area of the city covered by the plans	ha	3894	4420	4929	4761	4943	
Share of the area covered by the plans in force in the total city area	%	44.1	50.0	55.8	53.9	56.0	
Draft plans	units	28	24	24	32	32	
The area of the city covered by draft plans	ha	3053	1306	1435	1960	1819	
Decisions about conditions of spatial development	units	242	244	259	212	157	
Decision on the location of a public purpose investment	units	36	41	76	65	78	
Decisions concerning multi-family housing development	units	11	10	32	51	40	
Decisions concerning single-family housing development	units	20	53	60	44	47	
Decisions concerning service development	units	45	93	92	71	59	
Decisions concerning other developments	units	166	88	75	46	11	

Source: own elaboration based on data obtained from CSO.

As of the end of 2018, 76 local land-use plans were in force in Olsztyn. They covered 4943 ha, which is 56% of the city area. An additional 32 plans were in preparation. This is a better result than the average for Poland (plans cover about 32% of the country's area). However, the value for Poland refers both to non-urbanized areas – rural (where there are much fewer plans and often no need to develop them) and urbanized – urban (where there are more plans). In comparison with other cities in Poland, Olsztyn's score is at an average level. A big plus, however, is the ever-increasing number of plans being passed. As can be seen in Table 1, the years 2010–2018 saw an increase in the number of plans by about 58% and an increase in the area covered by plans by about 27%. The development of the city of Olsztyn has a great influence on the neighbouring municipalities, where large changes in land use can also be observed [Tataruch et al., 2019].

Such a trend is not visible when making Decisions about conditions of spatial development. Between 2010 and 2016, the number of decisions issued is relatively stable, and in 2018 it is even decreasing. This, however, taking into account the function of the decision in the spatial planning system in Poland (it is to be a supplement to the local land-use plans and is only issued for the area where there is no plan), is also a positive indicator. A worrying trend can be observed in many municipalities in Poland. The local authorities, instead of shaping the development of space using plans, prefer to issue decisions that are less complicated in procedure, less time consuming and cheaper to prepare. This is not fully consistent with the idea of the spatial planning system in Poland, although formally compliant with the law. The decisions concern single investments, most often located on single plots. Through plans, the municipality can comprehensively shape the space of larger areas [Gawroński et al., 2010, Krajewska et al., 2014, Niedziałkowski & Beunen, 2019, Oxley et al., 2009]. In view of the above, the results of Olsztyn in terms of decisions issued must be regarded as positive. The largest number of decisions concerns service investments, a clear increase in residential investments is also visible. As a plus, the increasing number of Decisions on the location of a public purpose investment issued should also be indicated. This type of decision concerns investments for the development of public space (such as roads, technical infrastructure, public facilities), improving its quality and used by citizens.

Taking into account the above elements, the planning state of Olsztyn can be assessed positively, indicating that the city authorities have developed the space in accordance with the principles of the spatial planning system in Poland.

# Spatial planning system in Bari

Bari overlooks the Adriatic Sea for a length of over 42 km, between the municipalities of Giovinazzo, to the north, and Mola di Bari, to the south. It extends in a latitudinal direction for about 18 km, starting from the port area to the extreme district of Loseto in the south-west. The municipal territory is at the center of a large flat and depressed area, the Bari basin. However, in its central portion, it goes for a few kilometers inland, up to the centers of Capurso, Triggiano, Bitritto, Modugno and Bitonto, meeting so the first slopes of the Murge. The conformation of the city is often described as an eagle with outstretched wings, whose head is the small peninsula on which the first urban center, "Bari Vecchia", was built; conformation that they wanted to give to the agglomeration and the municipal territory especially in the Fascist era. The city is characterized by a Mediterranean climate with mild winters and hot summers. The thermal excursions are contained by the marine mitigating action. However, the city in the winter months can be influenced by the cold currents of north-eastern Balkan and north-western origin coming from the high Abruzzo mountains, which sporadically cause precipitation even of a snowy nature. The rains, concentrated in the winter months, are characterized by an extremely variable regime; in the summer months there is alternation between waves of torrid heat coming from North Africa alternating with as many waves of humid heat coming from the eastern regions of the lower Mediterranean basin. In contrast to heat waves, there are days in which northern winds of the mistral blow, which can be associated with transient low pressure zones that can give rise to storms typical of the summer season, sudden drops in temperature and rough sea.

The Municipality of Bari has a PRG approved by decree of the President of the Regional Council n. 1475 of 08/07/76 (called "PRG Quaroni") available in digital format on the website of the Municipality of Bari [www.comune.bari.it]. Quaroni based his planning in 1976 starting from a population of 351200 inhabitants and foreseeing a city that could host 628577. The demographic decline of the last decades has produced a population that today in Bari has about 322316 making forecasts ever more distant plan from demographic realities. Added to this were the crisis in the construction market and the birth of new regional planning legislative instruments which resulted in numerous variants of the Quaroni plan and in one and a series of implementation measures in a limited number compared to forecasts. Therefore, the Quaroni plan has no longer been adequate to the needs of the Municipality of Bari for several years, which since 2013 has been working on the new General Urban Planning Plan (PUG) [www.comune.bari.it]. The Preliminary Planning Document (DPP) of the new PUG published by the Municipality of Bari in December 2010, in the General Report part 2, reports the budget of the current planning referred to the Quaroni plan [www.comune.bari.it]. According to this report, it is appropriate to carry out the quantitative estimate of the planning status of the city in December 2010 through the survey of the residential expansion areas and the areas for directional-tertiary activities of the Quaroni plan. For each of these areas, the expected planning volume was therefore quantified (obtained by multiplying the area of each area by its own territorial buildability index contained within the technical regulations for implementing the PRG), the volume achieved and the residual volume (reported in the General Report part 2). Table 4 summarizes the state of planning in volumetric terms from 1976 to 2010.

On April 1, 2009, the Agreement between the state, regions and local authorities was formalized on the act concerning measures for the revival of the economy through construction activity. The Puglia Region has implemented this agreement by approving the regional law of 30 July 2009, n. 14 (called "Piano Casa")

and unectiona	i-tertiary						
PRG		1976	2010				
area type	Area (ha)	Planning volume (m <sup>3</sup> )	Built volume (m <sup>3</sup> )	Residual volume (m <sup>3</sup> )	Built volume (%)	Residual volume (%)	
Expansion areas	1240.8	13169500	5673211	7496289	43.8	56.92	
Directional-tertiary	297	14850000	9993159	4856841	67.29	32.71	
Total	1537.8	28019500	15666370	12353130	55.91	44.09	

Table 4. State of planning in volumetric terms of the municipality of Bari from 1976 to 2010 with respect to the expansion areas and directional-tertiary

Source: www.comune.bari.it, date 10.12.2020.

