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**AXIOLOGY OF SPACE AS A COMPONENT OF CONTEMPORARY LAND
MANAGEMENT THEORY: VALUE REGIMES, INSTITUTIONS, AND
INSTRUMENTS OF SPATIAL ORDER**

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***Abstract.** The article reveals the axiology of space as a component of contemporary land management theory. It substantiates that land management decisions always possess not only a metric and resource dimension, but also a value-normative dimension, since space is a bearer of economic, environmental, social, cultural, security-related, and legal meanings and an arena of their conflicts. The purpose of the study is to conceptualize the theoretical and methodological foundations of the axiology of space in land management, to describe the mechanism of transition from values to institutional and design decisions, and to construct a conceptual model*

of “value regimes of space.” The methodological basis consists of a systematized review of relevant scientific and framework sources, a conceptual analysis of the basic categories (value, regime, legitimacy, admissibility), and a typologization of regimes supplemented by operationalization through indicator metrics suitable for land management analytics. A definition of the value regime is proposed as a stable configuration of priorities embedded in institutions and practices, and a typology of regimes is presented (utilitarian-economic; environmental-protective; socially just; cultural-identificational; security/risk-oriented; legal/procedural), together with their applied manifestations in land management and a set of quantitative metrics. It is shown separately that the use of a single metric for optimization models is possible only under a transparent distinction between threshold constraints (inadmissibility) and compromise criteria (weighted optimization), which opens the possibility of the correct use of mathematical methods and GIS modeling in the design of spatial decisions. The practical value of the article lies in the formation of an instrumentally coherent framework for substantiating land management decisions as the management of the value of space and for increasing the transparency of reconciling “benefit / irreplaceability,” “private interest / common good,” and “local / general.”

Keywords: *axiology of space; land use organization; value regimes of space; institutional regimes of land use; value conflict; commensurability; multicriteria optimization; geographic information system modeling; spatial planning; legitimacy; threshold constraints; management of the value of space.*

Problem statement. In contemporary land management theory and practice, space is predominantly conceptualized as geometric extension, an object of measurement and cartography, or as a resource subject to accounting, distribution, and rational use. Such a reduction, despite its operational necessity, methodologically narrows the subject matter of land management, because “space” in the social dimension is not reducible to a neutral stage for action: historically, it was understood primarily as “Euclidean” and “mathematical,” whereas the transition to the concept of “social space” signifies a fundamentally different ontology—space as something formed by practices, representations, and institutional orders [1]. For land

management, this has a fundamental consequence: design decisions always affect not only the metric of territory, but also which meanings, rights, expectations, and forms of belonging are “inscribed” in space and reproduced through it.

Land management operates at the intersection of norms, rights, and interests, where space is a bearer of values (economic, social, cultural, environmental) and, at the same time, an arena of value conflicts. The practice of regulating land relations demonstrates that conflicts arise not only because of resource scarcity, but also because of contradictions concerning access, boundaries, recognition of rights, and the legitimacy of use regimes; accordingly, professional materials on land relations management directly link conflicts with land rights, tenure security, and access to land resources [2]. Therefore, considering space as a “resource” without an explicit analysis of its value content deprives land management of a key explanatory layer: why technically correct decisions may prove socially unacceptable or normatively unstable.

International approaches to land administration further emphasize that the subject matter is not “geographic information” as such, but the “people–land” relationship, which must be defined, recorded, and communicated to participants in circulation and governance [3]. At the same time, land management as a professional activity is described as one that requires the type of specialist capable of acting as a “reflective practitioner,” combining a theoretical understanding of phenomena with context-sensitive work on practical problems [4]. These characteristics indicate that classical rationality in land management requires refinement: a level of categorical thinking is needed that makes it possible to work with value regimes, contradictions, and compromises.

From this follows the article’s principal theoretical problem: the axiology of space, understood as the structure of values attributed to territory and inscribed in it by institutions, practices, and symbolic orders, is not an optional humanitarian supplement to land management, but its internal component. If space is socially produced and loaded with meanings [1], then land management in fact performs not only the optimization of land-use parameters, but also the management of values within which the admissibility, priority, and legitimacy of spatial transformations are determined.

Applied definitions of land management explicitly state that it is an “art or science” of making informed decisions regarding the allocation, use, and development of natural and built resources [5]. For land management, this means a specific type of rationality: on the one hand, normative and institutional frameworks (law, standards, procedures, public policies), and, on the other hand, the creative engineering component of the designer who, in a real situation, must assemble contradictory requirements into a workable decision. It is for precisely this reason that land management is, to a certain extent, an art: it combines the management of value, including its legal regimes, with the design creativity of the land-management engineer within the bounds of established rules.

