



ENVIRONMENTAL TRANSFORMATIONS IN LATIN AMERICA, A CRITICAL  
REVIEW OF THE SUSTAINABLE PRACTICES IN THE TERRITORIES  
TRANSFORMACIONES AMBIENTALES EN AMÉRICA LATINA, UNA  
REVISIÓN CRÍTICA DE LAS PRÁCTICAS SUSTENTABLES EN LOS  
TERRITORIOS

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**Abstract**

Sustainable practices are a set of behavioral strategies aimed at satisfying human needs within a specific historical, cultural, and community framework, emphasizing the harmonious relationship with the natural environment, society, and culture. These practices are considered fundamental pillars in the promotion of sustainable behaviors in local, urban, rural, educational, and other communities, adopting a participatory approach for their implementation. In a context such as Latin America and the Caribbean, the need to incorporate sustainable practices arises from the environmental challenges generated by the historical processes of extractivist development dissociated from native cultures, making it necessary to rethink development models towards approaches that prioritize equity, ethics, and environmental justice. The study aims to identify research on the theoretical and procedural approach to sustainable practices in the LATAM context. A systematic review of 200 academic articles addressing the theoretical and procedural approaches to these practices in Latin America during the period 2010–2024 is carried out. The results, organized by year of publication, type of study, data collection methods, and study populations, reveal how sustainable practices have evolved and strengthened in diverse inclusive contexts, such as educational, peasant, and indigenous communities. This analysis provides a detailed overview of the current landscape of environmental sustainability, contributing significantly to academic knowledge and serving as a basis for future research and public policies aimed at fostering a cultural transformation towards a more equitable, just, and responsible community development with nature.

**Keywords:** Sustainability, Communities, Cultural, Latin America, Environmental.

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### Resumen

Las prácticas sustentables son un conjunto de estrategias conductuales dirigidas a satisfacer las necesidades humanas dentro de un marco histórico, cultural y comunitario específico, destacando la relación armoniosa con el entorno natural, la sociedad y la cultura. Estas prácticas se consideran como pilares fundamentales en la promoción de comportamientos sustentables en las comunidades locales, urbanas, campesinas, educativas y otras, adoptando un enfoque participativo para su implementación. En un contexto como LATAM y el Caribe, la necesidad de incorporar las prácticas sustentables surge de los desafíos ambientales generados por los procesos históricos del desarrollo extractivista y disociados de las culturas originarias, siendo necesario replantear los modelos de desarrollo hacia enfoques que prioricen la equidad, ética y justicia ambiental. El estudio tiene como objetivo identificar las investigaciones sobre el abordaje teórico y procedimental de las prácticas sustentables en el contexto latinoamericano. Se realiza una revisión sistemática de 200 artículos académicos que abordan los enfoques teóricos y procedimentales de estas prácticas en Latinoamérica durante el periodo 2010–2024. Los resultados, organizados por año de publicación, tipo de estudio, métodos de recolección de datos y poblaciones de estudio, revelan cómo las prácticas sustentables han evolucionado y se han fortalecido en diversos contextos integradores, como comunidades educativas, campesinas e indígenas. Este análisis proporciona una visión detallada del panorama actual de la sustentabilidad ambiental, contribuyendo significativamente al conocimiento académico y sirviendo de base para futuras investigaciones y políticas públicas orientadas a fomentar una transformación cultural hacia un desarrollo comunitario más equitativo, justo y responsable con la naturaleza.

**Palabras clave:** Sustentabilidad, Comunidades, Cultural, América Latina, Ambiental.

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## 1 Introduction

Throughout millions of years, human evolution has been a continuous process of adaptation and survival, from the Paleolithic era to the present day (Maya, 2015). In its early stages, humankind developed primitive tools that strengthened its relationship with nature (Carrillo, 2011). Nomadic societies, in their quest to satisfy basic needs, used natural resources and created communication methods that facilitated adaptation to their environment (Serrano, 2007).

With the end of the Paleolithic period came key transitions, particularly during the Neolithic era, when humans adopted agriculture and animal domestication, establishing sedentary and organized societies that laid the foundations for Food Sovereignty and Security (Leiva-Sajuria, 2014; Villalva and Inga, 2020). This advancement enabled social organization and the emergence of the first great civilizations. The Neolithic and Industrial Revolutions marked profound transformations in production, social organization, and the economy, establishing a model that continues to this day (Sanchís, 2013, citing Comín, 2011).