concerning "Extraordinary and urgent measures to support the construction activity and to improve the quality of the residential building heritage" [Repubblica Italiana, 2009]. The legislation has followed several changes over the years and the municipality of Bari has adopted various administrative acts to regulate the methods of implementation of the L.R. 14/09 in its own area. The following summarizes the effects of the application of the regional law of 30 July 2009, n. 14 [Comune di Bari, 2009] within the municipality of Bari both in terms of buildings and urban planning, starting from the data contained within the *Report on the implementation to the year 2019. Update September 2019* published by

Table 5a. Volumes built in the municipality of Bari accordingto the regional law of 30 July 2009, n. 14

Year	Expansion volume (m <sup>3</sup> )	Volume of demolition and rebuilding (m <sup>3</sup> )	Total volume (m <sup>3</sup> )
2009	7.44	0	7.44
2010	188.5	963.26	1151.76
2011	18.62	13121.6	13140.22
2012	753.12	3914.7	4667.82
2013	360.45	9965.74	10326.19
2014	710.09	0	710.09
2015	758.67	7167.93	7926.6
2016	1022.15	142256.78	143278.93
2017	1647.39	145360.98	147008.37
2018	1755.22	83582.92	85338.14
2019	1228.28	56490.6	57718.88
Total volume (m <sup>3</sup> )	8449.53	462824.51	471274.44

Source: Comune di Bari, 2009.

the Town Planning and Private Building Department of the Municipality of Bari [Comune di Bari, 2019]. It is possible to distinguish within Table 5a effects of the extraordinary enlargement interventions pursuant to Article 3 of the regional law of July 30, 2009, n. 14 and effects Extraordinary of demolition and reconstruction works pursuant to Article 4 of the regional law of July 30, 2009, n. 14 in Table 5b.

Table 5b. Building applications under construction in the municipality of Bari according to regional law n. 14 of 30 July 2009

	, ,		
Year	Instances for expansion	Instances for demolition and reconstruction	Total instances
2009	1	0	1
2010	3	4	7
2011	5	12	17
2012	12	8	20
2013	13	4	17
2014	19	3	22
2015	12	8	20
2016	16	22	38
2017	33	58	91
2018	31	73	104
2019	32	26	58
Total instances	177	218	395

Source: Comune di Bari, 2009.

The data show that from 2009 to 2019 a significant part of the construction activity in the municipality of Bari – solely due to the regional law of July 30, 2009, n. 14 – was concentrated in demolition and reconstruction interventions (462824.51 m<sup>3</sup>) instead

of in expansion activities (8449.53 m<sup>3</sup>). At the end of 2019, the volumes defined in tables 6a and 6b are divided between the residential expansion areas and the areas for directional-tertiary activities of the Quaroni PRG, as reported in table 6.

**Table 6.** Distribution of building volumes for the period 2009–2019 between the residential expansion areas and theareas for directional-tertiary activities of the PRGof Bari according to regional law of July 30, 2009, n. 14

	2009-2019				
PRG area type	Expansion volume (m <sup>3</sup> )	Volume of demolition and rebuilding (m <sup>3</sup> )			
Expansion area	2345.3	33433.98			
Directional-tertiary	463.76	0			
Total volume	2809.06	33433.98			

Source: Comune di Bari, 2019.

The comparison between what was achieved and what was planned in terms of areas was deduced from the analysis of the areas of the Quaroni planning of 1976, from the areas deductible from the General Report part 2 of the 2010 DPP and from the areas directly observable through the PRG computerized report of the Puglia SIT at the end of 2019 Figure 9.

# The comparison of analyzed planning systems

The data collected and presented in the above chapters show that there are spatial planning systems in both analyzed countries. Both are based on the legal regulations in force in the countries. In both cases their main goal is rational space management, but this goal is implemented in different ways. The systems operate on different historical and legal bases, different administrative divisions. The system in Italy has a rich tradition, which began in the 1940s and has already evolved to the present day to the final version. The system in Poland is still evolving, due to the fact that it started to be created only after the political and economic changes in the country in the 1990s.

Table 7 below presents an attempt to compare both systems, based on the data collected and presented above, including a compilation of the results presented in previous chapters.



**Fig. 9.** The PRG of Bari within the webgis of the SIT Puglia *Source*: sit.egov.ba.it, date 10.12.2020.

#### Table 7. Comparison of spatial planning systems in Poland and Italy

A	em Spatial planning system Poland Italy the 90's of the 20th century the 40's of the 20th century on uistra- ves (municipalities, voivodeships, state) ves (municipalities, metropolitan cities, provin	g system
Analyzed item	Poland	Italy
The beginnings of system creation	the 90's of the 20th century	the 40's of the 20th century
Based on administra- tive division	yes (municipalities, voivodeships, state)	yes (municipalities, metropolitan cities, provinces, regions)
Planning levels and their legal relationships	Central (country), regional (voivodeship), local (munici- pality) Voivodeships must comply with national regulations, municipalities at local level must take into account regional solutions	Regional, local On state level – coordination of regional activities On local level, all municipalities can form a general regulatory plan, but its formation is mandatory for those municipalities indicated in special lists to be approved by the region
Planning documents prepared at specific planning levels	CENTRAL (country) – National Spatial Management Concept REGIONAL (voivodeship) –Voivodship land-use plan LOCAL (municipality) – Study of the conditions and directions of the commune spatial development, Local land- use plan, Decision about conditions of spatial development	CENTRAL (country) – Address and Coordination of Regional Administrative Activities REGIONAL (region) – Regional Territorial Urban Plan (PTR) or Regional Landscape Plan (PPR) SUB-REGIONAL (province AND metropolitan city) – Territorial Coordination Plan (PTC) and General Metropolitan Territorial Plan (PTGM) LOCAL (municipality) – General Regulatory Plan (PRG) and its implementation plans
Planning level at which the area's function is determined	local	local
Covering the country with plans	about 32% Different level in municipalities in different voivodeships, from about 7% in Kujawsko-Pomorskie to about 68% in Małopolskie Voivodeship. The largest area is covered by plans in the Lublin Voivodeship – 1 420 289 ha, the smallest, in the Kujawsko-Pomorskie Voivodeship – 125 072 ha	about 99% Almost the whole country is covered by plans
The obligation to prepare plans	The plans are obligatory only in specific situations, if a special law regulation so provides	The regions are required to arrange the PTR (Presi- dential Decree n. 616 of 1977) Provinces and Metropolitan Cities are required to have PTC and PTGM (Law n. 56/2014) The PRG is mandatory for the Municipalities included in special lists prepared by decrees of the Minister for Public Works and in those indicated by the Regions to which they belong (Law n. 1150/1942)
Problem with the func- tioning of the system	Low coverage of the country by plans, complicated and lengthy procedure of passing new plans, abuse by municipalities of Decisions about conditions of spatial development, which should only be a supplement to plans, and due to simpler and faster procedures of elaboration and issuance, they start to replace plans	The principle of co-planning between the different administrative levels generates the disadvantage of lengthy bureaucratic procedures that often make urban planning tools obsolete when they are created
Age of urban planning tools	Last twenty/thirty years	Decades
Flexibility of urban planning tools	Plans can be changed when needed	New needs can be satisfied through variations to the plans
Correspondence of reality to the plans	The way of land development is usually consistent with the plans	Frequent deviations between reality and original plans

Source: own elaboration.