Although contemporary literature and institutional documents actively distinguish and correlate the concepts of land administration, land management, and land governance, and also emphasize the blurred boundaries of the domain field and the confusion in the use of these terms [6], the axiological status of space in land management is usually not articulated as a separate theoretical node. This creates a methodological gap: at the practical level, land management constantly deals with value conflicts and regimes of legitimacy, but at the theoretical level these phenomena often remain unconceptualized in the categories of spatial axiology. It is precisely this mismatch between the real complexity of the subject matter and its habitual technical-resource descriptions that constitutes the problem statement of the present study.

The aim of the article is to theoretically and methodologically substantiate the axiology of space as a necessary component of contemporary land management theory, showing that space in land management cannot be adequately described solely as geometric extension or as a resource, but must be considered as a value- and normatively laden reality within which socially significant values—economic, social, environmental, cultural, and legal—are reproduced, coordinated, and brought into conflict. Accordingly, the article is directed toward overcoming the methodological reduction of space to a purely technical object and toward revealing its role as a bearer of values and a mechanism of their institutional consolidation through the legal, planning, and managerial decisions of land management.

To achieve this aim, the study provides for: revealing the theoretical and methodological foundations of the axiology of space within the subject field of land management; conceptualizing the mechanism of transition from values to institutional and design decisions, that is, describing how value priorities become principles, criteria, constraints, and procedures; constructing a conceptual model of “value regimes of space” as an analytical framework that makes it possible to systematically describe the varieties of the value loading of territories, the types of conflicts between them, and the ways of reconciling them within normative and institutional conditions; and determining the heuristic and applied capacity of the proposed model for contemporary land management theory as a basis for more transparent substantiation of decisions, more accurate consideration of public interest, and the reduction of conflict through the explicit management of values rather than merely the formal parameters of space.

Materials and methods of research. The study employs a theoretical-conceptual strategy oriented toward clarifying the categorical apparatus and constructing an explanatory model. The materials used were: scientific works on the social theory of space and adjacent fields that allow a proper distinction between the geometric and the social-institutional dimensions of space [1]; international framework and analytical documents and works on land administration, land management, and land governance that fix the “people–land” domain, the interdisciplinary nature of practice, and the need for reflective professional judgment; and contemporary publications on domain standardization, in particular the Land Administration Domain Model, responsible land administration, SDG indicator approaches, justice and participation in planning, and methods for mapping sociocultural meanings. The methods applied were a systematized review and conceptual analysis, including the clarification of definitions and the logical decomposition of the concepts of value, regime, legitimacy, and constraint/admissibility, as well as typologization for distinguishing classes of value regimes of space as analytical units of land management theory.

The methodological procedure included: comparing terminology and domain assumptions in different corpora of sources—standards and models, policy documents,

and academic studies—in order to identify where the value dimension is already present implicitly and how it is institutionalized; constructing the conceptual model of “value regimes of space” as stable configurations of priorities fixed in norms and practices; and operationalizing regimes through the selection of indicator metrics used in land administration and spatial planning, together with the formulation of a generalized scheme for the transition from heterogeneous indicators to forms suitable for GIS analysis and optimization settings, including normalization, aggregation, and constraints. The sources were used not as a basis for empirical generalizations about a specific territory, but as evidentiary material for deriving a coherent theoretical and methodological framework.

The study has principled limitations. First, the work is conceptual and does not claim empirical verification of the effects of the proposed model on specific cases; applied conclusions require further testing on the data of territorial communities and regions and by means of comparative studies. Second, any attempt to reduce heterogeneous value regimes to a single metric inevitably contains normative assumptions, including the choice of admissibility thresholds, weights, and utility or normalization functions; therefore, mathematical optimization in land management can be correct only under the condition of transparency of these assumptions and a clear fixation of what constitutes a hard constraint and what is a matter of compromise. Third, the results should be interpreted as a methodological instrument for substantiating and structuring decisions within existing legal and institutional frameworks, rather than as a replacement for legal analysis or for procedures of legitimation and participation.

Analysis of recent research and publications. In contemporary international scholarly and professional discussion on land management, a clear tendency can be observed toward expanding the subject field: from the description of land parcels and territories as objects of accounting and geometric modeling to the consideration of land and space as an institutionally ordered sphere of relations among people, rights, constraints, responsibility, value, and planned use. A revealing example is the development of the Land Administration Domain Model, positioned as a universal conceptual information model of “people–land” relations and, in its second multi-part

edition, directly integrating components of value and planned land use into a single conceptual framework [7; 8]. This line of work forms a highly standardized language for describing the spatial-legal reality, but does so mainly on the plane of data interoperability and engineering-organizational coherence rather than on the plane of philosophical and axiological analysis of values themselves as the grounds of decisions.

In parallel, a body of publications has emerged in which the value dimension is introduced through the ethical and normative orientations of responsible land administration and management. In the materials of the Global Land Tool Network and UN-Habitat, responsibility is structured as a framework that includes modules on basic values and principles, tenure security, as well as participatory planning and land-use management [9; 10]. Within this approach, values are presented explicitly; however, they are usually given as a set of principles of good governance and educational or practical orientations, whereas a categorical analysis of the way in which space itself becomes a bearer of competing values and how these conflicts structure design decisions in land management remains dispersed across different thematic blocks.