The Industrial Revolution caused a gradual rupture with nature and the past, replacing human energy with machines and giving rise to the modern economy (Valdivieso, 2009). However, this model is grounded in externalities and has imposed a hegemonic worldview that neglects local knowledge and sustainability, generating a systemic environmental crisis (Delgado and Rist, 2010; Porras and Pérez, 2018).

The current global scenario calls for a profound shift in human perception—from being mere managers of nature to recognizing ourselves as integral components of the environmental system (Mejía-Cáceres et al., 2018). This rethinking implies acknowledging that the current crisis is a consequence of modern culture, characterized by warfare and excessive industrialization, and thus requires a multidisciplinary re-evaluation (Noguera de Echeverri, 2011; Sarmiento and Larrinaga, 2021).

Among the proposals addressing this issue is Sustainable Development, conceptualized in the 1987 Brundtland Report as an alternative develop-

ment model intended to reconcile tensions between environmental degradation and economic growth. However, it has failed to produce substantial changes regarding environmental challenges in most countries (Eschenhagen, 2015). Consequently, there is a growing need for a new paradigm such as *Sustainable Development*, which promotes development centered on sustainability through the integration of natural, social, and cultural relationships (Gómez, 2014; Carapia, 2022, citing Leff, 1998).

The Manifesto for Life, supported by Latin American scholars such as Enrique Leff, is an initiative led by UNEP within the framework of the Forum of Ministers of the Environment of Latin America and the Caribbean (Gudynas, 2014). It advocates for an ethic of Environmental Sustainability (ES) focused on a new social, local, and productive rationality (Coarasa and Pequeño, 2006). This approach seeks to maintain balance between the use of natural resources and the preservation of ecosystems (Sarmiento and Larrinaga, 2021), promoting practices and policies that ensure biodiversity conservation and the inclusion of communities marginalized by corporate discourses. Therefore, the environmental crisis in Latin America and the Caribbean demands the deconstruction of modern rationality and the adoption of a biocentric perspective (Leff, 2004).

In Latin America, paradigms such as environmental rationality, *Buen Vivir*, *Sumak Kawsay*, and Human-Scale Development propose an ES founded on the dialogue between community knowledge and local development. Within this framework, Sustainable Practices (SP) constitute the fabric of environmental sustainability, aiming to meet present needs without compromising those of future generations (Sandoval-Escobar, 2012), while valuing local behaviors and self-reliance (Valenzuela-Van Treek et al., 2021).

The objective of this study is to identify research on Sustainable Practices in Latin America (LATAM) between 2010 and 2024, contributing academically to new ways of understanding Environmental Sustainability in the Latin American and Caribbean context by highlighting alternative development approaches and ongoing research processes.

## 2 Materials and Methods

The methodological parameters guiding the development of this research are based on an integral, holistic, qualitative, and descriptive perspective of Environmental Sustainability (ES) and Sustainable Practices (SP) within Latin American contexts. Therefore, a descriptive scope was established, aiming to gather individual or collective information on conceptual and dissemination aspects. As inferred by Hernández and Mendoza (2018), descriptive studies “measure or collect data and report information on various concepts, variables, aspects, dimensions, or components of the phenomenon or problem under investigation” (p. 603).

Accordingly, this study adopted an integrative and descriptive methodology focused on a systematic review of academic articles related to SP and ES in Latin America (LATAM). The search and selection of documents were conducted through databases such as Google Scholar, Redalyc, SciELO, and Dialnet, using keywords including “prácticas sustentables”, “sustentabilidad ambiental”, and “América Latina”, covering the period from 2010 to 2024.

The inclusion criteria considered articles originating from Latin American countries, published in Spanish, English, or Portuguese, and studies that explicitly addressed the topic in their title, abstract, or keywords. The exclusion criteria involved the removal of duplicates and studies not focused on ES. The search and selection process of the information is illustrated in Figure 1.

