

Integral landscape management

Gestion intégrale du paysage

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ABSTRACT: According to the historical and territorial context of Europe and America, the concept of landscape, like many others, was characterized by its polysemy until the mid-seventeenth century. It was not until the late seventeenth century that it began to find spaces for development and application in different disciplines, from painting to science. In the geographical sphere, the essence of the concept of landscape has been transformed according to the needs of the territories, schools, and approaches. A theoretical and methodological model has been adopted today, where new trends such as integrated landscape management have emerged. In this context, this paper focuses on recognizing the main evolutionary paths of the concept of landscape, in its transience, from different concepts to what has been called integrated landscape management, to define the trends and scope of the most recent notions in Mexican territory, being able to apply these approaches in other territories towards the adoption of this theoretical-practical-functional conceptualization for the improvement of decision-making that is more consistent with reality.

KEY WORDS: landscape, polysemy, object-need, trends, management.

RÉSUMÉ : Dans le contexte historique et territorial de l'Europe et de l'Amérique, le concept de paysage, comme beaucoup d'autres, était caractérisé par sa polysémie jusqu'au milieu du XVIIe siècle. Ce n'est qu'à la fin du XVIIe siècle qu'il a commencé à trouver des espaces de développement et d'application dans différentes disciplines, de la peinture aux sciences. Sur le plan géographique, l'essence du concept de paysage s'est transformée en fonction des besoins des territoires, des écoles et des approches. Un modèle théorique et méthodologique a été adopté aujourd'hui, où de nouvelles tendances telles que la gestion intégrée du paysage ont émergé. Dans ce contexte, cet article s'attache à identifier les principales voies d'évolution du concept de paysage, dans son évolution, depuis différents concepts jusqu'à ce que l'on appelle la gestion intégrée du paysage. Il s'agit de définir les tendances et la portée des notions les plus récentes sur le territoire mexicain, afin de pouvoir appliquer ces approches à d'autres territoires en vue de l'adoption de cette conceptualisation théorique, pratique et fonctionnelle pour une prise de décision plus cohérente avec la réalité.

MOTS CLÉS : paysage, polysémie, objet-besoin, tendances, gestion.

1. Introduction

It has been established in the literature that the term "landscape" has found different nuances and ways of being analyzed since ancient times, and in particular, in the field of geography, it found a unique place because this concept managed to not only coin one of the basic principles of this science but also provided the theoretical and methodological elements for the study of geographic space at different scales, what geographers call holistic, a concept that emerged in 1926 with the proposal of John Smuts and the Theory of Holism.

Without a doubt, landscape geography has been consolidated in different parts of the world since the emergence of this discipline in the Soviet Union. The concept proliferated and from it were generated dissimilar conceptions, scales, and forms of analysis.

The holistic nature allowed the capacity to integrate different variables of natural, social, and economic order which led to the understanding of the different temporal and spatial relationships that Geography studies.

In the case of Mexico, it is recognized that the pioneering works on Landscape Geography were influenced by different schools of European geographic thought and in particular by the work developed at the University of Havana Cuba by José Mateo Rodríguez and the team of collaborators and researchers related to this area of knowledge.