The empirical and policy-oriented front of value research in the land sphere is connected with land as an infrastructure of social justice, inclusion, and sustainable development. In particular, studies working within the logic of the Sustainable Development Goals analyze institutional frameworks, policies, and land data as a condition for monitoring land governance and tenure security, linking them to specific indicators such as 1.4.2, 5.a.1, and 5.a.2 and to comparative assessment practices [11]. Here, value appears as the public significance of rights, access, security, and accountability, yet the axiological structure of space, as a multiplicity of regimes of significance—economic, legal, cultural, environmental, symbolic, and others—is usually not developed as a separate theoretical object; rather, it is implicitly present in the language of indicators, capacities, and institutional quality.

In the adjacent field of planning theory, the issue of justice as a normative criterion of spatial decisions is being intensively developed. A notable example is the systematization of the principles of just urban land-use planning, where, on the basis of a systematic review of a considerable corpus of sources, the principles are grouped

into blocks connected with the governance of land rights, social cohesion, accessibility, and spatial health [12]. At the same time, despite its obvious value saturation, this tradition usually operates with the norms of justice as criteria external to land management by which outcomes are assessed, whereas in land management the internal mechanism of project-level translation of conflicting values into concrete regimes of use, constraints, easements, compensations, consolidation measures, and planning decisions is fundamentally important.

Another rapidly growing direction links participation and spatial justice in planning. Integrative frameworks have been proposed that seek to embed participatory approaches into the cycle of planning and design actions through the prism of spatial justice and show that tools of participation must be selected contextually and tied to specific phases of planning, without any universal one-size-fits-all solution [13]. For the subject of the present article, it is essential that here values are not reduced to declarations: they come to the surface as matters of procedural coordination, recognition of groups, and distributive consequences. However, this layer generally describes urban or territorial planning in general rather than the specific epistemology of land management as engineering and normative design.

An additional bridge to the axiology of space is created by studies that assess and map the social and cultural meanings of landscapes and ecosystem services. A review of empirical PPGIS and PGIS approaches to ecosystem service mapping shows that cultural services are most often spatially fixed, but at the same time underscores the limited evidence of the actual use of such data in practical support for land-use decisions and the absence of an established best practice due to methodological pluralism [14]. Applied studies on participatory mapping of cultural ecosystem services, including recreation, aesthetic experience, and the sense of place, emphasize the suitability of such methods for landscape planning [15]. Yet these approaches usually remain at the level of identifying and visualizing meanings; they more rarely move to a categorical explanation of how multiple meanings acquire the status of legally and institutionally operative regimes of space in land management through norms, procedures, types of documentation, constructions of rights and constraints, and mechanisms of compensation.

Finally, policy documents and analytical materials demonstrate the sharpening of the value dilemmas of spatial development, when the goals of economic growth, housing construction, or infrastructural modernization come into collision with the goals of preserving soils, ecosystems, and open spaces, for example in discussions around the goal of no net land take [16; 17]. This group of publications very clearly reveals the conflictuality of space as a field of values, but usually does not offer a conceptualization specifically for land management that would connect the conflict of values with the project logic of land-management decisions.

In summary, the existing directions—standardization and information approaches associated with LADM, normative-educational approaches associated with responsible land administration, indicator-governance approaches related to the SDGs and tenure security, planning-theoretical approaches centered on justice and participation, and methodologies for mapping sociocultural meanings—each, in its own way, touches upon values [7; 9; 11–15]. However, the analyzed publications do not exhibit an integral theoretical and methodological synthesis that would describe space precisely as a system of value regimes operationalized in land management, that is, as a way of linking which values are recognized, by which institutional rules, in which project form, and with what consequences and conflicts. It is this discontinuity between the presence of value themes and the absence of their categorical synthesis into a special model for contemporary land management theory that defines the scholarly niche of the present study.

At the same time, the contribution of Ukrainian scholars to the development of land management theory should also be emphasized. D. S. Dobriak placed emphasis on the ecologization of land use and on the use of scientific land-management projects, underlining the necessity of transforming land management from a technical procedure into an instrument of economic and environmental governance [18]. The works of L. Ya. Novakovskiy addressed issues of the legislative support of land relations and the prospects for the development of the cadastral system and land management [19]. A. M. Tretiak considered land management not simply as a technical process, but as a complex socio-economic and environmental system. His works examine the impact of globalization on land management and substantiate institutional changes aimed at

improving land-management mechanisms in Ukraine under contemporary conditions [20; 21].