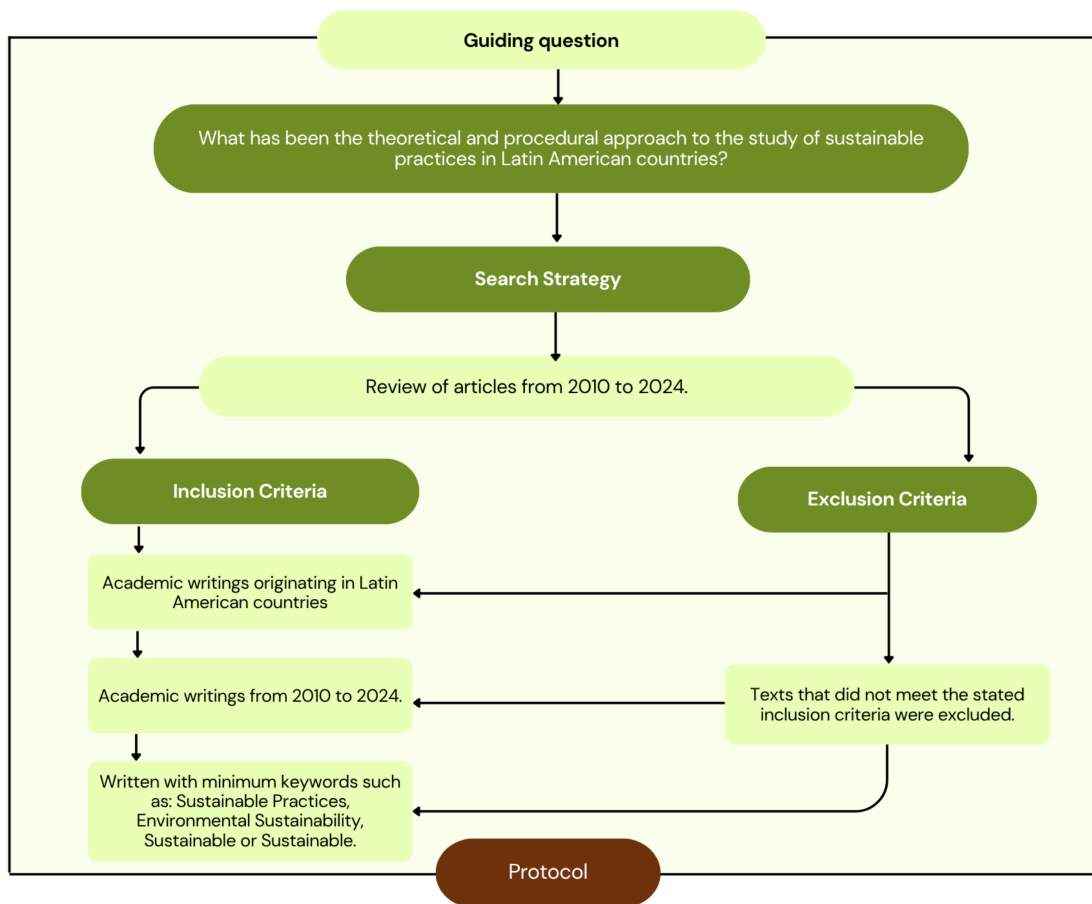


Figure 1. Protocol used in this study.

According to the protocol presented in Figure 1, this study seeks to answer the following research question:

*What has been the theoretical and procedural approach adopted in the study of sustainable practices in Latin American countries?*

This question arises from the need to identify the epistemological currents, conceptual approaches, and paradigms that have shaped studies on

Environmental Sustainability (ES) and Sustainable Practices (SP), including the influence of perspectives such as the dialogue of knowledges, agroecology, alternative economic models, and educational processes, among others. Likewise, from a methodological perspective, this research examines aspects related to study type, data collection techniques, and participant populations. Consequently, the question aims to articulate a comprehensive analysis of research on ES and SP in Latin America.