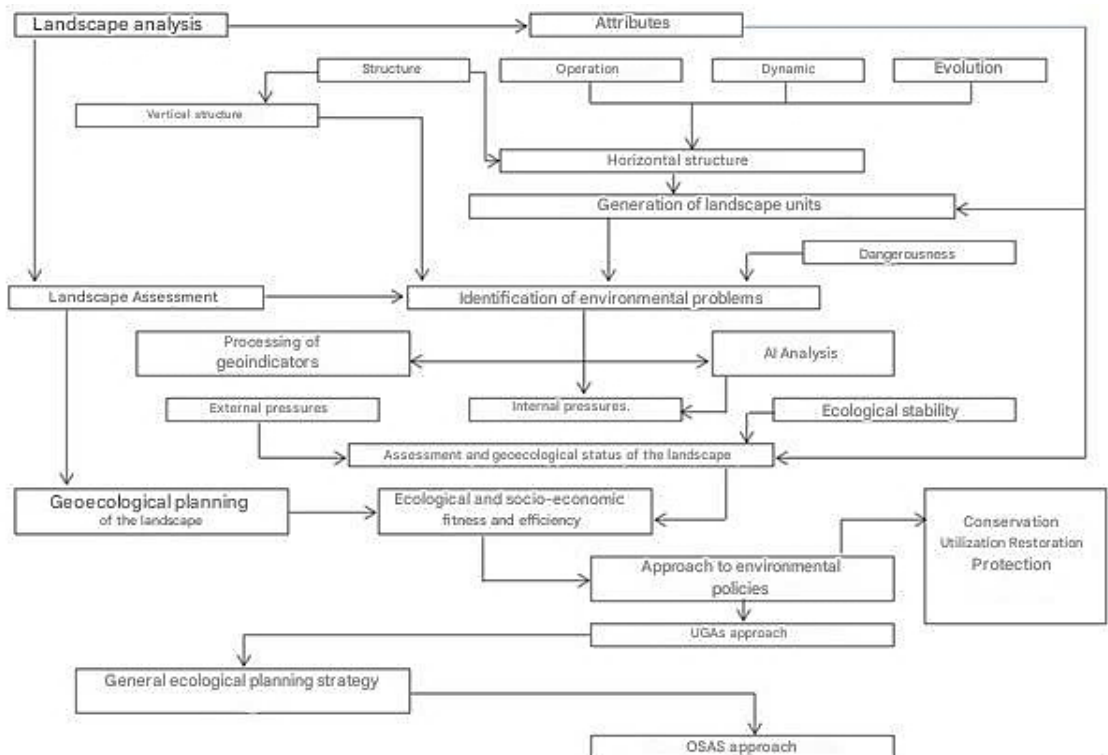


Figure 1 Methodological scheme for the evaluation of landscapes in the La Esperanza basin, Guanajuato. Source: D'Luna, 1990.

According to the above, one of the first methodologies for landscape analysis is the work of D'Luna (1995), who made a methodological proposal for the analysis of landscapes in a region of the state

of Guanajuato (Figure 1); as well as the work developed by Mateo and Ortiz (2001), at the Geography Institute of the National Autonomous University of Mexico.

At present, various points of view and applications are recognized in the field of landscape throughout the world, with notable examples of studies related to taxonomy, geographic differentiation, and territorial planning, including research by Bastian (2000), Malgorzata (2003), Romo et al., (2019), Narcís (2021), Salva et al., (2021), and, Lage and Cury (2023).

Concerning agricultural processes, soil degradation and conservation, urban structures, and territorial transformations, the works of Agnoletti stand out. et al., (2024) for the first case, and those of Bastian et al., (2020), Besse (2021), and Gómez *et al.*, (2024).

Likewise, the study and analysis of landscape have found a place in topics of geodiversity, biodiversity, climate, river environments, deforestation processes, maintenance and restoration of ecosystems, prevention of impacts, and sensory aspects. Various works on these topics can be found, such as those by Grunewaldk et al., (2014), Rojas et al., (2021), Lausch et al., (2022), Tafalla (2022), López et al., (2023), Silvestre (2023), Anastasia (2024) and Katarzyna et al., (2024).

The impact of landscape analysis reaches different universities around the world that have created observatories and laboratories such as the Landscape Observatory of the University of Barcelona; and the Laboratory of Landscape Analysis and Management of the University of Girona in Spain, as well as specific departments for the study of landscape such as those of the Salesian Polytechnic University of Ecuador, the Pan-American Center for Geographic Studies and Research, Venezuela; the University of Berkeley, California; the University of Los Andes in Venezuela; the University of Mato Grosso and the Fluminense of Rio in Brazil; the Alexander Von Humboldt University of Berlin, the University of Munich in Germany and the Free University of Brussels in Belgium.

In the case of Mexico, the range of applications is also wide and the perspectives of landscape analysis are found in diverse topics such as territorial planning, local development of indigenous groups, environmental degradation, dynamics of coastal zones, agricultural and urban development, lake environments and river development, among others. In these areas, there is research such as those by Espinosa (1996), Ortiz and Cyphers (1997), Priego and Esteve (2017), Bollo (2018), Lopez (2018), Bollo et al., (2008, 2010, 2014), Bocco (2010), Ortiz et al., (2010), Secundino and Bocco (2011), Sánchez et al., (2014), Pulido and Bocco (2016), Ramírez et al., (2016), Urquijo and Bocco. (2016), Morales and Priego (2020), Morales et al (2022), Hernández et al., (2023), and Ramírez et al., (2024) among others.

