Educational Administration: Theory and Practice
2023, 29(1), 825-833
ISSN: 2148-2403
https://kuey.net/

Research Article

Desafíos, Retos Y Limitantes De La Gestión Ambiental En Las Universidades Latinoamericanas
Challenges, Limitations And Limitations Of Environmental Management In Latin American Universities

Carlos Alberto Gómez Cano[1*], Verenice Sánchez Castillo[2], Javier Mauricio García Mogollón[3]

[1*]Corporación Unificada Nacional de Educación Superior – CUN. Florencia, Colombia. https://orcid.org/0000-0003-0425-7201, carlos_gomezca@cun.edu.co
[2]Universidad de la Amazonia. Florencia, Colombia. https://orcid.org/0000-0002-3669-3123, ve.sanchez@udla.edu.co
[3]Universidad de Pamplona. Pamplona, Colombia. https://orcid.org/0000-0001-7423-8909, *jmgmogollon@unipamplona.edu.co*

Citation: Carlos Alberto Gómez Cano, et al (2023), Desafíos, retos y limitantes de la gestión ambiental en las universidades latinoamericanas, Challenges, limitations and limitations of environmental management in Latin American universities, *Educational Administration: Theory and Practice*, 29(1) 825-833
Doi: 10.53555/kuey.v29i1.9704

ARTICLE INFO

ABSTRACT

The article addresses, from a documentary review approach in high-impact databases (2019-2023), the main aspects that influence the implementation of sustainability in higher education institutions in the region. Significant advances were identified, such as the adoption of environmental policies and the integration of environmental education in the curricula, although these efforts have been limited by the lack of economic resources, poor staff training and disconnection with local problems. Research on environmental issues has grown, but its practical impact is restricted by insufficient funding and the lack of inter-institutional collaboration. In addition, the importance of the active participation of the university community in decision-making is highlighted, although this has been limited by the absence of effective institutional mechanisms. It concludes by stating that, despite the progress, structural challenges persist that require a comprehensive and collaborative approach to strengthen environmental management and promote sustainable development in Latin American universities.

Keywords: inter-institutional collaboration, environmental education, environmental management, sustainability, Latin American universities

Clasificación JEL: I23, Q01, Q56, Q58

ARTICLE INFO

RESUMEN

El artículo aborda, desde un enfoque de revisión documental en bases de datos de alto impacto (2019-2023), los principales aspectos que influyen en la implementación de la sostenibilidad en las instituciones de educación superior de la región. Se identificaron avances significativos, como la adopción de políticas ambientales y la integración de la educación ambiental en los planes de estudio, aunque estos esfuerzos se han visto limitados por la falta de recursos económicos, la escasa capacitación del personal y la desconexión con problemáticas locales. La investigación en temas ambientales ha crecido, pero su impacto práctico se ve restringido por la insuficiente financiación y la falta de colaboración interinstitucional. Además, se destaca la importancia de la participación activa de la comunidad universitaria en la toma de decisiones, aunque esta ha sido limitada por la ausencia de mecanismos institucionales efectivos. Se concluye afirmando que, a pesar de los avances, persisten desafíos estructurales que requieren un enfoque integral y colaborativo para fortalecer la gestión ambiental y promover un desarrollo sostenible en las universidades latinoamericanas.

Palabras clave: colaboración interinstitucional, educación ambiental, gestión ambiental, sostenibilidad, universidades latinoamericanas

INTRODUCTION

Environmental management in Latin American universities has gained relevance in recent decades as a response to the growing awareness of global and local environmental challenges (Ripoll Rivaldo, 2023). These institutions have adopted multidisciplinary approaches to integrate sustainable practices in their operations, teaching, and research (Cattaneo et al., 2022). On the one hand, many universities have implemented environmental management systems that include waste reduction, efficient use of resources such as water and energy, and the promotion of green infrastructures (Acosta et al., 2020). On the other hand, academic programs and lines of research have been created focused on topics such as climate change, biodiversity conservation, and the transition to circular economies, reflecting a commitment to training professionals capable of facing the environmental challenges of the 21st century. In addition, Latin American universities have taken on a leading role in promoting social and environmental responsibility within their campuses and in their communities of influence (Asibor et al., 2022). Through outreach projects and collaboration with local actors (Schilling et al., 2021), these institutions encourage citizen participation in sustainability initiatives according to Vieira et al. (2022), such as reforestation (Acheampong & Opoku, 2023), environmental education and the implementation of clean technologies (Aminu et al., 2023).