**Table 1.** Analytical Categories of Environmental Sustainability (ES).

No.	Category	Description
1	Epistemological Constructions on Environmental Sustainability (ES)	This category refers to the diverse ways in which Sustainable Practices (SP) have been understood and addressed, their applications in fields of study, and interpretations based on the methods used.
2	SP and dialogue of knowledges	It analyzes SP and their relationship with the exchange and integration of traditional community knowledge within the sustainable paradigm. Likewise, it examines their relationship with scientific knowledge to establish holistic approaches.
3	SP and studies on biological diversity	The relationship between sustainable practices and biodiversity conservation is explored; this includes studies on conservation strategies for the protection and use of natural resources.
4	SP and formal educational processes	Educational strategies for strengthening environmental sustainability within formal education systems, oriented towards Environmental Education (EE), are addressed.
5	SP, agroecology for food sovereignty and security	Agroecology is linked as a sustainable strategy in peasant and local production systems. The implementation of new technical strategies is analyzed.
6	ES within the framework of environmental conflicts	Works addressed within the context of conflict are incorporated, examining the causes and consequences of environmental challenges to influence the search for resolution strategies.
7	ES and alternative socioeconomic models	Research processes seeking the creation of solid alternatives to generate a balance between sustainability and economics (e.g., rural cities) are integrated.
8	ES, resistance, and communities	Processes of resilience, empowerment, and struggle of communities organizing to influence participatory spaces regarding environmental challenges are considered.

Based on the data collected, the information was organized according to several factors such as year of publication, country of origin, type of document and study, population involved in each investigation, and the review or reflection presented in each article. These factors make it possible to identify

trends and patterns in academic production related to the topic during the period 2010–2024.

For data analysis, Python was employed as a quantitative tool, enabling rigorous data processing through advanced statistical techniques. Additio-

nally, a set of analytical categories was structured based on the emerging patterns identified within the reviewed corpus. This software facilitated the systematization of results according to a series of analytical categories related to Environmental Sustainability and Sustainable Practices in Latin America (Table 2).

The information obtained was organized into emergent categories that arose during the review process, summarized in Table 1.

### 3 Results and Discussion

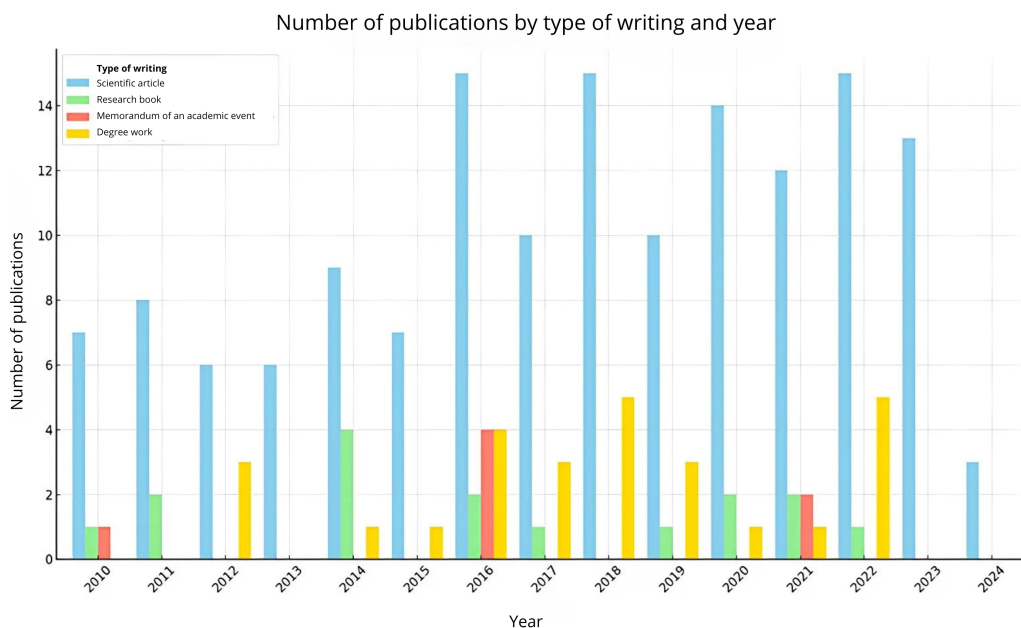
The systematic review of 200 articles on Sustainable Practices (SP) and Environmental Sustainability (ES) in Latin America (LATAM) reveals a dynamic and evolving landscape. Between 2010 and 2024, academic production has focused on four main categories: scientific articles, research books, academic conference proceedings, and theses or dissertations.