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As can be seen in Table 7, both systems have similarities, but in terms of effectiveness they differ. The coverage rate of the space plans in Italy seems to be even impossible to achieve in Poland. In Poland, plans are developed in the current state of law mainly for urbanized trains. In agricultural and forest areas plans are not adopted.

The weaknesses of the spatial planning system in Poland are too low land coverage with plans. This is related to many factors. One of them is for sure the relatively short period of functioning of the system in Poland on the current principles and the past, resulting from long years of functioning of the country in the post-communist system. Procedural considerations are also a big problem. Adopting a new plan (similarly to a change in the functioning one) is a long and complicated administrative procedure. It requires agreements and opinions with several bodies and institutions of different levels and types (responsible for e.g. environmental protection, monument protection, terrain armament, etc.). Adoption of a new plan usually takes a period of time in Poland, e.g. 1 year. In today's market reality it is a very long period. The municipalities also do not pass the plans, fearing claims from property owners, whose value may be reduced. All this results in the fact that more and more often municipalities, instead of adopting local plans, issue decisions on the development conditions in large numbers. It is not a good solution for space, because the decisions refer to individual plots of land or investments, and only through the plans the space is shaped in a comprehensive way, taking into account such elements as: public space, land utilities, land transport service, etc. The limitation of too much freedom to issue decisions on building conditions has been announced in the legislation for several years now, however, due to the not entirely stable today's political situation of the country, these changes still remain only in the announcements. An example of the imperfection of the Polish legislation in this area is also the current situation with regard to national planning. At the end of 2020, the current NSNC was repealed and no new document was produced in return. The announced NDC does not fully know

how it will look like and when it will be adopted. Such a situation may cause big problems in locating investments of supra-regional range, requiring coordination from the national level. In Poland, there is no document that would cover the whole area of the municipality, even in a general way, indicating areas for investments. The existing study of conditions and directions of spatial development of the municipality has too weak legal force and is only a provision of the spatial policy and not an executive document, which determines the designation of the land. Among the strengths of the planning system in Poland, it can be pointed out above all that the adopted local plans are to a large extent observed. The existing control system guarantees that forms of development that do not comply with the plans are sporadic. In the vast majority of cases the development method corresponds to the function established in the local plan or the decision on development conditions. The growing role of social participation in spatial planning can also be pointed out as a strong point. There is a growing social awareness of citizens, who either personally or through their representatives in various social organizations have a real impact on the designated area and the solutions adopted in new plans.

Italy does not have a real modern national urban planning policy: the basic urban planning law (1150 of 1942) is mainly administrative in nature and describes the consistency and elements of the planning activity that fact are then exercised by regions, provinces and municipalities; on the one hand this allows us to respond to specific local needs but on the other hand it determines a disharmony of procedures and reality.

The expropriation procedure for public utility undoubtedly represents a strong point of the Italian urban planning process, despite the process of complete legislative formulation and the period of "acceptance" by citizens have often extended the time of the activity until the 1990s planning frequently leading municipalities to resort to application solutions of agreement between public and private entities that cannot be configured as real urban plans (program agreements) in order to anthropize the territory.

A weakness for the Italian planning activity is represented by the imperfect correspondence between the forecasts of the plan and what was then achieved. In fact (as can be seen from the case of the city of Bari in which the Housing Plan concentrated the construction activity in the reconstruction interventions) in various circumstances urban planning in Italy had to give way to the need to meet emergency needs (reconstructions of the postwar period, natural disasters such as landslides, earthquakes and floods), and new needs (social economic housing plans). The crisis of the industrial model of the 70s and the demographic contraction with the consequent attention to building waste (recovery plans), historic centers and environmental issues have assumed a significant weight within the planning - reality divergence.

Sensitivity to the environmental theme in the 1980s became a strength for Italy and led to the development of urban planning skills specialized in the creation of Territorial Landscape Plans, Basin Plans for rivers, parks and protected areas that have become the basis of new Italian economy focused on tourism [Villani, 1969, Derycke & Caloia, 1975, Fiorelli, 1975, Sernini, 1974, Karrer & Lacava, 1974, Allione, 1976, Amante & Gorelli, 1991].

In many areas of the Italian territory it happens that several floors of different types overlap, often imposing incompatible urban restrictions that confuse or block urban planning activity.

From an economic point of view, the Italian urban planning tools do not consider the economic resources necessary for their implementation. Within a strategic planning, the plan instead raises the question of resources, their finding, the prioritization of actions over resources.

# CONCLUSIONS

Spatial planning systems in different European countries are different. This results from different traditions of spatial management, historical conditions, different political systems shaped over the years (especially in the countries of Eastern Europe, which for many years after the Second World War were strongly influenced by the communist system) and finally different rules of functioning of administrative divisions of countries. The planning system is different in Germany [Schmidt, 2009], Great Britain [Cullingworth & Nadin, 2006], Sweden [Granath Hansson, 2017], France [Thériault et al., 2020], the Netherlands [Buitelaar & Sorel, 2010], Latvia [Volosina et al., 2018], Bulgaria [Moteva & Marinova, 2020) and finally different in Italy and Poland analyzed in this article.

The analyzed systems differ from each other, but it is not surprising. Rational management of limited space is certainly the guiding principle of all systems, while each country has developed its own instruments, tools and rules for shaping space. Different countries have different administrative divisions, to which the spatial planning system created in them must also be adapted.

The research conducted within the article allows to formulate the following conclusions:

1. The analyzed systems of spatial planning in Poland and Italy have different historical conditions. Today's planning system in Italy could have started to take shape much earlier, already in the 40's of the 20th century. Today's system of planning in Poland has its roots only in the 90's of the 20th century after the political and economic changes that took place in Poland then. This has an impact on the functioning solutions, which in Italy are already developed to a much greater extent than in Poland, where they are still being evaluated today.

2. The system of spatial planning in Poland is clearly based on a hierarchical division related to the administrative division of the country. The national, regional and local levels are clearly visible here, with each of them developing different planning documents with a different scope of impact. On the national level, The National Spatial Management Concept is created, on the regional level – The Voivodeships land-use plans and on the local level – Study on the conditions and directions of municipality spatial development and Local land-use plans.

3. Italy is a unitary country, but its land planning system follows a model generally observed in federal countries, with regional laws and regulations

as the main source of legal provisions outlining the planning process. However, despite the high degree of regional autonomy, actual planning systems are similar across the country. Italian spatial planning is based on a tiered system, which consists of national Acts, regional and provincial spatial coordination plans, and general policy and land use plans at the level of municipalities.