There are still significant challenges, such as the lack of funding, the need for greater articulation between institutional policies and daily practices (Okumu et al., 2021), and the urgency of strengthening the environmental culture among students, faculty, and administrative staff (Bilalova et al., 2023). In this sense, environmental management in Latin American universities is not only an ethical imperative but also an opportunity to lead the transformation toward more sustainable and resilient societies (Collado Agudo et al., 2023).

In recent decades, the growing awareness of the environmental impacts generated by human activities has led to a redefinition of the role of higher education institutions in promoting sustainability (Acero Moreno et al., 2023). Universities, as spaces for training, research, and linkage with society, have been called upon to assume leadership in the integration of responsible environmental practices (Salmerón Manzano & Manzano Agugliaro, 2023). In Latin America, this responsibility has been reinforced by the urgency of addressing issues such as climate change (Fabiano et al., 2021), biodiversity loss, and inequality in access to natural resources (Gómez & Maynou, 2021), situations that particularly affect the region (Baquero Rodríguez et al., 2022).

Historically, Latin American universities have faced structural challenges that have hindered the effective implementation of environmental management (Garrett et al., 2019). The lack of financial resources (Soyacool et al., 2023), the poor articulation between academic and administrative functions, and the absence of public policies that promote sustainability in the educational field have been some of the recurring obstacles (González Vallejo, 2023). Despite this, various institutions have undertaken significant efforts to incorporate the environmental dimension in their activities (Wiegant et al., 2022), from creating specialized offices to including ecological content in the curricula.

There are interrelations that promote ecosystems with an environmental perspective and link population studies (Almenar et al., 2021), communities, land use, protected areas, and biodiversity (Luckeneder et al., 2021). These are based on theoretical studies that support the categories discussed and the results among alliances at a global level. There are issues that are still a social debt, and that must be addressed urgently, as stated by Ngcamu (2023). The polluting effects on the environment increasingly affect humanity itself, animals, and plants. At the same time, ecosystems are being destroyed (Price & Price, 2022). The creation of strategies and programs that include universities, organizations, and institutions of this nature is necessary to address and carry out the actions (Gaganis et al., 2023).

The study of environmental management in Latin American universities acquires relevance for its potential to reduce the negative impacts of these institutions and for their capacity to train professionals aware of their environmental responsibility (Yang et al., 2020). In addition, universities have the opportunity to become models of sustainability for their communities (Tápanez Suárez et al., 2023), promote innovative practices, and generate knowledge applicable to local and regional contexts (Tanoh et al., 2022). To achieve these objectives, it is necessary to identify and analyze the challenges and limitations that persist in this field in order to propose strategies to overcome them and move towards a more sustainable future, as stated by Higuera Carrillo (2022). In this context, this article seeks to deepen the analysis of these problems. It offers a critical and proactive vision to contribute to the strengthening of environmental management in higher education. Through a comprehensive approach, it explores the current trends, the progress achieved, and the obstacles that still persist, with the aim of providing a frame of reference for future research and actions in this field.

METHODOLOGY

This article was developed using a documentary review approach (Hatab et al., 2019), focused on the analysis of secondary sources published in high-impact databases between 2019 and 2023. The methodology was structured in four main stages (Orona Návar et al., 2022), each with specific dimensions and indicators that allowed guaranteeing the rigor and systematicity of the process.

Stage 1: Definition of the theoretical framework and objectives

In this stage, the conceptual foundations and objectives of the study were established. The key dimensions of analysis were defined: environmental management policies and systems, environmental education, sustainability research, community participation, and inter-institutional collaboration. The indicators included the identification of theoretical frameworks, key concepts, and guiding questions that oriented the documentary search and analysis.

Stage 2: Search and selection of documents

A systematic search was carried out in high-impact academic databases, such as Scopus, Web of Science, SciELO, Redalyc, and Google Scholar. The search strategy was based on keywords such as "university environmental management", "sustainability in higher education" and "Latin American universities". Temporal filters (2019-2023) and inclusion criteria were applied, such as thematic relevance, regional focus, and source quality. Indicators included the number of documents identified, selected, and discarded, as well as the justification for their inclusion or exclusion.

Stage 3: Analysis and categorization of information

The selected documents were analyzed using a matrix of predefined categories based on the dimensions of the study. A qualitative approach was used to identify trends, advances, challenges, and limitations. Indicators included the frequency of recurring themes, the identification of successful cases, and the detection of gaps in the literature.

Stage 4: Synthesis and validation

In this stage, the findings were integrated into a coherent synthesis and the different perspectives found in the literature were contrasted. The results were validated through triangulation of sources and peer review. In addition, the consistency and reliability of the conclusions was ensured. Indicators included the internal coherence of the analysis, the representativeness of the sources and the clarity of the conclusions. This methodology made it possible to guarantee a rigorous and systematic approach. It provided a solid basis for the discussion and conclusions of the article.