As shown in Figure 2, scientific articles dominate the output, with notable peaks in 2016 and 2020, indicating a significant increase in research activity during those years. It is worth noting that re-

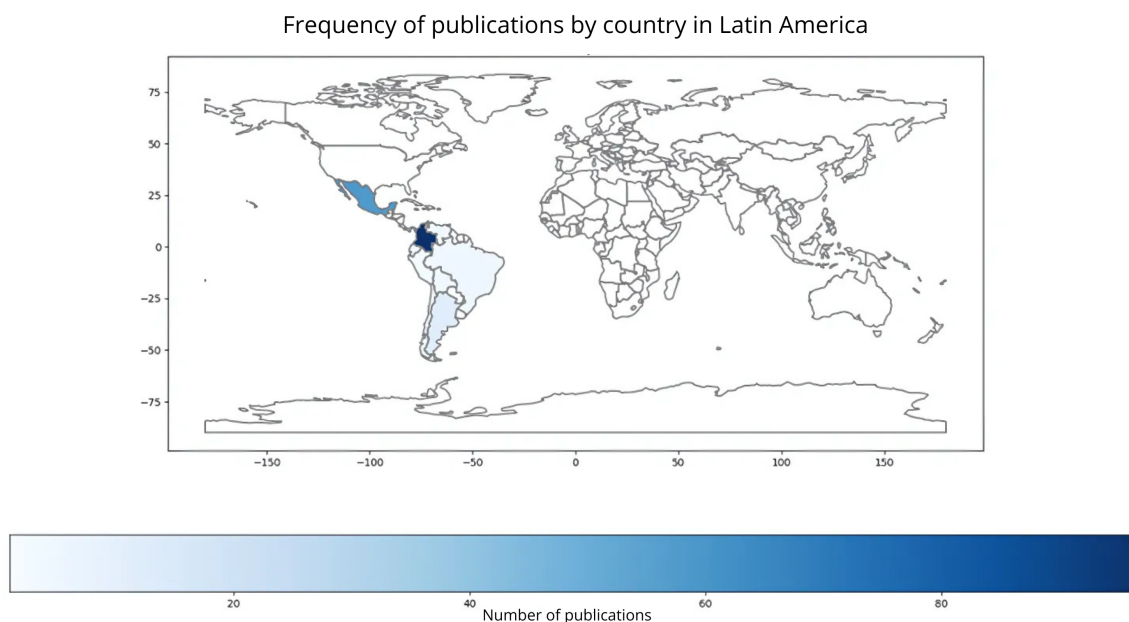
search books and academic conference proceedings also show considerable variability, particularly in 2016, while undergraduate and graduate theses have grown substantially in recent years, especially in 2021 and 2022, reflecting a stronger emphasis on research at both undergraduate and postgraduate levels.

These findings suggest a growing interest and sustained effort in the study of environmental sustainability across the region, contributing significantly to academic knowledge and the implementation of sustainable practices (Figure 2).

The geographic distribution of bibliographic production in Latin America (LATAM), shown in Figure 3, reveals a clear concentration in Colombia and Mexico, with 97 and 58 publications, respectively. This prominence positions Colombia as the leading country in research on Sustainable Practices (SP), followed closely by Mexico. Argentina, with 12 publications, and Chile and Ecuador, with 6 each, represent a moderate contribution. In contrast, countries such as Bolivia, Brazil, and Venezuela each contributed 5 publications, while Peru, Cuba, and Uruguay show significantly lower output, with 3, 2, and 1 publications, respectively.



**Figure 2.** Number of publications by type of document and year.



**Figure 3.** Graphical representation of the incidence of publications by country in Latin America.

The distribution of academic publications across Latin America highlights the notable dominance of Colombia and Mexico, which together account for more than half of the total reviewed works, suggesting a strong emphasis on research and the development of sustainable practices in these two countries. Conversely, the lower publication rates in countries such as Peru, Cuba, and Uruguay indicate regions with substantial potential for academic growth, emphasizing the need for local and regional collaborative initiatives to enhance both the recognition and advancement of sustainable practices and the overall research output in this field.

## 4 Study Population and Number of Publications

Figure 4 presents the results regarding the target population and the number of publications from 2010 to 2024. Approximately 40% (75) of the studies focused on peasant, Indigenous, and community groups, addressing key aspects related to territory, ecosystems, and sustainable practices (Auer et al., 2022). Likewise, works such as that of Calvo (2019)

propose the creation of sustainable alternatives and practices in the *Zona de Reserva Campesina del Valle del Río Cimitarra*.