4. The local level is the most important in the Polish spatial planning system. This is where Local land-use plans are developed, which are local laws. However, when planning their space, the municipalities must take into account the conditions resulting from planning documents created at regional and national levels. This applies primarily to investments of a supralocal nature. A certain problem visible in recent years is the abuse of Decisions about conditions of spatial development by municipalities. This instrument was supposed to complement the local land-use plans and in the majority of municipalities they are even beginning to replace them, which is not consistent with the idea of the system, although on the other hand it is legally permissible. The results presented in Figure 4 and their analyzes confirm the problem that is noticed in Poland.

5. The Italian planning system possesses both a hierarchical aspect from the regional to the municipal level and a complementary aspect since the higher site levels are involved in the design process of the lower-level urban planning tools.

6. Analyzing the synthetic indicators, one can conclude that the system of spatial planning in Italy is at a higher level than in Poland. In Italy 98.68% of the country is covered by plans. In Poland this indicator is three times lower and it amounts to 32%. On the one hand, this is due to the much earlier introduction of the planning system in Italy, which is still being evaluated in Poland. On the other hand, it is related to the specificity of the systems being compared. In Poland plans are developed mainly for urbanized space (in cities and rural areas), they are rarely found in non-urbanized areas.

7. Following the Italian experience, in order to increase the effectiveness of the planning system

in Poland, it is possible to postulate the introduction of an additional planning document in the form of a general plan, developed for the whole municipality, which would indicate the general possibilities of land development. This plan could be further elaborated with the existing local land-use plans. It would significantly improve the possibilities of land development in the municipalities.

8. Introduction in Poland, following the Italian system, of a general plan in the municipality would limit excessive freedom of interpretation when issuing Decisions about conditions of spatial development. As it stands, these decisions are definitely abused in Poland. In the Italian system, due to the almost complete coverage of the area with plans, such a document is not needed at all.

9. Italian urban planning tools are often obsolete and plan elements are no longer suited to the needs of the territory. The complexity of the design phases of the new plans and the long lead times of the Italian bureaucracy often lead the administrations to make variants to the old plans. The variants solve single problems but make reality increasingly disharmonious and far from the previsions of the plans.

10. Both cities, Olsztyn in Poland and Bari in Italy, both of which are analyzed in the article, have a similar function in their countries. Both have similar character and rich historical conditions. The conducted analyses allow concluding that the spatial planning in both cities is carried out at the right level. A certain problem in the case of Olsztyn is suburbanization. In recent years, it can be seen that a large part of the new buildings appear outside the administrative borders of the city in the neighbouring municipalities. This is a problem that local authorities have to deal with. Comparing synthetic indicators, Bari, like Italy as a whole, performs much better in this aspect than Olsztyn. 100% of the Bari area is covered by plans, for Olsztyn this indicator is about 56%. For Bari – beyond the covered area and the built volumes - given the age of the Quaroni plan, the demographic forecasts not verified by reality and the many variations made, there is a significant difference between the originally planned urban elements and those actually built [Granath Hansson, 2017].

The analyses of available scientific databases have shown a number of articles analyzing planning systems in different European countries. There are also individual publications in which the authors attempted to compare different systems in different countries. However, no publication was found in which the Authors attempted to compare and evaluate spatial planning systems in Poland and Italy. This publication is a proposal to fill a gap in this respect. It may also be useful for other researchers who would like to use the presented data and conclusions to compare the spatial planning system in Italy or Poland with systems operating in other countries.

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# MEASUREMENT OF SPATIAL ORDER AS AN INDICATOR OF SUSTAINABLE DEVELOPMENT OF FUNCTIONAL URBAN AREAS IN REGIONAL CAPITALS

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# ABSTRACT

The preservation of spatial order is one of the key objectives of spatial planning. Due to the dynamic changes associated with rapid urbanization, special attention should be paid to cities and the surrounding areas. The aim of this study was to measure spatial order in social, economic and environmental dimensions in the Functional Urban Area of Olsztyn, the capital city of the Polish voivodeship of Warmia and Mazury, and to propose indicators for measuring spatial order. Socioeconomic development should be balanced with environmental protection to promote spatial order and improve the quality of life. Functional urban areas should be regularly monitored to ensure that planning measures contribute to the preservation of spatial order, and to minimize local problems and conflicts. The municipalities belonging to functional urban areas should be regarded not only as distinct territorial units, but also as members of a cohesive area whose development in every dimension of spatial order contributes to an improvement in the quality of life for local communities.

**Keywords:** spatial planning, socioeconomic development, sustainable development indicators, Perkal's method, multidimensional comparative analysis

# INTRODUCTION

The Polish spatial planning system is composed of three levels: national, regional and local. Planning documents, strategies, programs and acts of local law are developed at each level to promote sustainable development and preserve spatial order. The Act on the principles of development policy was amended in 2020, and it replaced the National Spatial Development Concept 2030 which had delineated the main trends, challenges and scenarios for the socioeconomic development of Poland, as well as the directions of sustainable spatial development [Act on the principles of development policy and selected legal acts, 2020]. The National Spatial Development Concept 2030 placed strong emphasis on spatial order which was regarded as one of the policy priorities and one of the key development goals [National Spatial Development Concept 2030, 2013]. In the light of the Act on spatial planning and land management, spatial order and sustainable development constitute the basis for spatial policy and land management principles

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[Act on spatial planning and land management, 2003]. According to the above act, the preservation of spatial order is the main goal of spatial management at all levels of planning: national, regional and local.

In spatial management, spatial order is defined as the preservation of order, balance and harmony between different elements and functions of space. Spatial order is one of the criteria for evaluating the quality of changes in land management and their impact on socioeconomic processes, living standards and the quality of life [Prus et al., 2015]. Spatial order reflects on the existing social and economic mechanisms and the condition of the natural environment [Parysek, 2007]. However, spatial order is not a categorical concept that is associated with one specific phenomenon, and its scope is influenced by context. This multidimensional concept harmoniously combines several aspects [Wdowicka & Mierzejewska, 2012]. Mierzejewska [2003] identified six dimensions of spatial order: functional, economic, environmental, political, cultural and esthetic. According to Mikołajczyk & Raszka [2019], spatial order can be analyzed in four dimensions: environmental, socioeconomic, functional and cultural. Spatial order can also be regarded as a component of integrated order which combines environmental order, social order, economic order, and institutional and political order [Borys, 2011]. In some cases, spatial order is assessed in combination with environmental order, whereas social and economic dimensions are examined separately. According to another approach, environmental, social and economic components of spatial order can be identified [Polski, 2014]. A review of the literature clearly indicates that a wide variety of approaches can be applied to define and identify the dimensions of spatial order.