RESULTS and DISCUSSION

One of the main challenges faced by Latin American universities in implementing environmental management systems is the lack of economic and financial resources. Many higher education institutions in the region operate with limited budgets, which makes it difficult to invest in sustainable infrastructure, clean technologies, and environmental training programs. In addition, the prioritization of other academic and administrative aspects relegates environmental management to the background, thus limiting its integral development. This scenario is aggravated in contexts of recurrent economic crises, where environmental sustainability is not always perceived as an immediate priority. Figure 1 shows the most significant advances, limitations, and aspects associated with the research progress on the subject in question:

Figure 1: Challenges and limitations of environmental management in Latin American universities

Source: Own elaboration

There are many initiatives in this regard that could be reviewed in the literature. Such is the case of social involvement with their environment (Dobbin & Smith, 2021), adaptability and resilience (Gatto et al., 2021), sustainability (Al Shaikh & Hanaysha, 2023), strategies to mitigate deforestation (Purnomo et al., 2023) and process automation (Smith & Fressoli, 2021) and innovation (Piperopoulos et al., 2023). In general, these authors address aspects associated with studies and practical actions that respond to projects and initiatives that have arisen in universities or research groups.

The integration of sustainability into the organizational culture of Latin American universities represents a significant challenge. Although many institutions have adopted formal policies and statements on sustainability (Sanabria Martínez, 2022), their practical implementation is often fragmented and ineffective. This is due, in part, to resistance to change on the part of the university community, including students, teachers, and administrative staff. The lack of environmental awareness and education, as well as the absence of clear incentives to adopt sustainable practices (Karres et al., 2022), contribute to this situation. To overcome this challenge, it is necessary to foster a culture of environmental responsibility that involves all university stakeholders and promotes active participation in green initiatives (Beard et al., 2022). Cunha et al. (2021) exposes the importance of environmental management in the face of health crises from a sustainable perspective.

Mogroviejo Andrade (2022) discussed ways to mitigate the impacts of the COVID-19 pandemic at the global level and Pérez Guedes & Arufe Padrón (2023) explored the new perspectives towards energy transformation in Latin America after this pandemic, evidenced the need for clean energies and their implication with projects and research coming out of universities.

Latin American universities face structural and regulatory constraints that hinder effective environmental management. In many cases, national and institutional regulations related to sustainability are ambiguous or insufficient, which generates gaps in the implementation of concrete actions associated with environmental management, as stated by Vela Almeida et al. (2022). In addition, the lack of coordination between the different areas of the university (academic, administrative, and operational) hinders the creation of comprehensive environmental management strategies. The absence of robust monitoring and evaluation systems also limits the ability of institutions to measure the impact of their initiatives and adjust their policies accordingly.

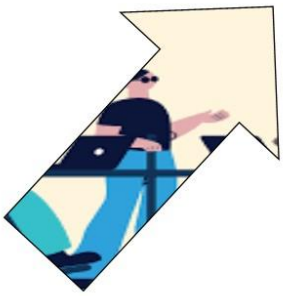
Despite the fact that universities are centers of knowledge and training, there is a major challenge in integrating sustainability into curricula and research. In many institutions, environmental issues are addressed superficially or limited to specific disciplines, without a cross-cutting vision that permeates all areas of knowledge (Jonkman, 2022). In addition, research in sustainability often faces difficulties in obtaining funding and visibility, which limits its impact on the solution of local and regional environmental problems. To advance in this area, it is necessary to promote interdisciplinary approaches and strengthen collaboration between universities, governments, and the private sector (Wang & Ng, 2023).

Waste management and efficient use of resources are critical challenges for Latin American universities. Many institutions lack adequate systems for waste separation, recycling, and final disposal, which generates negative environmental impacts (Yap et al., 2022). In addition, excessive energy and water consumption, as well as the lack of efficient infrastructure, contribute to the environmental footprint of these institutions (Alvarez Contreras et al., 2023). Implementing circular economy practices and adopting sustainable technologies are necessary steps, but their implementation requires investment, strategic planning, and institutional commitment.

Studies related to environmental governance highlight the importance of sound policies (Chuard et al., 2022); this impacts on macro scales, as stated by Axelrod et al. (2022), and on biodiversity at the global level, according to Droste et al. (2022). It also has a direct impact on human behaviors (Szablowski & Campbell, 2019). In the more specific case of environmental governance in Latin American universities, it faces limitations related to participation and decision-making (Debonne et al., 2021; Pérez Gamboa et al., 2022). In many cases, environmental initiatives are driven by small groups or committed individuals without the broad participation of the university community. This reduces the scope and sustainability of the actions undertaken (Valbuena et al., 2021). In addition, the lack of clear mechanisms for accountability and transparency in environmental management weakens trust in institutional policies. To overcome these limitations, it is essential to establish inclusive governance structures and promote co-responsibility in environmental management.