Presentation of the main research material. The axiology of space in land management is the theoretical and methodological component of land management that studies and formalizes the system of values of space, understood as a set of socially significant goods, risks, and constraints, as well as the mechanisms of their transformation into governable regimes through land-management decisions. In this sense, the axiology of space describes what exactly in space is recognized as valuable, for whom, under what conditions of admissibility, to what extent, and by what instrument this is fixed, coordinated, or compensated in the processes of parcel formation, the establishment of constraints, planning regulation, and the organization of land use. Land management accordingly appears as the management of the value of space, that is, as the management not only of market value or productivity, but of the full portfolio of spatial values, including those that are not reducible to price but possess normative obligatoriness and public weight.

In the technical-economic dimension, the axiology of space in land management is a framework that makes it possible to separate value, as multidimensional usefulness and significance, from cost, as the monetary metric of certain aspects; to identify the full benefits and full costs of spatial decisions, including external effects, risks, losses of access, and the growth of transaction costs due to regime uncertainty; and to substantiate the choice of land-management instruments as ways of redistributing benefits and burdens and minimizing conflicts through the certainty of rights, boundaries, conditions of use, and compensations. In other words, this is an approach that translates space from a mere surface for operations into a governable economic and institutional object, where every configuration of boundaries, easements, zones, and regulations has a measurable dimension in the form of changing opportunities, constraints, risks, and incentives for actors.

In the philosophical and categorical dimension, the axiology of space in land management fixes the fact that space is not a given, but a normatively saturated form of the shared world: it contains not only what is, but also what ought to be in the form of rules of the permissible, priorities of protection, and criteria of justice and

legitimacy. Space is understood here as a bearer of institutional meanings—recognized rights, statuses, and limits of the allowable—and as a medium of value conflict, because every land-management decision inevitably ranks competing goods such as efficiency, safety, environmental sustainability, cultural significance, and accessibility, and translates this ranking into practically operative norms. Thus, the axiology of space in land management is a disciplined language that allows one to describe and substantiate the fact that land-management design is simultaneously an engineering realization and a normative choice: it constructs spatial order as a balance of values fixed in use regimes, constraints, procedures, and mechanisms of responsibility.

Within the framework of this study, we propose a conceptual model of the value regimes of space, proceeding from the fact that land and space are a finite and non-substitutable environment of human existence: economy, settlement, infrastructure, ecosystems, and cultural meanings coexist within the relatively thin geographical shell of the planet, where every spatial decision inevitably has consequences for other users and functions. Under this condition, land management cannot be treated as a neutral technique of placement; it is an institutionally organized practice of distributing opportunities and constraints in space, that is, a practice of governing which values are recognized as priorities, where exactly, under what conditions, and at whose expense.

The model of value regimes offers an analytical language for describing the fact that different orders of significance—economic, environmental, social, cultural, security-related, and legal—operate simultaneously within a real territory, while land management functions as the mechanism for their identification, comparison, reconciliation, and fixation through the instruments of parcel formation, establishment of constraints, zoning, easements, use regimes, compensation, participation procedures, and control. Accordingly, in this model, the value regime is the unit of analysis that links priorities and criteria, institutions such as law, standards, and policies, practices such as design, approval, and control, and measurable consequences expressed in metrics.

A value regime of space is a stable configuration of priorities—economic, environmental, social, cultural, security-related, and legal—that is institutionally fixed in norms, procedures, and organizational practices and is reproduced in land-

management decisions as a specific way of determining: admissible types of use and the limits of intervention; the distribution of rights, access, benefits, and burdens; criteria of efficiency and justice; and procedures of substantiation, participation, control, and responsibility. The stability of a regime does not mean the absence of change, but the presence of inertia: the regime is supported by recurrent procedures, typical decisions, and the expectations of actors—owners, communities, the state, and business—and changes, as a rule, through normative reforms, changes in policy, or crisis events of an environmental, economic, or security-related nature.

Table 1 – Typology of Value Regimes of Space in Land Management

Name of the regime	Essence of the regime	Applied manifestations in land management	Quantitative metrics
Utilitarian-economic (efficiency, rent, investment attractiveness)	Space is treated as a factor of production and a platform for creating added value. The priority is the maximization of utility and economic result under given legal constraints: reducing fragmentation, increasing productivity, optimizing logistics, and increasing capitalization. Decisions are legitimized through criteria of efficiency, payback, tax base, and transaction benefits.	Land consolidation; optimization of the configuration of fields and parcels; allocation of sites for industrial parks and logistics; adjustment of boundaries to ensure access to roads and networks; determination of easements for engineering infrastructure; zoning for business activity; instruments for stimulating investment in degraded territories.	NPV, IRR, payback period; market price/capitalization of land (UAH/ha); land rent (estimate); gross value added per hectare; yield/productivity (centners/ha, tons/ha); logistics costs (UAH/ton-km), distance to market; fragmentation index (number of parcels per holding, average parcel size, average boundary length/perimeter-to-area ratio); transaction costs (time/cost of formalization, number of procedures); revenues from land tax/lease (UAH/ha); investment per hectare; territorial use coefficient (FAR/density, where applicable); infrastructure accessibility index (distance/time to road, networks).
Environmental-protective (irreplaceability of natural functions, precautionary principle)	Space is treated as the bearer of critical natural functions: soils, water, biodiversity, and climate regulation. The priority is the preservation of the	Establishment of protected zones and buffers; restriction or prohibition of certain uses in sensitive territories; anti-erosion measures; restoration of degraded land; regulation of water-protection strips;	Share of protected territories (%); biodiversity indices (species richness, Shannon index, where available); area of natural habitats/land uses (ha); habitat fragmentation (mesh size, edge density); SOC (soil organic carbon,

