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Geography as a Tool in Landscaping Practice

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Summary

This article proposes an in-depth analysis of the contribution of geography as a technical, aesthetic and environmental tool in the practice of landscaping, also known as landscaping.
The article addresses how the fundamentals of geographic science — such as relief, climate, land use and occupation, hydrography, and biogeography — constitute essential elements for the planning, execution, and maintenance of sustainable and functional landscape projects. From an interdisciplinary perspective, the interfaces between spatial analysis, cartography, remote sensing, and ecological practices are investigated. The objective is to highlight how geographic knowledge allows for more accurate decisions in spatial interventions, promoting environmental quality, ecological balance, and aesthetic appreciation. The methodology adopted is based on a bibliographic review and analysis of landscape projects with explicit application of geographic techniques. It is concluded that mastery of the fundamentals of geography is indispensable for landscaping professionals committed to interventions that are consistent with the environment and human needs.

Keywords: geography; landscaping; spatial analysis; sustainability; environmental planning.

Abstract

This article offers an in-depth analysis of the contribution of geography as a technical, aesthetic, and environmental tool in the practice of landscaping. It addresses how the fundamentals of geographical science — such as relief, climate, land use and occupation, hydrography, and biogeography — are essential elements for planning, executing, and maintaining sustainable and functional landscape projects. From an interdisciplinary perspective, the article explores the interfaces between spatial analysis, cartography, remote sensing, and ecological practices. The objective is to demonstrate how geographical knowledge enables more accurate decisions in spatial interventions, promoting environmental quality, ecological balance, and aesthetic enhancement. The methodology is based on literature review and analysis of landscape projects with explicit application of geographic techniques. It concludes that mastering geographical fundamentals is indispensable for landscaping professionals committed to environmentally coherent and human-centered interventions.

Keywords: geography; landscaping; spatial analysis; sustainability; environmental planning.

1. Geographical fundamentals applied to landscaping

The theoretical basis of geography offers landscaping a complex and articulated reading of space. The relief, for example, directly influences drainage, sunlight and the choice of plant species. In sloping regions, techniques such as terracing and containment are necessary, while flat areas may require artificial drainage. Interpreting the relief allows the landscaper to anticipate challenges and enhance the natural characteristics of the terrain.

Climate, another essential element, determines the viability of certain plants, the frequency of maintenance and the most appropriate type of vegetation cover. The Köppen climate classification is often used to match plant species to local conditions, ensuring sustainability and longevity of the project. In addition, factors such as relative humidity, rainfall and wind patterns directly affect the health of vegetation.

Land use and occupation are central elements in the preliminary analysis of a landscape project. Urbanized areas require specific adaptations due to soil compaction, waterproofing and the presence of underground infrastructure. On the other hand, rural areas allow greater freedom for ecological intervention, respecting the original biomes. Knowledge of environmental legislation and urban zoning is essential in this analysis.

Hydrography is essential for irrigation and drainage planning. The location of bodies of water, groundwater and flooded areas influences the definition of flowerbeds, water features and canals. Geographical analysis helps to avoid negative impacts such as erosion, silting and water contamination, promoting responsible use of natural resources.

Biogeography provides support for the selection of native species, the floristic composition and the ecological balance of landscaping. Projects that respect the original vegetation tend to have a lower environmental impact, greater resistance to pests and lower maintenance requirements. Mapping regional biodiversity is an essential tool at this stage.

An integrated knowledge of these fundamentals allows landscaping professionals to develop projects that engage with the environment and enhance it. A geographical understanding of the territory transforms the landscape into a planned, functional and sustainable space. In this way, geography not only underpins landscaping, but elevates it to a technically and ecologically oriented practice.

2. Spatial analysis and landscape planning

Spatial analysis is one of the main methodological tools in geography and is essential for landscaping planning. With the help of software such as QGIS and ArcGIS, it is possible to integrate data on relief, land use, hydrography and vegetation cover, creating thematic maps that support technical decision-making. Spatial analysis allows the diagnosis of land conditions and the proposal of informed interventions.

This spatial interpretation is especially relevant in urban contexts, where the fragmentation of natural elements poses challenges to ecological continuity and soil permeability. Spatial analysis allows us to visualize areas of greater density, ecological corridors, flooding points and heat islands, enabling regenerative and functional landscaping.

Digital elevation models (DEMs), for example, allow the simulation of water flows and sunlight, indicating the most suitable areas for planting, shaded areas and risk zones.
These models, integrated with three-dimensional terrain modeling, are powerful allies for the design of gardens, parks and green areas integrated into the urban or rural fabric.