The main drivers of spatial change are urbanization processes [Szarek-Iwaniuk, 2020]. The measures and policies targeting sustainable development and the preservation of spatial order aim to instill harmony in social, economic and environmental dimensions [Alińska et al., 2018]. Spatial order and sustainable development are the key objectives of spatial planning and urban policies. The main goals of the National Urban Development Policy are to promote the sustainable development of Polish cities and the surrounding areas, to coordinate various measures that aim to achieve spatial order, and to improve the quality of life. This policy document emphasizes the significance of cities in contemporary economies, and their role in job creation, economic growth and the provision of high-quality public services. The document underlines that special attention should be paid to cities and suburban areas where dynamic urbanization processes take place [National Urban Development Policy 2023, 2015]. In view of the above, the aim of this study was to measure spatial order in social, economic and environmental dimensions in a functional urban area. The studied object was the Functional Urban Area of Olsztyn, the capital city of the Voivodeship of Warmia and Mazury. The analysis covered a period of ten years between 2010 and 2019. Data were analyzed in a dynamic (2010-2019) and a static (2019) approach. The two approaches were combined to conduct an in-depth analysis of the studied phenomenon and to determine whether rapid urbanization in territorial units was accompanied by equally high levels of development in the evaluated categories. Three main dimensions of spatial order were identified for the needs of the study: social, economic and environmental (Fig. 1).



**Fig. 1.** Dimensions of spatial order *Source*: own elaboration.

The changes in functional urban areas should be regularly monitored to promote sustainable development and the preservation of spatial order. However, there are no universally acknowledged standards or datasets for measuring spatial order at the regional or local level, which poses certain diagnostic problems. Therefore, a detailed goal of this study was to propose indicators for measuring spatial order in both absolute terms and in each of the identified dimensions. The discussed problem plays a very important role in spatial planning and urban policy which aim to maintain spatial order and promote the sustainable development of regions.

### MATERIALS AND METHODS

# Indicators and methods for measuring spatial order

Sustainable development and spatial order can be described and analyzed with the use of various types of statistical data. Depending on the research objective, data can be presented in a dynamic approach to identify changes that occur in a specific time interval, or a static approach to describe the situation at a given moment of time (year, quarter, etc.). The selected diagnostic attributes should be available for all analyzed territorial units, and they should guarantee the required level of detail. The indicators that can be applied in analyses of the social, economic and environmental dimensions of spatial order are presented in Tables 1, 2 and 3, respectively. These data can be analyzed to expand the knowledge about the socioeconomic development of the examined territorial units, as well as the success of local policies aiming to promote sustainable development and the achievement of spatial order. The presented indicators are not exhaustive, and they can be modified subject to research needs, the availability of data and the required level of detail. A wide variety of diagnostic attributes are available at the level of macroregions (NUTS 1), regions (NUTS 2) and subregions (NUTS 3). Data for international comparisons can be obtained

sion	
Demography	Population density per 1 km <sup>2</sup>
	Population growth rate
	Natural increase per 1000 population
	Number of marriages per 1000 population
	Infant deaths per 1000 live births
	Average life expectancy at the age of 65 years
	Foreign emigration rate
Education	Number of children aged 3–5 years per one place in preschool education establishments
	Public expenditure on education (% GDP)
	Gross education ratio - primary school
	Public expenditure on education per capita
Healthcare	Population per outpatient clinic
	Total expenditure on healthcare per capita
	Number of outpatient clinics per 10,000 population
	Infant deaths per 1000 live births
	Disability-free life expectancy at the age of 65 years
	Population per commercial pharmacy
Culture, sports, recreation	Public expenditure on culture and national heritage protection per capita
	Registered public library users per 1000 population
Employment	Unemployment rate in the working age population
	Unemployed women per 100 working-age female population
	Registered unemployment rate
	Employment rate of persons with disabilities
Safety	Detection rate for offenders
	Road fatalities per 1 million population
	Crime detection rate per 1000 population
	Total expenditure on public safety and fire protection services per capita
Social partici- pation	Number of foundations, associations and social organizations entered into the REGON register per 1000 population

Table 1. Selected indicators of spatial order in the social dimension

Source: own elaboration.

Table 2. Selected	indicators	of	spatial	order	in	the	economi	С
dimensio	on							

Municipal	Municipal revenue per capita
finance	Municipal own-source revenue per capita
	Municipal expenditure per capita
Entrepre- neurship	Number of business entities entered in the REGON register per 10,000 population
	Number of self-employed persons per 1000 population
	Number of new business entities entered in the REGON register per 10,000 population
Economic dependency	Dependency ratio (number of people of non- -working age per 100 persons of working age)
by age	Old-age dependency ratio in total population
	Child dependency ratio in total population
Housing	Number of new build dwellings per 10,000 pop- ulation – three-year average
	Average usable floor area per new build dwelling
Tourism	Number of beds in tourist establishments per 1000 population
	Number of overnight visitors in tourist estab- lishments per 1000 population
Public	Length of the water supply network per 100 km <sup>2</sup>
utilities	Length of the sewer network per 100 km <sup>2</sup>
	Length of the gas supply network per 100 km <sup>2</sup>
Availability of public	Percentage population served by the sewer net- work in total population
utilities and services	Percentage population served by the water sup- ply network in total population
	Percentage population served by water treatment plants in total population

Source: own elaboration.

from Eurostat, the statistical office of the European Union. However, detailed statistical data describing territorial units (NUTS 4) are less available, and accurate data are least available at the local level (NUTS 5) which is characterized by the highest level of detail and the highest number of analyzed units.

Regardless of the selected analytical method, diagnostic variables should fulfill the following criteria [Grabiński, 1988, Zeliaś, 2000]:

- they should be universal,
- indicators should be measurable,
- data should be available,

Table 3. Selected indicators of	of spatial	order in	the environ	men-
tal dimension				

Environmental protection	Legally protected area in the total area of the municipality
	Natural monuments per 100 km <sup>2</sup>
Municipal services	Municipal waste generated per capita
	Household waste collected per year per capita
	Percentage of waste collected for recy- cling in total collected waste
	Industrial and municipal wastewater that requires treatment and is evacuated to water bodies or the ground per year per capita
Resource use	Electricity consumption per capita
	Water consumption per capita
Land management	Built-up and urbanized area in total area
	Forest cover
	Parks, green squares and residential green space in total area
	Area covered by local zoning plans in total area

Source: own elaboration.

- data should be of high quality (they should be informative and clearly formulated),
- variables should be characterized by high variation,
- variables should be bound by weak correlations,
- variables should be economical (to minimize data collection costs),
- variables should be easy to interpret (data should be non-ambiguous and should meet research criteria),
- variables should exert the same effects (stimulants, destimulants and nominants),
- variables should be clearly expressed (preferably by indicators).

A comparative analysis of territorial units described by various diagnostic attributes can pose numerous problems. Multi-dimensional comparative analyses, including taxonomic methods, are widely applied in research. These methods are used to build synthetic indices for analyzing objects that are described by numerous attributes [Tarka, 2010]. Multi-dimensional comparative methods provide aggregate data and support analyses of complex phenomena that are characterized by many attributes.