	<p>irreplaceable and the reduction of irreversible losses; threshold and precautionary logic operates here: some interventions are recognized as unacceptable regardless of economic benefit. Decisions are legitimized through environmental standards, the principle of preventing harm, and long-term sustainability.</p>	<p>ecological corridors; requirements for compensatory/restorative measures in projects; integration of nature-based solutions into spatial planning.</p>	<p>t/ha) and SOC change; soil erosion losses (t/ha/year); water-quality indicators (nitrates/phosphates, BOD/COD where applicable); water balance/infiltration and runoff-retention capacity; area of floodplains/wetlands/restored territories (ha); degradation/desertification risk index; CO₂-equivalent emissions/absorption (t/ha/year, estimates); share of impervious surface/development (%); ecological status of water bodies (categories).</p>
<p>Socially just (access, inclusion, compensation, non-discrimination)</p>	<p>Space is treated as a condition of a dignified life and an opportunity to participate in public goods. The priority is the fair distribution of access to land, housing, services, and public spaces; minimization of spatial inequality and exclusion; procedural justice— participation, transparency, appeal—and substantive justice— compensation and protection of vulnerable groups. Decisions are legitimized not only by efficiency, but also by the way benefits and burdens are distributed.</p>	<p>Projects of territorial land-management organization with due regard for accessibility; provision of drives and passages; establishment of easements for access; consolidation with correct compensation; reservation and planning of social infrastructure; elimination of “land traps” characterized by a lack of access or communications; transparent public discussion procedures; instruments for preventing eviction without proper compensation.</p>	<p>Accessibility indices: time/distance to schools, healthcare, transport (minutes, km); share of population within normative accessibility (%); provision of green areas (m²/person); spatial inequality index (Gini/Atkinson for access or value, where data exist); share of households with secure/guaranteed tenure rights (%); number of disputes/complaints per 1,000 parcels; average compensation and its adequacy (ratio of compensation to market/assessed value); share of budget/programs for infrastructure in deprived areas; participation inclusiveness index (number of participants/represented groups, share of proposals taken into account).</p>

<p>Cultural-identificational (heritage, memory, symbolic places)</p>	<p>Space is treated as the bearer of historical continuity, collective memory, and symbolic significance. The priority is the preservation of authenticity, landscape identity, and sacred/memorial topoi; the admissibility of change is determined not only functionally, but also by whether it destroys the semantic structures of place. Decisions are legitimized through cultural norms, protective statuses, and public recognition of significance.</p>	<p>Establishment of protection zones for monuments and historical areas; limitations on height and density in valuable landscapes; regulation of land use in burial grounds, memorials, and sacred sites; preservation of the traditional structure of land use; consideration of cultural landscapes in land-management documentation and spatial plans.</p>	<p>Number/density of cultural heritage objects (units/km²); area of protection zones (ha, %); number of violations/unauthorized works within protection zones; share of territories with cultural-landscape regulations (%); visual-impact indices (viewshed area, % panorama overlap, where applicable); visitation of cultural sites (persons/year); “sense of place” and value-significance indices from surveys (scores, share of high ratings) where participatory mapping has been implemented.</p>
<p>Security / risk-oriented (hazards, resilience, critical infrastructure)</p>	<p>Space is treated as a field of risk and resilience: natural, technogenic, social, and, where relevant, security-related. The priority is the prevention of catastrophic losses, reduction of the exposure of population and infrastructure, and ensuring the functioning of critical systems. The legitimacy of decisions is based on evidence-based hazard assessment, the principle of</p>	<p>Restriction of development in flood- and landslide-prone zones; establishment of sanitary protection zones; routing of corridors of critical infrastructure and related easements; planning of evacuation routes and territorial reserves; consideration of risks in consolidation and redistribution of parcels; requirements for protective measures in projects.</p>	<p>Risk indicators: Hazard × Exposure × Vulnerability; share of population/assets in hazard zones (%); expected annual damage (EAD, UAH/year); event frequency/probability (1/T); infrastructure resilience index (recovery time, MTTR); distance to shelters/safety points (minutes, km); length/density of critical networks and their redundancy (% duplication); number of accidents/incidents (units/year); area of sanitary protection zones (ha) and share of regime violations.</p>