Visibility analysis is also a tool used to design landscapes with greater visual impact and aesthetic integration. Using the viewshed technique, it is possible to predict the most visible points on the land, helping with the strategic positioning of sculptures, trees, urban equipment and water features.

Furthermore, spatial analysis supports the dimensioning of permeable areas and the definition of accessible and sustainable routes. Integration with socioeconomic data allows the design of landscaped spaces that reflect the needs of the community, promoting inclusion and collective well-being.

In short, spatial analysis transcends the mere graphic representation of the territory and becomes a decision-making, technical and creative instrument for landscaping. Mastering these geographic tools allows professionals to propose more effective, ecological and aesthetically integrated solutions.

3. Cartography and spatial representation in landscaping projects

Cartography, as the science of graphic representation of space, plays a central role in the development of landscape projects. The creation of topographic plans, sketches, thematic maps and three-dimensional representations allows the landscaper to visualize and communicate his ideas clearly. In addition to aesthetics, cartography brings technical precision that is essential for the execution of projects that are consistent with the territorial reality.

One of the first steps in developing projects is reading topographic maps, which indicate contour lines, drainage, vegetation and infrastructure. This information helps to understand the morphology of the terrain, enabling interventions that are appropriate to the terrain and minimizing the risks of erosion, flooding or landslides.

Thematic cartography also has a prominent place, being used to represent aspects such as land use, vegetation density, permeability and areas of permanent preservation. These maps contribute to the definition of intervention zones, areas of restricted use and conservation spaces, articulating landscaping and sustainability.

The introduction of CAD (Computer-Aided Design) and GIS (Geographic Information Systems) software has revolutionized cartographic practice in landscaping. Tools such as AutoCAD, Revit, QGIS and Lumion allow the creation of plans at different scales, visual simulations and the compatibility of projects with other areas of engineering and architecture, promoting an integrated and collaborative approach.

Cartography also plays a pedagogical and communicative role in participatory projects.
Through models, conceptual maps and explanatory panels, professionals can

involve communities in the construction of squares, gardens and parks, strengthening the social bond with the space and promoting territorial belonging.

Thus, cartography transcends its technical role to take on a creative and strategic function in landscaping. It is through cartography that the dialogue between geography and landscape design materializes, enabling the transformation of the territory into a functional, beautiful and ecologically balanced space.

4. Remote sensing and environmental diagnostics for landscaping

Remote sensing, a technique that allows information to be obtained from the Earth's surface using satellite or drone images, has become a strategic tool for environmental diagnostics for landscaping. It allows large areas to be analyzed quickly, accurately and in great detail, providing valuable support for planning sustainable interventions.

Satellite images are useful for detecting changes in vegetation cover, identifying degraded areas, mapping flood zones and analyzing urban dynamics. Using spectral indices, such as NDVI (Normalized Difference Vegetation Index), it is possible to assess the health of vegetation and propose corrective actions in landscape projects based on empirical evidence.

The use of drones represents a breakthrough in high-resolution sensing. Equipped with multispectral cameras and thermal sensors, these devices produce detailed orthophotos and digital surface models, enabling precise mapping and the identification of microclimates, plant species and environmental pathologies that would be difficult to detect with the naked eye.
naked.

The integration of remote sensing and geoprocessing generates complete environmental diagnostics, with dynamic and updatable mapping. This is essential in areas of urban expansion or ecological regeneration, where landscaping plays a strategic role in the recovery of ecosystems and in improving quality of life.

Remote sensing also contributes to environmental impact assessment, enabling the analysis of human interference in the natural environment before, during and after the implementation of the project. This practice aligns landscaping with the guidelines of environmental management and sustainable territorial planning.

In short, remote sensing makes landscaping more technical, scientific and conscious. By combining technology and geography, it allows professionals to develop interventions that respect the environment, enhance the landscape and promote human and ecological well-being.

5. Sustainability and environmental responsibility in geographic landscaping

The integration between geography and landscaping must necessarily incorporate the principle of sustainability, which involves the rational use of natural resources, the protection of biodiversity and respect for ecological cycles. In this context, geographic interpretation allows the landscaper

understand the environmental dynamics of the territory, promoting more conscious and lasting interventions.

The use of native and adapted species is an ecological guideline that is increasingly valued in landscape projects. Geography, through biogeography and knowledge of biomes, offers technical support for the selection of plants that require less water, are more resistant to the local climate and promote greater interaction with fauna. This strategy reduces maintenance costs and enhances the regional ecosystem.