Therefore, this work presents some approximations and focuses on landscape management, based on those schools, notions, and conceptualizations from a diachronic point of view, where two main lines of understanding can be addressed in theoretical-epistemological conceptions, as well as foreseen from the methods, models, and applications in the understanding of the functions of the landscape, where the possibilist, integrative, holistic, critical and socio-natural-cultural construction approach stand out.

Likewise, reflections are carried out on the passage of time in the conceptualization of the landscape from the origin, the appropriation, and application of the term management, which implies a holistic and dialectical point of view, as well as those remains for their use from Emerging Geography.

One point of view that was addressed for the proposal of this work is that the landscape can be considered as a complex understanding of geographic space, not only as a territory but as a geosystemic structure that is made up of components, dynamics, functionality, which leads to a constant transformation and evolution, beyond the use of the territory and scenic beauty, where it is perhaps the maximum expression of what we know as the functioning materialized in the

geographic envelope diachronically and cyclically, where the state of geoecological degradation and stages of hemerobia are not necessarily known in detail.

2. Study area

The application of this work is focused on the study of psychology in an Ibero-American context, particularly in Mexico, where adaptations can be made to a context appropriate to territories in other latitudes, where the promotion of a new approach to integrated landscape management is sought.

3. Methods

To achieve the results, a bibliographic review was carried out, integrating procedural methods of theories, axioms, and models, the Constant and in-depth discussion with specialists on the subject and the analysis of postulates and theoretical notions, presented by Mateo and Ortiz, Canchola et al Ortiz 2021, Espinosa, Magaña, Hettner, Bertrand, de Bolós, and Mateo according to the following theoretical -territorial-functional model:

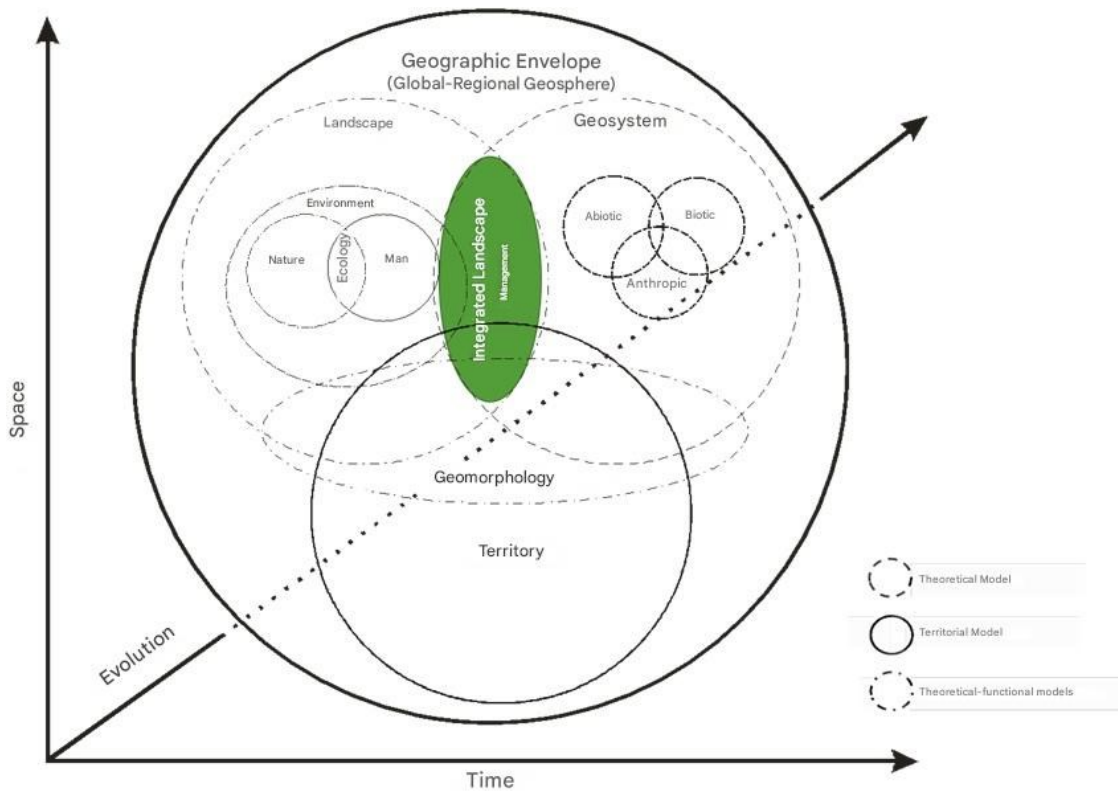


Figure 2 Schematic theoretical-conceptual approach to the complex geo-systemic functionality where Landscape Science (Landscape Geography) is located and the contribution of geomorphology to its study. Source: Own elaboration, based on concepts of Ortiz, Espinosa, Magaña, Hettner, Bertrand, de Bolós, and Mateo (Canchola, 2024).