	acceptable risk, and ensuring the continuity of life-support systems.		
Legal / procedural (rule of law, certainty, transparency)	Space is treated as a system of legal titles, constraints, and procedures in which predictability and legitimacy are the key values. The priority is the legal certainty of boundaries, rights, and obligations; transparency of procedures, equal access to decisions, and accountability. The regime reduces transaction costs and conflict and builds trust in the land order.	Establishment/clarification of boundaries; correction of cadastral errors; harmonization of documentation with plans/registers; standardization of approval procedures; publicity of data; clear rules regarding constraints and their compensation; appeal mechanisms; audit of land-management decisions.	Completeness of registration of rights (% of parcels with registered rights); accuracy/quality of boundaries (average error, % of boundary disputes); time and cost of administrative procedures (days, UAH); number of refusals/returns of documentation (%); number of court disputes per 1,000 parcels; share of decisions adopted with public consultations (%); transparency index (availability of data, share of open datasets); plan-cadastre consistency index (% inconsistencies); share of cases of unauthorized occupation/use (units, %).

Note: developed by the authors.

Because space is finite and multifunctional, conflicts among value regimes are not an anomaly, but a structural norm. They arise not only because actors have different interests, but because they operate with different criteria of rationality: each regime has its own valid grounds—efficiency, irreplaceability, justice, memory, security, legal certainty—which cannot be reduced to a common denominator without loss. Within this logic, land management is an arena of reconciliation in which the key tensions assume typical forms. The first is “benefit / irreplaceability”: investment expediency and increases in value may conflict with the threshold logic of protecting soils, water regimes, or biodiversity, where some losses are irreversible or unacceptable irrespective of compensation. The second is “private interest / common good”: optimization of private use in terms of profitability or development collides with the public functions of space—accessibility, ecological services, infrastructural corridors, safety—which require constraints, easements, or withdrawals, together with proper procedural guarantees and compensation. The third is “local / general”: local values,

such as identity, traditional land use, and local ecosystems, may conflict with societal objectives such as transport highways, energy infrastructure, or national safety standards, where legitimacy depends on transparent substantiation, participation, and the fair distribution of burdens.

Within the model of value regimes, the task of land management is therefore formulated as managed reconciliation: not to avoid conflict, which is often impossible, but to make its resolution rationally substantiated, procedurally legitimate, and measurable through the explicit determination of priorities, the establishment of thresholds of the admissible, the choice of instruments such as constraints, incentives, and compensation, and the control of consequences in metrics. This constitutes the practical value of the conceptual model: it transforms value plurality from an informal background into a governable object of land management theory and methodology.

The conceptual model of value regimes acquires applied meaning only when values and priorities are materialized in institutions, that is, in stable rules, procedures, and organizational practices that make spatial order reproducible and accountable. In land management, the institutions of spatial order include: legal institutions of rights to land and other immovable property—ownership, use, easement, encumbrance, protection regimes—together with the rules of their acquisition, change, and protection; planning and regulatory institutions that determine permissible types of use and parameters of intervention through zoning, regulations, special territorial regimes, and standards of constraints; procedural institutions of legitimation that ensure the transparency and acceptability of decisions through public access to data, participation, coordination, impact assessment, and appeal mechanisms; and economic institutions of incentives and compensations, including payments, tax and lease mechanisms, compensations for constraints, and tools of consolidation and redistribution of benefits and burdens. It is precisely institutions that transform the plurality of values into a governable order, determining which conflicts may be admitted as compromise and which are blocked by thresholds of inadmissibility.

The instruments of spatial order in land management are the operational form of action of these institutions and, at the same time, the means by which value regimes are translated into design decisions. Among the basic instruments are the formation and

reorganization of land parcels—division, amalgamation, boundary ordering, consolidation—which change the spatial structure of opportunities; the establishment of constraints and easements—protection zones, sanitary gaps, water-protection strips, and corridors of engineering and transport infrastructure—which fix the limits of the permissible; functional zoning and the regulation of use parameters, which institutionalize the priorities of regimes in specific territories; compensatory and incentive mechanisms that make it possible to reduce conflict by means of a fair distribution of burdens and benefits; cadastral-registration and informational instruments that ensure the certainty of rights and the transparency of regimes through data and their interoperability; and procedures of participation and coordination that transform value disagreements into governable decisions with a legitimate status. Taken together, these instruments form the practical mechanism of spatial order, in which land management appears not merely as a technical operation with territory, but as an institutionally organized process of managing the value of space and stabilizing conflicting regimes.