Another fundamental aspect is the management of water resources. Analysis of natural drainage, the presence of groundwater and the rainfall regime guides the installation of efficient irrigation and rainwater collection systems. Geography contributes to the project's water balance and to the preservation of increasingly scarce resources.

Waste management is also a concern in sustainable practices. Landscaping projects should include the reuse of organic and inorganic materials, the use of biodegradable substrates and the composting of plant waste. Territorial logistics and spatial planning, provided by geography, help to effectively implement these systems.

Environmental responsibility is also reflected in the commitment to environmental education.
The construction of sensory gardens, ecological trails and information panels transforms landscaped spaces into places for learning and raising awareness. Geography contributes to the mapping of environmental vocations and territorialized educational strategies.

Therefore, geography provides a solid basis for landscape practices aligned with sustainability. Its critical and integrative approach allows the landscaper to act as an agent of environmental transformation, promoting projects that harmonize aesthetics, function and ecological responsibility.

6. Professional training and interdisciplinary work in geographic landscaping

Professional work in landscaping requires increasingly interdisciplinary training, in which geography plays a strategic role. Mastering geographic concepts provides a broad understanding of space, integrating physical, social, economic and cultural factors. This systemic vision is essential for developing coherent projects adapted to local realities.

In architecture, urban planning, environmental engineering and landscape design courses, subjects such as geoprocessing, climatology, geomorphology and cartography should be incorporated into the curriculum. Technical training in spatial analysis software, such as QGIS and AutoCAD, is also essential for practicing the profession in an up-to-date and efficient manner.

Interdisciplinary landscaping practices also require dialogue with areas such as botany, ecology, civil engineering and social sciences. Geography, with its ability to articulate diverse knowledge, acts as an integrating axis in this process. Landscape projects that

contemplate the social, cultural and ecological dimension of the space are more sustainable and well received by the community.

Professional performance must also consider legal instruments and public policies for land use planning. Knowledge of environmental legislation, master plans and accessibility standards is essential for developing projects that are compatible with legal frameworks and urban guidelines.

Additionally, constant updating through conferences, scientific publications and professional networks strengthens practice and innovation in the sector. Geography applied to landscaping is constantly evolving, incorporating new technologies, participatory methodologies and sustainable parameters.

In short, professional training in landscaping needs to integrate geography as an applied and practical science. This ensures the creation of more contextualized, resilient and socially relevant landscape projects, expanding the professional's field of action and their impact on the territory.

Conclusion

The intersection between geography and landscaping, as explored throughout this study, reveals itself as a fertile field for practical and theoretical innovations that transcend the conventional aesthetics of landscaping. The geographic approach broadens the scope of landscaping by providing an in-depth reading of the space that takes into account its physical, ecological, social and cultural aspects. This broadening of perspective allows landscaping to cease being a merely decorative activity and become an instrument of territorial planning, environmental qualification and collective well-being.

By incorporating methodologies such as spatial analysis, remote sensing and thematic mapping, landscaping projects can operate with greater technical support and predictability of impacts. This translates into more sustainable, economically viable and socially responsible decisions. Landscaping based on geography not only responds to current challenges – such as climate change, rapid urbanization and biodiversity loss – but also anticipates solutions for future challenges, promoting territorial resilience and environmental adaptation.

Additionally, professional training enriched by geography provides landscapers with a more sophisticated analytical repertoire and a more engaged ethical stance. This is a professional capable of engaging with multiple areas of knowledge, proposing integrated solutions and working on different scales — from micro-gardens to urban macro-landscapes. This new profile responds to a growing demand for projects that consider the complexity of territories and the populations that inhabit them.

Another fundamental aspect highlighted in this research is the need for public policies that encourage the use of geographic and environmental criteria in urban and rural landscaping. The appreciation of the landscape as a collective heritage, the regulation of sustainable practices and the encouragement of social participation are fronts in which geography can contribute

substantially. Modern urban planning requires technical tools for territorial reading, and geographically oriented landscaping is an essential part of this new model.

Finally, it is possible to state that the recognition of geography as a fundamental pillar in landscaping represents a paradigmatic evolution in the way we conceive and transform spaces. This approach breaks with fragmented intervention models and inaugurates a systemic and holistic vision, which understands the territory as a living organism, in constant interaction between nature, society and aesthetics. It is, therefore, a repositioning of landscaping in the contemporary context — not as an adornment, but as a strategy for ecological balance, spatial justice and territorial innovation.

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