In agreement with Rosinger et al. (2020), the challenges and limitations of environmental management in Latin American universities are multiple and complex, but they also represent opportunities to transform these institutions into models of sustainability. García (2022) states that, to achieve this, it is necessary to address economic, cultural, structural, and regulatory barriers, as well as to promote research, education, and the active participation of the entire university community. Only through a comprehensive and collaborative approach will it be possible to move towards effective and sustainable environmental management in the Latin American university context. The following figure shows two significant aspects of the importance of community participation and its effect on Latin American universities (Figure 2):

Figure 2: Importance of community participation in Latin American universities



Community Participation:

Active Involvement: The importance of engaging the university community in decision-making processes is emphasized.

Barriers: Limited by the absence of effective institutional mechanisms for participation.

Structural Challenges: Despite progress, significant structural challenges remain.

Need for Collaboration: A comprehensive and collaborative approach is necessary to enhance environmental management and promote sustainable development in Latin American universities.

Fuente: Own elaboration

Based on the research conducted on trends in environmental management in Latin American universities, five key aspects were identified that have marked the discussion and practice in this area. These findings reflect both advances and persistent challenges in the integration of sustainability in higher education institutions.

First, it was noted that many universities have adopted formalized environmental management policies and systems, such as the implementation of ISO 14001 standards. These initiatives sought to improve the environmental performance of the institutions, but faced limitations related to the lack of economic and trained human resources. Despite these obstacles, some universities have made significant progress in reducing their ecological footprint, especially in areas such as waste management and efficient energy use (Shonande, 2023).

Secondly, environmental education was consolidated as a cross-cutting theme in the curricula of various degree programs. However, its integration was not always homogeneous or effective. In some cases, environmental contents were incorporated in a superficial manner, without a clear connection with local or regional problems. Nevertheless, there were successful experiences where student participation in research and extension projects related to sustainability was encouraged (Turner et al., 2023).

A third important aspect was the growing interest in research on environmental issues. Latin American universities increased their academic production in areas such as climate change, biodiversity, and water resource management. However, this trend was limited by scarce funding and a lack of inter-institutional collaboration, which hindered knowledge transfer to society and the practical application of findings (Murgas Téllez et al., 2023).

Fourth, progress was identified in the creation of networks and alliances between universities to address common environmental challenges (Oliveira et al., 2021). These networks allowed the exchange of experiences and good practices, although their impact is still incipient due to the lack of continuity in the projects and dependence on external funding. Despite this, these collaborations represented an important step towards the construction of an academic community more committed to sustainability.

It was found that the participation of the university community in environmental decision-making was a key factor in the success of the initiatives. In those institutions where the inclusion of students, faculty, and administrative staff was encouraged, greater ownership of the projects and greater environmental awareness were achieved. However, in many cases, this participation was limited due to the lack of institutional mechanisms to guarantee its effectiveness.

The analysis carried out allows us to affirm that Latin American universities have advanced in incorporating environmental management. However, they still face important challenges related to financing, training, and integrating sustainability into their substantive functions. These challenges require a comprehensive and collaborative approach to achieve a lasting impact in the region.

CONCLUSIONS

Environmental management in Latin American universities has made significant progress in the adoption of formal policies and systems, such as ISO 14001 standards, but faces persistent limitations due to a lack of

economic and trained human resources. These challenges have hindered the effective implementation of sustainable initiatives, although some institutions have made notable progress in areas such as waste management and energy efficiency.

The integration of environmental education into curricula has been uneven and, in many cases, superficial. Despite efforts to include environmental content, its connection to local and regional issues has been insufficient, which has limited its impact on the training of professionals who are aware of and committed to sustainability.

Research on environmental issues has grown in Latin American universities, but its practical impact is restricted by scarce funding and a lack of inter-institutional collaboration. This has hindered the transfer of knowledge to society and the application of innovative solutions to urgent environmental problems.

The participation of the university community in environmental decision-making is essential for the success of sustainability initiatives. The lack of institutional mechanisms that encourage effective participation has limited its scope, highlighting the need to create more inclusive and transparent structures that involve students, teachers, and administrative staff in environmental management.