The key question of the axiology of space in land management may indeed be formulated as a problem of the commensurability of values: does there exist a single metric capable of correctly translating heterogeneous value regimes of space—economic, environmental, social, cultural, security-related, and legal—into a common scale such that spatial decisions can be optimized mathematically, including by means of GIS modeling? This question is not merely technical, but also categorical and normative. Any single metric presupposes the thesis of commensurability, that is, the possibility that different types of spatial significance may be compared by means of a common measure without the loss of essential meaning. In land management, however, some regimes function as threshold regimes—inadmissibility of interventions in certain zones, safety requirements, legal prohibitions—whereas others function as compromise regimes, in which trade-offs among benefits and costs are permitted. Therefore, a strictly correct formulation is as follows: a single metric is possible only after a prior normative decision has been made, first, as to which values constitute hard constraints under no circumstances to be violated, and second, as to which values enter

a weighted compromise and may be reconciled at a certain price, under certain conditions, or through compensation.

In this sense, a single metric is not given by nature; it is the result of an institutional and methodological construction that makes different regimes suitable for comparison within a single computational framework. It is precisely this that opens the way to optimization models in land management: space is represented as a value surface, while the land-management decision is represented as the choice of a configuration of use regimes that maximizes a selected objective function under given constraints.

Below are the classes of candidate metrics that, in our view, can theoretically be applied to all regimes, although each has its own price in the form of assumptions and losses of meaning. The first is monetary universalization, or the monetary metric, in which the common scale is money and the value of space is defined as the present value of the flow of benefits and costs, including valuations of external effects and risks. The second is a public-welfare metric in units of utility or equivalent income, in which the common scale is not money as such, but aggregated welfare, expressed in equivalent income or units of utility with due regard for inequality, risk, and distribution. The third is a risk-adjusted generalized net benefit, in which the common scale is the expected or guaranteed overall effect, calculated as benefits minus costs minus expected losses from risks and minus penalties for violations of thresholds. The fourth is a dimensionless integral index, that is, a normalized composite score, for example on a scale from 0 to 1 or from 0 to 100, constructed by standardizing different indicators and aggregating them with weights. The fifth is a shadow metric generated by the optimization setting itself, where each constraint—environmental, legal, security-related, social—obtains a shadow price as the marginal value of relaxing that constraint. In practical terms, the most workable solution is a mixed approach: threshold regimes are formalized as constraints, while the remaining ones enter an integral welfare or index metric.

Let Ω be a territory (continuous or discretized into geographic information system cells/pixels), and $x \in \Omega$ a point (or cell). For each value regime $r \in \{1, \dots, R\}$,

a set of primary indicators $m_{rj}(x)$ (measured or modeled) is defined. To obtain a universal quantity, the following is introduced:

1) *A standardization/utility function for each regime:*

$$S_r(x) = \Phi_r(m_{r1}(x), \dots, m_{rk_r}(x)),$$

where $S_r(x) \in [0,1]$ (or another unified interval), and $\Phi_r(\cdot)$ specifies the transition from “raw” metrics to a generalized regime score (taking into account that some indicators follow the logic “more is better,” others “less is better,” and that thresholds may exist).

2) A set of hard constraints (thresholds of inadmissibility) that exclude decisions regardless of integral benefit:

$$g_c(x) \leq 0, \quad c \in \{1, \dots, C\}.$$

In geospatial form, these are prohibition masks, protection zones, sanitary setbacks, zones of risk with inadmissible exposure, and the like.

3) *Scalarized “value of space” as an integral function of regimes:*

$$V(x) = \sum_{r=1}^R w_r S_r(x), \quad \text{if } g_c(x) \leq 0 \quad \forall c,$$

$$V(x) = -\infty, \quad \text{otherwise.}$$

Here, $w_r \geq 0$ and $\sum_r w_r = 1$ are weights that fix the normative-institutional priority of regimes in a given context (for a territory, scenario, policy). The value $-\infty$ means “inadmissible”; in applied models it is replaced by a very large penalty.

This formula is minimally sufficient, first, to define the value surface in a geographic information system and, second, to use it in spatial optimization problems.

Then a land-management/planning decision may be specified as a function assigning the type of use $z(x)$ (or choosing regimes/constraints at a point), and the objective is to maximize total value:

$$\max_{z(\cdot)} \int_{\Omega} V(x, z(x)) dx \text{ subject to } g_c(x, z(x)) \leq 0, \forall x, c,$$

together with additional resource/planning constraints (for example, minimum areas of certain functions, zone connectivity, budget, constraints on fragmentation, transport accessibility, and so forth).

A principled clarification for the correctness of the model is that a single metric is possible not as a “natural common measure” of all values, but as a justified construction that combines: (a) hard thresholds (where compromise is forbidden), (b) weighted compromise (where compromise is admissible), (c) transparent rules for transforming heterogeneous indicators into $S_r(x)$, and (d) explicit fixation of the weights w_r as a normative choice.