From this, the following equation is postulated for the Integrated Landscape Management Equation:

$$GiP = (C + Es + F + D) + (Ta/Di) + T + Ev + APH + Mo$$

where;

C= Components

It is = Structure

F= Functionality

D= Dynamic

T= Transformation

Ev = Evolution

Ta= Typification of landscapes

Di= Socioeconomic dimensioning of landscapes

APH= Actions from the Pentahelix

Mo= Monitoring

GiP = Integrated Landscape Management

4. Results and discussion

From a holistic point of view, the results show that the dialectical conjunction of various sciences under a procedural approach leads us to the integration of approaches such as landscape management, where management itself speaks to us of a cycle of actions to determine the activities to be developed, and on the other hand, the landscape, which is considered as the broad, complex, multifunctional, dynamic and temporal conception of geospatial elements.

Tho this end, the following are proposed 6 main lines are proposed to carry out comprehensive management of the landscape:

1. The determination of the hemerobia stages of the typified landscape
2. The implementation of actions aimed at Sustainable Socio-ecological development and monitoring.
3. Social participation from the Pentahelix
4. Public use of the landscape as a public-private resource and common good. (Luis)
5. Environmental-landscape education.
6. The application of environmental public policies aimed at supporting the processes of landscape self-regulation-landscape-state-nation project.

This line of work is focused on training human resources through continuous training systems such as diplomas and courses, as well as generating a comprehensive action plan for landscape management.

5. Conclusion

Integrated Landscape Management involves the conjunction of various schools of thought to integrate multivariable models of actions and public policies under the pentahelix approach, where the need for training new human resources in the field is highlighted with the proposal of a Diploma in Integrated Landscape Management.

The studies arising from the determination of the levels of degradation and hemerobia in the landscape are the basis for the implementation of projects and corrective measures more in line with the reality of the landscape, where public environmental policies are implemented seeking economic instruments for the crystallization of works and projects to maintain a hemerobic balance aligned with sustainable local, regional and national development.

One of the strategies to crystallize the culture of appropriation in Mexico and perhaps in Latin America is the creation of the Diploma in the training of new human resources in landscape management, where in turn it can be scaled to a public policy transversal to the level of secretariat, ministry, local governments to develop joint projects for each unit of the defined territorial landscape and prioritize the actions according to the stages of heterogeneity and degradation, to avoid unpleasant conditions and/or situations of antopicization and reversible nature in the different geoecological systems.

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References

- Agnoletti M., Dobricic S., Matteini T., Palerm J. (2024). Cultivating continuity of the European Landscape. *Environmental history . New Challenges , Innovative Perspectives . Springer .* 10/1007/978-3-031-25713-1
- Anastasia C. (2024). The captivating proximity to the waters: the project of the riparian limits of the Tagus estuary. In: *Landscape here and now. Theory and practice of landscaping.* Esther Valdés Tejera Coord. University of Granada. 291-322 .
- Bastian O. (2000). Landscape classification in Saxony (Germany), a holistic regional planning tool. *Landscape and Urban Planning* 50 (1-3) doi : 10.1016/S0169-2046(00)00086-4. 145-155.
- Bastian O., Cudlín P., Pechanec V., Brzoska P., Sterbová L., Vceláková R., Purkyt J., Grunewald K. (2020) Assessments of biodiversity and habitat services in cities – xemplified by Dresden