FINANCING
None

CONFLICT OF INTEREST STATEMENT
None

AUTHORSHIP CONTRIBUTION:
Conceptualization: Carlos Alberto Gómez Cano, Verenice Sánchez Castillo y Javier Mauricio García Mogollón
Research: Carlos Alberto Gómez Cano

Methodology: Verenice Sánchez Castillo
13. Drafting - original draft: Verenice Sánchez Castillo y Javier Mauricio García Mogollón
Drafting - proofreading and editing: Carlos Alberto Gómez Cano

REFERENCES

1. Acero Moreno, A. M., Ordoñez Paredes, B. A., Toloza Guardias, H. P., & Vega Palmera, B. (2023). Análisis estratégico para la empresa Imbocar, seccional Valledupar – Colombia. *Región Científica*, *2*(2), 202395. https://doi.org/10.58763/rc202395
2. Acheampong, A. O., & Opoku, E. E. O. (2023). Energy justice, democracy and deforestation. *Journal of Environmental Management*, *341*, 118012. https://doi.org/10.1016/j.jenvman.2023.118012
3. Acosta, L. A., Maharjan, P., Peyriere, H. M., & Mamiit, R. J. (2020). Natural capital protection indicators: Measuring performance in achieving the Sustainable Development Goals for green growth transition. *Environmental and Sustainability Indicators*, *8*, 100069. https://doi.org/10.1016/j.indic.2020.100069
4. Almenar, J. B., Elliot, T., Rugani, B., Philippe, B., Gutierrez, T. N., Sonnemann, G., & Geneletti, D. (2021). Nexus between nature-based solutions, ecosystem services and urban challenges. *Land Use Policy*, *100*, 104898. https://doi.org/10.1016/j.landusepol.2020.104898
5. Al Shaikh, M. E., & Hanaysha, J. R. (2023). A conceptual review on entrepreneurial marketing and business sustainability in small and medium enterprises. *World Development Sustainability*, *2*, 100039. https://doi.org/10.1016/j.wds.2022.100039
6. Álvarez Contreras, D. E., Montes Padilla, J. D., & Osorio Martínez, C. D. (2023). Habilidades gerenciales como factor de competitividad empresarial. *Región Científica*, *2*(2), 2023109. https://doi.org/10.58763/rc2023109
7. Aminu, N., Clifton, N., & Mahe, S. (2023). From pollution to prosperity: Investigating the Environmental Kuznets curve and pollution-haven hypothesis in sub-Saharan Africa's industrial sector. *Journal of Environmental Management*, *342*, 118147. https://doi.org/10.1016/j.jenvman.2023.118147
8. Asibor, J. O., Clough, P. T., Nabavi, S. A., & Manovic, V. (2022). A country-level assessment of the deployment potential of greenhouse gas removal technologies. *Journal of Environmental Management*, *323*, 116211. https://doi.org/10.1016/j.jenvman.2022.116211
9. Axelrod, M., Vona, M., Colwell, J. N., Fakoya, K., Salim, S. S., Webster, D. G., & Torre Castro, M. de la. (2022). Understanding gender intersectionality for more robust ocean science. *Earth System Governance*, *13*, 100148. https://doi.org/10.1016/j.esg.2022.100148
10. Baquero Rodríguez, G. A., Martínez, S., Acuña, J., Nolasco, D., & Rosso, D. (2022). How elevation dictates technology selection in biological wastewater treatment. *Journal of Environmental Management*, *307*, 114588. https://doi.org/10.1016/j.jenvman.2022.114588
11. Beard, V. A., Satterthwaite, D., Mitlin, D., & Du, J. (2022). Out of sight, out of mind: Understanding the sanitation crisis in global South cities. *Journal of Environmental Management*, *306*, 114285. https://doi.org/10.1016/j.jenvman.2021.114285