However, there are no generally recognized rules concerning the number of indicators that should be considered in analysis [Mikołajczyk & Raszka, 2019]. Multi-dimensional comparative analyses are widely used in geographic research, including in analyses of socioeconomic development, sustainable development and economic growth [Cheba & Szopik-Depczyńska, 2017, Chrzanowska & Zielińska-Sitkiewicz, 2018, Janusz, 2019, Rogalska, 2018, Sojka, 2008, Zygmunt, 2017]. The Wrocław taxonomic method (dendritic method) was applied to assess the development of small towns belonging to the Cittaslow network [Senetra & Szarek-Iwaniuk, 2020]. Hellwig's taxonomic method for identifying development patterns, a synthetic measure of development and Ward's method were used in a comparative analysis of access to ICT infrastructure [Łogwiniuk, 2011]. Perkal's method of natural indicators belongs to the group of classical taxonomic methods [Perkal, 1953]. This approach was applied to evaluate cultural resources in Poland's largest cities, to analyze the competitive advantage of regions, and assess the socioeconomic development of rural municipalities [Feltynowski, 2009a, 2009b, Kruk & Waśniewska, 2017, Namyślak, 2013]. Perkal's method and Hellwig's taxonomic method were also used to evaluate the innovation potential of regions [Feltynowski & Nowakowska, 2009].

#### Sources of data and the applied method

The study was conducted at the local level (NUTS 5) to analyze the research object, a functional urban area, based on detailed data. Data for the analysis were obtained from Statistics Poland [2020]. The acquired data covered 2019 (in the static approach) and the period between 2010 and 2019 (in the dynamic approach). The volume of household waste collected per year per capita was determined based on more recent data because the relevant information was not available for 2010. This indicator was selected for analysis because it is an important determinant of spatial order in the environmental dimension, and the annual changes are easy to observe and quantify.

Three dimensions of spatial order were taken into consideration in the study: social, economic and environmental. Each dimension was analyzed separately. The study was divided into several stages. In the first stage, diagnostic attributes for each analyzed dimension were selected from the sets of criteria presented in tabular form. In every evaluated dimension of spatial order, one diagnostic criterion was selected from each major category, and a total of seven diagnostic attributes were chosen in each dimension. The only exception was the environmental dimension, where a total of seven diagnostic attributes were selected from four major categories. In each dimension, the choice of diagnostic attributes was based on two factors: 1) availability of data for every territorial unit, and 2) relatively high variation of data describing the analyzed territorial units. A total of seven diagnostic attributes were ultimately selected in each dimension (Table 4).

Two analytical approaches were used in the study. Changes in descriptive parameters that occurred over a period of 10 years (2010–2019) were analyzed in the dynamic approach, whereas data covering 2019 only were analyzed in the static approach. The two approaches were combined to conduct an in-depth analysis of the studied phenomenon and to determine whether territorial units that had undergone the most extensive changes in the analyzed decade were characterized by the highest levels of development in each evaluated dimension in 2019.

Perkal's method was applied in the study [Chojnicki & Czyż, 1991] to develop a synthetic index as the sum of standardized values of partial indicators. The analysis was conducted on the assumption that all attributes have equal weight and that all analyzed variables exert the same effect on the studied phenomena. Stimulating and destimulating variables were identified. Stimulating variables exert a positive influence, whereas destimulating variables exert a negative influence on a given phenomenon. All destimulating variables were converted to stimulating variables. To compare the relative impact of each variable, the analyzed variables were standardized with the use of below formula:

$$X = \frac{x_i - x_{avg}}{\delta}$$

where;

- $x_i$  value of attribute,
- $\dot{x}_{avg}$  average value of attribute in the analyzed sample,
- $\delta$  standard deviation of a sample.

Perkal's synthetic indicator was calculated in the next stage of the study. The indicator is expressed by the sum of partial standardized values, and it was calculated with the use of the following formula:

$$WP = \frac{1}{n} \sum_{i=1}^{n} X_{ii}^{*}$$

where: WP – Perkal's indicator,

> X`<sub>ij</sub> - standardized value of the j-th attribute in the *i*-th object when destimulating variables are converted to stimulating variables,
>  n - number of objects.

Perkal's indicator is applied to rank objects based on a set of selected attributes. The objective of the

Table 4. Indicators of spatia	order selected for	r analysis in each	dimension
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		Social dimension	Variables*
X <sub>1</sub>	Demography	Natural increase per 1000 population	S
X <sub>2</sub>	Education	Number of children aged 3-5 years per one place in preschool education establishments	D
X <sub>3</sub>	Healthcare	Number of outpatient clinics per 10,000 population	S
X <sub>4</sub>	Culture, sports and recreation	Registered public library users per 1000 population	S
$X_5$	Employment	Unemployment rate in the working age population	D
Х <sub>6</sub>	Social participation	Number of foundations, associations and social organizations entered into the REGON register per 1000 population	S
$X_7$	Safety	Total expenditure on public safety and fire protection services per capita	S
		Economic dimension	
X <sub>8</sub>	Municipal finance	Municipal own-source revenue per capita	S
X9	Entrepreneurship	Number of business entities entered in the REGON register per 10,000 population	S
X <sub>10</sub>	Economic dependency by age	Dependency ratio (number of people of non-working age per 100 persons of working age)	D
X <sub>11</sub>	Housing	Number of new build dwellings per 10,000 population – three-year average	S
X <sub>12</sub>	Tourism	Number of beds in tourist establishments per 1000 population	S
X <sub>13</sub>	Public utilities	Length of the sewer network per 100 km <sup>2</sup>	S
X <sub>14</sub>	Availability of public utilities	Percentage population served by sewer networks in total population	S
		Environmental dimension	
X <sub>15</sub>	Environmental	Legally protected area in the total area of the municipality	S
X <sub>16</sub>	protection	Natural monuments per 100 km <sup>2</sup>	S
X <sub>17</sub>	Municipal services	Household waste collected per year per capita	D
X <sub>18</sub>		Industrial and municipal wastewater that requires treatment and is evacuated to water bodies or the ground per year per capita	D
X <sub>19</sub>	Resource use	Water consumption per capita	D
X <sub>20</sub>	Land management	Forest cover	S
X <sub>21</sub>	-	Area covered by local zoning plans in total area	S
* S -	stimulating variables. D	– destimulating variables	

\* S – stimulating variables; D – destimulating variables

Source: own elaboration.
ranking process is to determine which objects occupy higher positions in the ranking. The results obtained in each analyzed dimension (social, economic and environmental) were presented in diagrams. The results were analyzed and discussed in the last stage of the study.

## Study area – Olsztyn Functional Urban Area

The Act on spatial planning and land management [Act on spatial planning and land management, 2003] defines functional areas and functional urban areas of the capital cities of Polish voivodeships. In the light of the above act, a functional area is defined as a compact spatial structure composed of functionally related areas with similar conditions for development and similar anticipated development goals, where various spatial phenomena or spatial conflicts occur. Functional urban areas of the capital cities of Polish voivodeships are functional areas that play special role in the national spatial policy. Such a functional urban area is composed of a city which is the seat of a voivodeship self-government or a voivodeship governor as well as adjoining areas that are functionally linked with the urban core [Act on spatial planning and land management, 2003].