- (Germany) and Liberec (Czech Republic). *Science , Ekologia (Bratislava)* 39(2) 174-189. 10.2478/cko-2020-0013
- Besse J. (2021). *L'espace du paysage . Considerations Theory and landscape: reflections from interdisciplinary perspectives*. Laura Puigbert , Ágata Losantos and Gemma Bretcha eds. Pompeu University Fabra , Catalonia. 7-24.
- Bocco G. (2010). Geography and Environmental Sciences. Related disciplinary fields or epistemic redundancy? *Environmental Research. Science and Policy*. ISSN 2007-4492. NUM. 2(2): 25-31.
- Bollo M. (2018). *Landscape Geography and Geoecology : theory and approaches*. In. *Landscape: methods of analysis and reflections*. Ed. Mexico. ISBN. 978-607-28-1169-0.
- Bollo M., Hernández J. (2008). Physical-geographic landscapes of the northeast of the state of Chiapas. *Geographical research, Bulletin of the UNAM Institute of Geography* Num . 66, 2008, pp 7-24.
- Bollo M., Hernández J., Méndez P. (2014). The estate of the environment in Mexico. *Central European Journal of Open Geosciences* 6(2): 219-228. July 2014-219. doi :10.2478/s13533-012-0172-1
- Busquéts J. Present and future of the Landscape: the vision from Catalonia. *Notebooks of Territorial Planning*. ISSN 0212-07981(5): 39-40.
- Busquéts J. (2010). Landscape education: an opportunity for schools. *Iber : Didactics of social sciences, geography and history*. ISSN 1133-9810 65(1): 7-16.
- D'Luna C. (1995). *Landscape evaluation for land use planning in the conservation area "La Esperanza", Guanajuato*. Thesis for the degree of Master in Geography. Division of Graduate Studies, Faculty of Philosophy and Letters. National Autonomous University of Mexico. 174 p.
- Espinosa G. 1996. The enchantment of the lake. The lake system of the basin of Mexico in the Mexican worldview. *History of Science and Technology Series 7*. Institute of Historical Research, Institute of Anthropological Research. National Autonomous University of Mexico. 244 p.
- Gómez D., Zahonero A., Rubio J., Pujol A. (2024). From residual impact to the design of green spaces and compensatory measures. *Methodology for the evaluation of the biodiversity balance related to a new urban development*. In: *Landscape here and now. Theory and practice of landscaping*. Esther Valdés Tejera Coord. University of Granada. 226-237.
- Grunewaldk ., Syrbe R., Bastian O. (2014). Landscape management accounting is a tool for indicating the need of action for ecosystem maintenance and restoration. Exemplified for Saxony. *Ecological Indicators*. 37 (2014)241-251.
- Lage B., Cury I. (2023). *Paisageme territorial planning . Integrated management strategies and instruments . Paisagens Hybridadas* ed. ISBN: 978-6587833781. Rio de Janeiro; 186 p.
- Lausch A., Schaepman E., Skidmore K., Catana E., Bannehr I., Bastian O., Borg E., Bumberguer J., Dietrich P., Glässer C. (2022). Remote sensing of geomorphological diversity linked to biodiversity. Part III: treatments , Processes and remote sensing characteristics. *remote Sens .* 2022, 14, 2279 doi.org/103390/re14092279
- López A., del Valle L., Azpeitia A. (2023). *River urban spaces. Guide to good practices in the field of landscape*. Heritage, Territory and Landscape Collection. University of the Basque Country . ISBN: 978-84-1319-587- 2 188 p.
- Lopez E., Bocco G., Mendoza M., Duhau E. (2001). Predicting land cover and land use change in the urban fringer : a case in Morelia city, Mexico. *Landscape and urban planning*. 55 (4): 271-285.