12. Bilalova, S., Newig, J., Tremblay Lévesque, L. C., Roux, J., Herron, C., & Crane, S. (2023). Pathways to water sustainability? A global study assessing the benefits of integrated water resources management. *Journal of Environmental Management*, *343*, 118179. https://doi.org/10.1016/j.jenvman.2023.118179
13. Cattaneo, A., Adukia, A., Brown, D. L., Christiaensen, L., Evans, D. K., Haakenstad, A., McMenomy, T., Partridge, M., Vaz, S., & Weiss, D. J. (2022). Economic and social development along the urban–rural continuum: New opportunities to inform policy. *World Development*, *157*, 105941. https://doi.org/10.1016/j.worlddev.2022.105941
14. Chuard, P., Garard, J., Schulz, K., Kumarasinghe, N., Rolnick, D., & Matthews, D. (2022). A portrait of the different configurations between digitally-enabled innovations and climate governance. *Earth System Governance*, *13*, 100147. https://doi.org/10.1016/j.esg.2022.100147
15. Collado Agudo, J., Herrero Crespo, Á., & Martín Gutiérrez, H. S. (2023). The adoption of a smart destination model by tourism companies: An ecosystem approach. *Journal of Destination Marketing & Management*, *28*, 100783. https://doi.org/10.1016/j.jdmm.2023.100783
16. Cunha, M. da C., Ju, Y., Morais, M. H., Dronova, I., Ribeiro, S. P., Bruhn, F. R., Lima, L. L., Sales, D. M., Schultes, O. L., Rodriguez, D. A., & Caiaffa, W. T. (2021). Disentangling associations between vegetation greenness and dengue in a Latin American city: Findings and challenges. *Landscape and Urban Planning*, *216*, 104255. https://doi.org/10.1016/j.landurbplan.2021.104255
17. Debonne, N., Vliet, J. van, Metternicht, G., & Verburg, P. (2021). Agency shifts in agricultural land governance and their implications for land degradation neutrality. *Global Environmental Change*, *66*, 102221. https://doi.org/10.1016/j.gloenvcha.2020.102221
18. Dobbin, K. B., & Smith, D. W. (2021). Bridging social capital theory and practice: Evidence from community-managed water treatment plants in Honduras. *Journal of Rural Studies*, *88*, 181-191. https://doi.org/10.1016/j.jrurstud.2021.10.002
19. Droste, N., Olsson, J. A., Hanson, H., Knaggård, Å., Lima, G., Lundmark, L., Thoni, T., & Zelli, F. (2022). A global overview of biodiversity offsetting governance. *Journal of Environmental Management*, *316*, 115231. https://doi.org/10.1016/j.jenvman.2022.115231
20. Fabiano, E., Schulz, C., & Brañas, M. M. (2021). Wetland spirits and indigenous knowledge: Implications for the conservation of wetlands in the Peruvian Amazon. *Current Research in Environmental Sustainability*, *3*, 100107. https://doi.org/10.1016/j.crsust.2021.100107
21. Gaganis, C., Galariotis, E., Pasiouras, F., & Tasiou, M. (2023). Managerial ability and corporate greenhouse gas emissions. *Journal of Economic Behavior & Organization*, *212*, 438-453. https://doi.org/10.1016/j.jebo.2023.05.044
22. García, N. A. (2022). Can direct democracy deliver an alternative to extractivism? An essay on popular consultations. *Political Geography*, *98*, 102715. https://doi.org/10.1016/j.polgeo.2022.102715
23. Garrett, R. D., Levy, S., Carlson, K. M., Gardner, T. A., Godar, J., Clapp, J., Dauvergne, P., Heilmayr, R., Waroux, Y. le P. de, Ayre, B., Barr, R., Døvre, B., Gibbs, H. K., Hall, S., Lake, S., Milder, J. C., Rausch, L. L., Rivero, R., Rueda, X., … Villoria, N. (2019). Criteria for effective zero-deforestation commitments. *Global Environmental Change*, *54*, 135-147. https://doi.org/10.1016/j.gloenvcha.2018.11.003
24. Gatto, M., Naziri, D., Pedro, J. S., & Béné, C. (2021). Crop resistance and household resilience – The case of cassava and sweetpotato during super-typhoon Ompong in the Philippines. *International Journal of Disaster Risk Reduction*, *62*, 102392. https://doi.org/10.1016/j.ijdrr.2021.102392
25. Gómez, S., & Maynou, F. (2021). Balancing ecology, economy and culture in fisheries policy: Participatory research in the Western Mediterranean demersal fisheries management plan. *Journal of Environmental Management*, *291*, 112728. https://doi.org/10.1016/j.jenvman.2021.112728
26. González Vallejo, R. (2023). La transversalidad del medioambiente: facetas y conceptos teóricos. *Región Científica*, *2*(2), 202393. https://doi.org/10.58763/rc202393
27. Hatab, A. A., Cavinato, M. E. R., Lindemer, A., & Lagerkvist, C. J. (2019). Urban sprawl, food security and agricultural systems in developing countries: A systematic review of the literature. *Cities*, *94*, 129-142. https://doi.org/10.1016/j.cities.2019.06.001
28. Higuera Carrillo, E. L. (2022). Aspectos clave en agroproyectos con enfoque comercial: Una aproximación desde las concepciones epistemológicas sobre el problema rural agrario en Colombia. *Región Científica*, *1*(1), 20224. https://doi.org/10.58763/rc20224
29. Jonkman, J. (2022). Hidden tunnels, drowned dragons, and other subterranean secrets: Environmental politics of small-scale mining in Colombia. *Journal of Rural Studies*, *96*, 293-304. https://doi.org/10.1016/j.jrurstud.2022.09.038
30. Karres, N., Kang, S., Aldous, A., Pattison Williams, J. K., & Masuda, Y. J. (2022). How effective is community-based management of freshwater resources? A review. *Journal of Environmental Management*, *323*, 116161. https://doi.org/10.1016/j.jenvman.2022.116161
31. Luckeneder, S., Giljum, S., Schaffartzik, A., Maus, V., & Tost, M. (2021). Surge in global metal mining threatens vulnerable ecosystems. *Global Environmental Change*, *69*, 102303. https://doi.org/10.1016/j.gloenvcha.2021.102303
32. Mogrovejo Andrade, J. M. (2022). Estrategias resilientes y mecanismos de las organizaciones para mitigar los efectos ocasionados por la pandemia a nivel internacional. *Región Científica*, *1*(1), 202211. https://doi.org/10.58763/rc202211