The Olsztyn Functional Urban Area is situated in the voivodeship of Warmia and Mazury. It consists of the urban core - city of Olsztyn and six municipalities that surround the urban core (Table 5). The municipalities within the Olsztyn Functional Urban Area differ considerably in population and area. As the capital city of the voivodeship of Warmia and Mazury, Olsztyn plays an important role in the national and regional settlement network, and it is part of a functional network of Polish cities. Olsztyn performs a wide range of functions at the national level as well as several metropolitan functions. The city's functions extend beyond its administrative boundaries. The urban core and the surrounding suburban areas are bound by increasingly stronger functional and spatial links, as demonstrated by the number of residents who commute to work and school

Table 5. Municipanties of the Oisztyn Functional Orban Area					
No.	Municipality	Туре	Population (2019)	Area [km <sup>2</sup> ] (2019)	
Urban core					
1.	Olsztyn	urban	171,979	88	
External zone of the functional urban area					
2.	Stawiguda	rural	10,548	223	
3.	Jonkowo	rural	7430	169	
4.	Gietrzwałd	rural	6685	172	
5.	Dywity	rural	12,004	161	
6.	Barczewo	urban- -rural	18,019	320	
7.	Purda	rural	8708	317	

Source: own elaboration.

on a daily basis. Rapid suburbanization is a negative consequence of these processes [Land use plan of the Voivodeship of Warmia and Mazury, 2018].

#### **RESULTS AND DISCUSSION**

Data relating to spatial order in social, economic and environmental dimensions were analyzed. The changes that took place in the examined decade (2010 to 2019) were first analyzed in the dynamic approach, followed by the static approach (2019). The municipalities in the functional urban area were evaluated and ranked in each dimension of spatial order. The extent to which the observed changes affected spatial order in the investigated municipalities was discussed.

#### Social dimension

The social dimension of spatial order concerns the processes and changes relating to demography, employment, education, healthcare, safety, culture, entertainment, sports and social participation. Considerable changes in these areas took place in all of the analyzed territorial units between 2010 and 2019 (Fig. 2a). The observed changes were largely positive in the municipalities surrounding the urban core, in particular in Stawiguda as well as Dywity and Jonkowo. A marked decrease in the unemployment



**Fig. 2.** Perkal's indicator in the social dimension (a) in the dynamic (2010–2019) and static (b) approach (2019) *Source*: own elaboration.

rate in the working age population and an increase in the number of foundations, associations and social organizations were noted in all territorial units. Total expenditure on public safety and fire protection services and total expenditure on healthcare increased in most of the evaluated municipalities. The population growth rate decreased in the Olsztyn functional urban area, but this negative phenomenon is consistent with the national trend. Population growth was highest in the Stawiguda municipality. Most changes in the functional urban area were positive, and they contributed to an improvement in the social dimension of spatial order.

In 2019, the most favorable values of the analyzed social indicators were noted in the city of Olsztyn (Fig. 2b). Between 2010 and 2019, not all changes and processes in the functional urban area were desirable (compared with the remaining territorial units), and Olsztyn ranked first and second in all categories of social order. The Stawiguda municipality was also characterized by largely positive social trends, including very high population growth and the lowest unemployment rate. Social indicators also assumed largely positive values in the municipalities of Dywity and Gietrzwałd. The least satisfactory values of social indicators were observed in the Barczewo municipality which was characterized by the highest unemployment and the lowest population growth. An analysis of the social dimension of spatial order and its changes in the functional urban area revealed that the social situation was most favorable in the city of Olsztyn, which differed considerably from the surrounding municipalities, followed by the Stawiguda municipality. The most positive changes were observed in the municipalities of Stawiguda, Dywity and Jonkowo. In turn, the Barczewo municipality was characterized by the least favorable social situation and the least desirable social changes in the examined period.

### **Economic dimension**

The economic dimension of spatial order concerns the processes and changes associated with entrepreneurship, economic dependency by age, the financial performance of territorial units, the availability of public utilities, housing and tourism. The economic performance of all analyzed territorial units improved between 2010 and 2019. The most positive changes were noted in the external zone of the functional urban area (Fig. 3a). Own-source revenues per capita increased in all territorial units, which points to the growing affluence of the examined municipalities. A clear improvement was also observed in the entrepreneurship category (highest in the Gietrzwałd municipality and lowest in the city



**Fig. 3.** Perkal's indicator in the economic dimension (a) in the dynamic (2010–2019) and static (b) approach (2019) *Source*: own elaboration.

of Olsztyn). The availability of public utilities improved in all examined territorial units. An increase was noted in the length of the sewer network per 100 km<sup>2</sup> (by more than 170% in Purda and Jonkowo) and the percentage of population served by sewer networks (by more than 45% in Gietrzwałd, and by more than 80% in Jonkowo). The Stawiguda municipality witnessed particularly desirable changes in housing construction. The greatest positive changes in the economic dimension were noted in Dywity, followed by Jonkowo and Purda. The city of Olsztyn and the municipality of Stawiguda were characterized by the smallest changes in the evaluated economic indicators.

In 2019, Stawiguda ranked first in terms of economic performance, and it clearly outpaced the remaining municipalities in this respect (Fig. 3b). A favorable situation was also observed in the city of Olsztyn. Stawiguda and Olsztyn ranked first or second in all of the analyzed economic categories. They were characterized by the highest own-source revenues per capita, the greatest availability of public utilities, the highest level of entrepreneurship, and positive changes in housing construction. Despite the above, Olsztyn was also characterized by the least desirable dependency ratio with nearly 70 people of non-working age per 100 persons of working age. In the remaining municipalities, this parameter ranged from 53 to 58 people of non-working age per 100 working-age population. In the static approach, the remaining municipalities were ranked in the following order based on the values of the analyzed economic indicators: Gietrzwałd, Dywity, Purda, Jonkowo and Barczewo. In 2019, Barczewo was characterized by the lowest own-source revenues per capita and the lowest entrepreneurship rate.

An analysis of the economic dimension of spatial order and its changes in the functional urban area revealed that the city of Olsztyn city and the municipality of Stawiguda were characterized by the highest levels of economic performance, and they differed most significantly from the remaining territorial units in this respect. The greatest positive changes were noted in the external zone of the functional urban area (municipalities of Dywity, Barczewo, Jonkowo, Purda and Gietrzwałd). These findings indicate that the municipalities surrounding the urban core are steadily improving their economic performance (the noted changes were most pronounced in these municipalities), which contributes to the sustainable development of the entire functional urban area.