- López V., Busquéts J., Cortina A. (2009). Landscape management: a manual for the protection, management and planning of landscapes. *Her & Mus: heritage & museography* . ISSN 2171-3731 1(1):125-127.
- Mateo J. and Ortiz M. (2001). Landscape degradation as a theoretical- methodological conception. *Varia Series*. New Era. No. 1. Institute of Geography, UNAM.
- Mazur M., Zielinska M., Boratynska A., Romo A., t Salva M., Marcysiak K., Boratynski A. (2018). Taxonomic and geographic differentiation of *Juniperus phoenicea* agg based on cone, seed, and needle characteristics. *Systematics and Biodiversity*, pp. 1 - 14 . <https://doi.org/10.1080/14772000.2018.1439120> . ISSN: 1477-2000
- Morales H., Priego A. (2020). Landscape diversity in the state of Chiapas. *Geographic notebooks* 59(/1): 306-316
- Morales H., Priego A., Díaz E., Alatorre M. (2022). Landscapes with the Greatest Natural Heritage in Chiapas Mexico. *Geography and Natural Resources*. Plaidades Publishing Ltd. Russian text. *Geography Prirodnye Resursy* . ISSN 1875-3728. Vol 43, 4: 394-400.
- Narcís S. (2021). *Girona: Libres del Segel* , 2021. Esther Valdés (coord.). Editorial Universidad de Granada, 2024. ISBN: 978-84-338-7384-2.
- Ortiz M., Cyphers A. (1997). Geomorphology and archaeological evidence in the region of San Lorenzo Tenochtitlán, Veracruz. *Population, Subsistence and Environment in San Lorenzo Tenochtitlán*. Institute of Anthropological Research, UNAM
- Ortiz M., Méndez A. (1999). Vulnerability scenarios due to sea level rise on the coast of the Gulf of Mexico and the Caribbean Sea. *Geographical Research* No. 39. Institute of Geography, UNAM
- Ortiz M., Summer I., Oropeza O. (2010). Criteria for estimating the physical vulnerability of barrier coasts to hydrometeorological impacts . *Climate change in Mexico. A coastal-marine approach*. EPOMEX/ Autonomous University of Campeche. Government of the State of Campeche.
- Priego A. Esteve M. (2017). Analysis of the complexity and heterogeneity of the landscapes of Mexico. *Geography Papers*. University of Murcia. *Geography Papers* 2017, 63. doi : 10.6018/geografia/2016/259991
- Pulido J., Bocco G. (2016). Traditional knowledge of the landscape in an indigenous community: a case study in the Purépecha region, western Mexico. *Geographical research. Bulletin of the Institute of Geography, UNAM*. ISSN 0188-4611 Num . 89, 2016.41-57. doi:10.14350/rig.45590
- Ramírez L., Gutiérrez E., Morales H. (2024). Anthropization of the vegetation cover of the physical-geographic landscapes of the La Virgen River basin, Ocosingo. Chiapas. In: *Selected topics of socio-environmental risk in southeastern Mexico*. University of Sciences and Arts of Chiapas. Vol. 1. 71-80
- Ramírez L., Priego A., Bollo M. (2016). Potential for the conservation of geodiversity of landscapes in the state of Michoacán, Mexico. *Geographic Perspective* 21(2) 321-344.
- Rojas Y., Velazco K., Montoya J. Salva M. (2021). Deforestation risk in the Peruvian Amazon basin. *Environmental Conservation*, 48(4), pp. 310 - 319. ISSN: 0376-8929
- Romo A., Mazur M., Salva M., Boratynski A. (2019). A re-evaluated taxon: Genetic values and morphological characters support the recognition of the Canary Island juniper of the phoenicea group at a specific level. *Phytotaxa* , 406(1), pp. 64 - 70 . <https://doi.org/10.11646/phytotaxa.406.1.3> . ISSN: 1179-3155

- Salva M., Romo A., Mazur M., Zielinska M., Minissale P.; Dönmez A., Boratynska K., Boratynski A. (2021). Past, present, and future geographic range of the relict Mediterranean and Macaronesian *Juniperus phoenicea* complex. *Ecology and Evolution*, 11(7), pp. 1 - 21. <https://doi.org/10.1002/ece3.7395>. ISSN: 2045-7758.
- Salva M., Walas L., Romo A., Gholizadeh H., Naqinezhad V., Mazur M. & Boratynski A. (2024). Consequence of habitat specificity: a rising risk of habitat loss for endemic and sub - endemic woody species under climate change in the Hyrcanian ecoregion. *Regional Environmental Change*, 24(68), pp. 1 - 16 . <https://doi.org/10.1007/s10113-024-02222-7>. ISSN: 1436-3798
- Sánchez M., Izquierdo J., Bocco G. (2014). Territorial planning policy in Mexico: from theory to practice. Reflections on its progress and future challenges. *Geographical Research* NO. 85. ISSN 2448-7279 DOI: 10.14350/RIG.47348
- Secundino J., Bocco G. (2011). How is land degradation assessed? Global and local overview. *Interciencia* 0378-1844/11/02/096-08. Feb. 2011 36(32): 96-103.
- Silvestre F. (2023). Landscape concretion. Landscape and sensoriality. In: theory and landscape III: reflections from interdisciplinary perspectives. Laura Puigbert , Ágata Losantos and Gemma Bretcha eds. Pompeu University Fabra , Catalonia. 21-46.
- Tafalla M. (2022). Landscape and sensoriality. In: theory and landscape: reflections from interdisciplinary perspectives. Laura Puigbert , Ágata Losantos and Gemma Bretcha eds. Pompeu University Fabra , Catalonia. 115-136.
- Urquijo P., Bocco G. (2016). Geographical thought in Latin America. Retrospective and general balance sheets. *Geographical research*. ISSN 2448-7279 DOI: 10.14350/RIG.47348