33. Murgas Téllez, B., Henao Pérez, A. A., & Guzmán Acuña, L. (2023). Oposición pública o manifestación social frente a proyectos de inversión en Chile y Colombia. *Región Científica*, *2*(2), 2023112. https://doi.org/10.58763/rc2023112
34. Ngcamu, B. S. (2023). Application of the disaster management cycle and climate change: Studying flood disasters in South Africa. *Social Sciences & Humanities Open*, *8*(1), 100657. https://doi.org/10.1016/j.ssaho.2023.100657
35. Okumu, B., Kehbila, A. G., & Osano, P. (2021). A review of water-forest-energy-food security nexus data and assessment of studies in East Africa. *Current Research in Environmental Sustainability*, *3*, 100045. https://doi.org/10.1016/j.crsust.2021.100045
36. Oliveira, T. D., Gurgel, A. C., & Tonry, S. (2021). Potential trading partners of a brazilian emissions trading scheme: The effects of linking with a developed region (Europe) and two developing regions (Latin America and China). *Technological Forecasting and Social Change*, *171*, 120947. https://doi.org/10.1016/j.techfore.2021.120947
37. Orona Návar, C., García Morales, R., Loge, F. J., Mahlknecht, J., Aguilar Hernández, I., & Ornelas Soto, N. (2022). Microplastics in Latin America and the Caribbean: A review on current status and perspectives. *Journal of Environmental Management*, *309*, 114698. https://doi.org/10.1016/j.jenvman.2022.114698
38. Pérez Gamboa, A. J., Gómez Cano, C. A., & Sánchez Castillo, V. (2022). Decision making in university contexts based on knowledge management systems. *Data and Metadata*, *1*, 92. https://doi.org/10.56294/dm202292
39. Pérez Guedes, N., & Arufe Padrón, A. (2023). Perspectivas de la transición energética en Latinoamérica en el escenario pospandemia. *Región Científica*, *2*(1), 202334. https://doi.org/10.58763/rc202334
40. Piperopoulos, P., Jimenez Moro, E., Yeung, M., Christopoulou, D., & Ming, A. A. (2023). The impact of exogenous shocks on the innovation performance of firms in the Caribbean small island economies: Quasi-replication of Paunov (2012). *Technological Forecasting and Social Change*, *196*, 122843. https://doi.org/10.1016/j.techfore.2023.122843
41. Price, R., & Price, S. (2022). Bookshelf 2021. *New West Indian Guide / Nieuwe WestIndische Gids*, *96*(1), 90-132. https://doi.org/10.1163/22134360-09601053
42. Purnomo, H., Okarda, B., Puspitaloka, D., Ristiana, N., Sanjaya, M., Komarudin, H., Dermawan, A., Andrianto, A., Kusumadewi, S. D., & Brady, M. A. (2023). Public and private sector zero-deforestation commitments and their impacts: A case study from South Sumatra Province, Indonesia. *Land Use Policy*, *134*, 106818. https://doi.org/10.1016/j.landusepol.2023.106818
43. Ripoll Rivaldo, M. (2023). El emprendimiento social universitario como estrategia de desarrollo en personas, comunidades y territorios. *Región Científica*, *2*(2), 202379. https://doi.org/10.58763/rc202379
44. Rosinger, A. Y., Brewis, A., Wutich, A., Jepson, W., Staddon, C., Stoler, J., & Young, S. L. (2020). Water borrowing is consistently practiced globally and is associated with water-related system failures across diverse environments. *Global Environmental Change*, *64*, 102148. https://doi.org/10.1016/j.gloenvcha.2020.102148
45. Salmerón Manzano, E., & Manzano Agugliaro, F. (2023). Worldwide research trends on land tenure. *Land Use Policy*, *131*, 106727. https://doi.org/10.1016/j.landusepol.2023.106727
46. Sanabria Martínez, M. J. (2022). Construir nuevos espacios sostenibles respetando la diversidad cultural desde el nivel local. *Región Científica*, *1*(1), 20222. https://doi.org/10.58763/rc20222
47. Schilling, J., Schilling Vacaflor, A., Flemmer, R., & Froese, R. (2021). A political ecology perspective on resource extraction and human security in Kenya, Bolivia and Peru. *The Extractive Industries and Society*, *8*(4), 100826. https://doi.org/10.1016/j.exis.2020.10.009
48. Shobande, O. A. (2023). Rethinking social change: Does the permanent and transitory effects of electricity and solid fuel use predict health outcome in Africa? *Technological Forecasting and Social Change*, *186*, 122169. https://doi.org/10.1016/j.techfore.2022.122169
49. Smith, A., & Fressoli, M. (2021). Post-automation. *Futures*, *132*, 102778. https://doi.org/10.1016/j.futures.2021.102778
50. Sovacool, B. K., Rio, D. F., & Zhang, W. (2023). The political economy of net-zero transitions: Policy drivers, barriers, and justice benefits to decarbonization in eight carbon-neutral countries. *Journal of Environmental Management*, *347*, 119154. https://doi.org/10.1016/j.jenvman.2023.119154
51. Szablowski, D., & Campbell, B. (2019). Struggles over extractive governance: Power, discourse, violence, and legality. *The Extractive Industries and Society*, *6*(3), 635-641. https://doi.org/10.1016/j.exis.2019.06.009
52. Tanoh, R., Nikiema, J., Asiedu, Z., Jayathilake, N., & Cofie, O. (2022). The contribution of tipping fees to the operation, maintenance, and management of fecal sludge treatment plants: The case of Ghana. *Journal of Environmental Management*, *303*, 114125. https://doi.org/10.1016/j.jenvman.2021.114125
53. Tápanes Suárez, E., Bosch Nuñez, O., Sánchez Suárez, Y., Marqués León, M., & Santos Pérez, O. (2023). Sistema de indicadores para el control de la sostenibilidad de los centros históricos asociada al transporte. *Región Científica*, *2*(1), 202352. https://doi.org/10.58763/rc202352
54. Turner, J. A., Percy, H., Hall, A., & Klerkx, L. (2023). Re-orientating agricultural research to address complex challenges: Legitimacy dynamics of a hybrid research organization. *Journal of Rural Studies*, *103*, 103137. https://doi.org/10.1016/j.jrurstud.2023.103137