#### **Environmental dimension**

The environmental dimension of spatial order relates to environmental protection, municipal services, resource use and land management. Changes

in the environmental dimension were observed in all analyzed territorial units between 2010 and 2019. Positive changes were noted in Olsztyn and in the municipalities of Jonkowo, Barczewo and Dywity, whereas relatively unfavorable changes were observed in the municipalities of Stawiguda, Purda and Gietrzwałd (Fig. 4a). In 2010-2019, the share of legally protected areas increased in most municipalities, and the greatest increase of 18% took place in Purda. A small decline in legally protected areas was observed in Stawiguda. The number of natural monuments increased only in Olsztyn (by 100%), and this parameter decreased or remained unchanged in the remaining municipalities. Forest cover increased in the entire external zone of the functional urban area, which contributed to environmental protection and improved the local environmental conditions. The volume of household waste collected per capita increased in all municipalities in the external zone of the functional urban area, and the said increase reached 19% in Gietrzwałd and 23% in Stawiguda. A significant increase in the volume of generated municipal and industrial wastewater per capita was observed in the municipalities of Purda (140%) and Gietrzwałd (53%). In turn, the volume of wastewater that requires treatment decreased by around 20% in Barczewo and Dywity. Water consumption per

capita increased considerably in most of the examined municipalities, which was an undesirable change.

In 2019, the Purda municipality ranked first in the environmental dimension of spatial order, and it clearly outpaced the remaining territorial units in this respect (Fig. 4b). The environmental status of Barczewo was also largely positive. Purda and Barczewo were characterized by the lowest volume of household waste collected per capita, lowest water consumption per capita, and the lowest volume of municipal and industrial waste per capita which was three to even four times lower than in the remaining municipalities. The percentage of legally protected areas was also highest in these municipalities. In the environmental ranking, Purda and Barczewo were followed by the municipalities of Gietrzwałd, Jonkowo and Dywity. The least satisfactory values of the analyzed environmental indicators were noted in Olsztyn and Stawiguda. These municipalities were characterized by the highest volume of municipal and industrial wastewater per capita (considerably higher than in the remaining municipalities), the highest volume of generated waste, and high water consumption per capita (which was highest in Stawiguda, differing considerably from the values noted in the remaining municipalities).



**Fig. 4.** Perkal's indicator in the environmental dimension (a) in the dynamic (2010–2019) and static (b) approach (2019) *Source*: own elaboration.

An analysis of the environmental dimension of spatial order in the functional urban area revealed that despite relatively unfavorable changes noted in Purda, this municipality was characterized by the most satisfactory environmental status. It should be noted that most municipalities where positive environmental changes had occurred in the examined period (Olsztyn, Jonkowo, Barczewo and Dywity) ranked last in the analysis of 2019. These findings suggest that urbanization processes exerted the greatest impact on the current environmental status of the studied territorial units. In most municipalities, waste production, wastewater generation and water consumption continued to increase steadily in the evaluated period. These changes exert a negative impact on the natural environment.

## Spatial order in the Olsztyn Functional Urban Area

The evaluation of spatial order in each of the analyzed dimensions (social, economic and environmental) revealed certain differences between territorial units that constitute the Olsztyn functional urban area. Between 2010 and 2019, visible changes occurred in every dimension in all municipalities (Fig. 5). The most even changes were observed in the municipalities of Jonkowo and Dywity. Dywity ranked third in the social dimension, first in the economic dimension, and second in the environmental dimension, whereas Jonkowo occupied the second, third and third position in the above ranking, respectively. The most diverse changes in the examined dimensions of spatial order were noted in the city of Olsztyn and in the municipality of Stawiguda. Olsztyn experienced the most profound changes in the environmental dimension, whereas its economic performance remained most stable in the analyzed period relative to the remaining territorial units. Olsztyn also ranked second to last with respect to changes in the social dimension. In turn, Stawiguda was characterized by the most profound changes in the social dimension, but it lagged behind the remaining municipalities in the ranking based on economic and environmental indicators. In the social and economic dimensions, the most rapid changes took place in the external zone of the functional urban area.

An analysis of spatial order data for 2019 (Fig. 6) revealed that the city of Olsztyn and the municipality of Stawiguda clearly outranked the remaining territorial units in social and economic dimensions. These municipalities were characterized by the most





Fig. 6. Spatial order in the Olsztyn Functional Urban Area in 2019

*Source*: own elaboration.

satisfactory social and economic status, but relatively unfavorable values of environmental indicators in comparison with the remaining territorial units. The values of social and economic indicators were also relatively satisfactory in Dywity and Gietrzwałd, and they were least favorable in Purda, Jonkowo and Barczewo. At the same time, Purda and Barczewo emerged as the leading municipalities in the environmental dimension.

The study demonstrated that municipalities with the highest ranking in the social and economic dimension were characterized by the least satisfactory performance in the environmental dimension (Olsztyn and Stawiguda), which can be largely attributed to urbanization and the development of suburban zones. At the same time, municipalities with the most favorable environmental status ranked last in the social and economic dimensions of spatial order (Purda and Barczewo). Considerable and largely positive changes were noted in all territorial units between 2010 and 2019. The highest levels of development were observed in the municipalities surrounding the urban core. The most positive changes occurred in the economic dimension. The performance of all territorial units improved in the examined period, with Olsztyn and Stawiguda as the main drivers of economic growth in the functional urban area. However, economic growth and social development were accompanied by a decline in the environmental dimension.

The preservation of spatial order in all analyzed dimensions is a very important goal that promotes sustainable development not only in individual units of territorial administration, but also in the entire functional urban area. Special emphasis should be placed on environmental protection because the relevant indicators were below the optimal values in the studied area. Socioeconomic development should be balanced with environmental protection to promote spatial order and improve the quality of life.

## CONCLUSIONS

Spatial order and sustainable development should be the pillars of spatial policy at both the local and central levels of administration. Various methods, diagnostic attributes, criteria and approaches can be applied to measure spatial order. However, regardless of the adopted research methodology, changes in space should be regularly monitored and development goals should be set in a manner that promotes the preservation of spatial order and sustainable development of entire regions. The achievement of these goals requires well-planned implementing actions, strategies and political decisions at the local, regional and national level. Acts of local law, documents, programs and strategies that aim to improve the quality of life in an environmentally-friendly manner and protect the existing resources for future generations contribute to the preservation of spatial order. A functional approach to urban development that extends beyond the administrative boundaries of urban areas is becoming increasingly popular. These areas are experiencing growing urbanization pressure, which is why the implemented strategies and programs should be geared towards the achievement of sustainable development goals.

The current study demonstrated that multi-dimensional comparative analyses support measurements of spatial order in the static and dynamic approach. Both approaches were combined to identify the full spectrum of changes in space. The study revealed positive changes in the economic and social dimension of spatial order in the Olsztyn Functional Area, whereas the environmental dimension requires special attention. The results of the presented analyses indicate that changes in the social, economic and environmental dimensions of space should be regularly monitored to ensure that local policies and strategies contribute to the preservation of spatial order. Regular monitoring efforts also facilitate early identification of the emerging problems and conflicts.

The municipalities belonging to functional urban areas should be regarded not only as distinct territorial units, but also as members of a cohesive area whose development in every dimension of spatial order contributes to an improvement in the quality of life for local communities.

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