This is precisely how the axiology of space in land management becomes the computational basis of optimization: conflicts of regimes do not “disappear,” but become formalized in the form of constraints and aggregation rules, which makes it possible to design the use of space mathematically—without losing the principled distinction between “benefit / irreplaceability,” “private interest / common good,” and “local / general.”

Conclusions. The article substantiates that the reduction of space in land management either to geometry or to a resource is methodologically insufficient for explaining and designing real land-management decisions, because in land use space functions as a bearer of values and as a field of value conflicts that acquire institutional form through rights, constraints, use regimes, and procedures of legitimation. The proposed approach makes it possible to consider land management as the management of the value of space in a broad sense—not merely of market value or productivity, but of a set of economic, environmental, social, cultural, security-related, and legal dimensions that determine the admissibility and acceptability of spatial transformations.

The key result of the study is the formalization of the conceptual model of the value regimes of space as an analytical framework that systematically combines

priorities, institutions, practices, and metrics. The model is useful for three reasons. First, it creates a common language for reconciling interdisciplinary requirements—engineering, legal, social, and environmental—in land-management design and explains conflicts among regimes as a structurally normal condition of finite space. Second, the proposed typology of regimes and the set of metrics provide a basis for the operationalization of values in documentation and analytics, from the mapping of regimes to the control of consequences and the substantiation of compromises. Third, the methodological problem of commensurability is clarified, and it is shown that the application of mathematical optimization methods is possible only under the condition of a clear distinction between threshold constraints, that is, inadmissibility, and compromise criteria, that is, weighted optimization, or, in other words, under the condition of transparent normative calibration of the objective function and the rules of aggregation.

Prospects for further research lie in the development of the proposed framework at the level of empirical verification and methodological standardization. It is advisable to test the model on applied cases at the level of the community or region through the construction of maps of value regimes, the comparison of alternative land-management scenarios, and the analysis of the way in which changes in weights and thresholds affect decisions by means of sensitivity analysis. Research is also needed into procedures of legitimation, including methods of justified determination of weights and thresholds through participation, expert panels, and legal standards, as well as mechanisms of compensation and distribution of burdens in regime conflicts. A promising direction is the formalization of the connection between the model and digital instruments such as GIS, spatial optimization settings, and multi-criteria methods, together with harmonization with domain standards of land administration, in order to ensure the reproducibility, comparability, and auditability of land-management decisions. Thus, the article lays a theoretical and methodological foundation for the transition from implicit management of values in land management to their explicit, measurable, and procedurally legitimate consideration in contemporary theory and practice.

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АКСІОЛОГІЯ ПРОСТОРУ ЯК СКЛАДОВА СУЧАСНОЇ ТЕОРІЇ ЗЕМЛЕУСТРОЮ: ЦІННІСНІ РЕЖИМИ, ІНСТИТУТИ ТА ІНСТРУМЕНТИ ПРОСТОРОВОГО ПОРЯДКУ

Анотація. У статті розкрито аксіологію простору як складову сучасної теорії землеустрою. Обґрунтовано, що землевпорядні рішення завжди мають не лише метричний і ресурсний, а й ціннісно-нормативний вимір, оскільки простір є носієм економічних, екологічних, соціальних, культурних, безпекових і правових значень та ареною їх конфліктів. Метою дослідження є

концептуалізувати теоретико-методологічні засади аксіології простору в землеустрої, описати механізм переходу від цінностей до інституційно-проектних рішень та побудувати концептуальну модель «ціннісних режимів простору». Методологічну основу становлять систематизований огляд релевантних наукових і рамкових джерел, концептуальний аналіз базових категорій (цінність, режим, легітимність, допустимість) і типологізація режимів, доповнена операціоналізацією через показники-метрики, придатні для земельпорядної аналітики. Запропоновано визначення ціннісного режиму як стабільної конфігурації пріоритетів, закріпленої в інститутах і практиках, та наведено типологію режимів (утилітарно-економічний; екологічно-охоронний; соціально-справедливий; культурно-ідентифікаційний; безпековий/ризик-орієнтований; правовий/процедурний) із прикладними проявами у землеустрої та набором кількісних метрик. Окремо показано, що застосування єдиної метрики для оптимізаційних моделей можливе лише за прозорого розрізнення порогових обмежень (недопустимості) та компромісних критеріїв (зважуваної оптимізації), що відкриває можливість коректного використання математичних методів і ГІС-моделювання у проектуванні просторових рішень. Практична цінність статті полягає у формуванні інструментально узгодженої рамки для обґрунтування земельпорядних рішень як управління цінністю простору та для підвищення прозорості узгодження «вигода / незамінність», «приватний інтерес / спільне благо», «локальне / загальне».

Ключові слова: аксіологія простору; землеустрій; ціннісні режими простору; інституційні режими землекористування; конфлікт цінностей; багатокритеріальна оптимізація; ГІС-моделювання; просторове планування; легітимність; порогові обмеження; управління цінністю простору.