55. Valbuena, D., Cely Santos, M., & Obregón, D. (2021). Agrochemical pesticide production, trade, and hazard: Narrowing the information gap in Colombia. *Journal of Environmental Management*, *286*, 112141. https://doi.org/10.1016/j.jenvman.2021.112141
56. Vela-Almeida, D., Gonzalez, A., Gavilán, I., Sánchez, G. M. F., Torres, N., & Ysunza, V. (2022). The right to decide: A triad of participation in politicizing extractive governance in Latin America. *The Extractive Industries and Society*, *9*, 100875. https://doi.org/10.1016/j.exis.2021.01.010
57. Vieira, C. L., Rumenos, N. N., Gheler Costa, C., Toqueti, F., & Spazziani, M. de L. (2022). Environmental education in urban cities: Planet regeneration through ecologically educating children and communities. *International Journal of Educational Research Open*, *3*, 100208. https://doi.org/10.1016/j.ijedro.2022.100208
58. Wang, J., & Ng, Y. Y. (2023). Post-earthquake housing recovery with traditional construction: A preliminary review. *Progress in Disaster Science*, *18*, 100283. https://doi.org/10.1016/j.pdisas.2023.100283
59. Wiegant, D., Bakx, J., Flohr, N., Oel, P. van, & Dewulf, A. (2022). Ecuadorian water funds' use of scale-sensitive strategies to stay on course in forest and landscape restoration governance. *Journal of Environmental Management*, *311*, 114850. https://doi.org/10.1016/j.jenvman.2022.114850
60. Yang, S., Zhao, W., Liu, Y., Cherubini, F., Fu, B., & Pereira, P. (2020). Prioritizing sustainable development goals and linking them to ecosystem services: A global expert's knowledge evaluation. *Geography and Sustainability*, *1*(4), 321-330. https://doi.org/10.1016/j.geosus.2020.09.004
61. Yap, X. S., Truffer, B., Li, D., & Heimeriks, G. (2022). Towards transformative leapfrogging. *Environmental Innovation and Societal Transitions*, *44*, 226-244. https://doi.org/10.1016/j.eist.2022.07.003