Table 2 identifies the top 10 journals with the highest number of publications on Sustainable Practices (SP). *Gestión & Ambiente* leads with 8 articles, followed by *Cuadernos de Desarrollo Rural* with 6, and *Community Development Journal* with 5, highlighting key topics such as environmental management and rural development. The data reveal that research on SP is well distributed across various fields of study, which is crucial for achieving a holistic understanding and fostering the development of sustainable practices within territories.

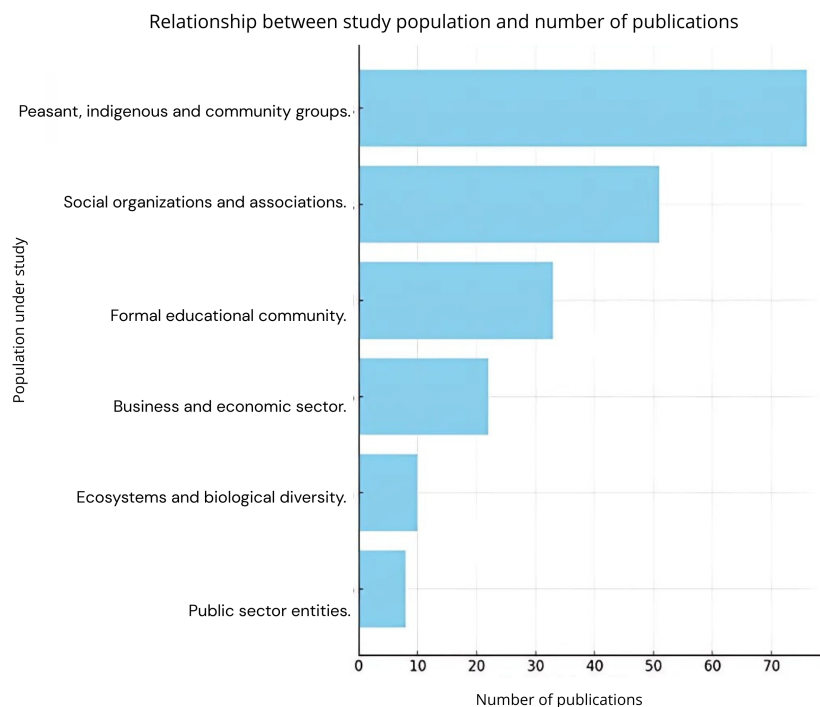
On the other hand, organizations and social associations represented 25% of the studies, indicating the existence of inter-institutional research that acknowledges the role of social actors as active agents in communities, particularly in the development of processes oriented towards community-based economies (Payarés-Comas and Garnica-Morales, 2010).

**Table 2.** Top 10 Latin American journals with the highest number of publications in PS Sustainable Practices.

No.	Journal	Number of Publications
1	Gestión & Ambiente	8
2	Cuadernos de Desarrollo Rural	6
3	Community Development Journal	5
4	Estudios Sociales: Revista de Alimentación Contemporánea y Desarrollo Regional	4
5	La Granja: Revista de Ciencias de la Vida	3
6	Sociedad y Ambiente	3
7	Repositorio Institucional de la Universidad Nacional de Colombia	3
8	Agricultura, Sociedad y Desarrollo	2
9	Biografía. Escritos sobre la Biología y su Enseñanza	2
10	Bitácora Urbano Territorial	2

Additionally, 8% of the studies focused on mitigating the negative effects of anthropocentric practices on ecosystems and biological diversity, with notable contributions such as those by Daga et al. (2022) and Bernal (2017). Finally, studies involving

public sector entities emphasize their contribution to environmental sustainability through models of territorial planning and social construction, as evidenced in the research by Rincón-Martínez (2012).

**Figure 4.** Relationship between study population and number of publications.

## 5 Research Methodologies

Figure 5 shows that qualitative studies predominate with more than 160 publications, reflecting a marked preference for methods that enable in-depth, contextualized exploration. Mixed-methods studies rank second, with nearly 30 publications, indicating efforts to combine approaches for a more

comprehensive view. By contrast, quantitative studies are the least common, with fewer than 10 publications, suggesting a lower inclination toward measurement-centered and statistical analyses.

To strengthen the field, it would be beneficial to balance study types by promoting methodological diversity and complementarity between qualitative and quantitative approaches.

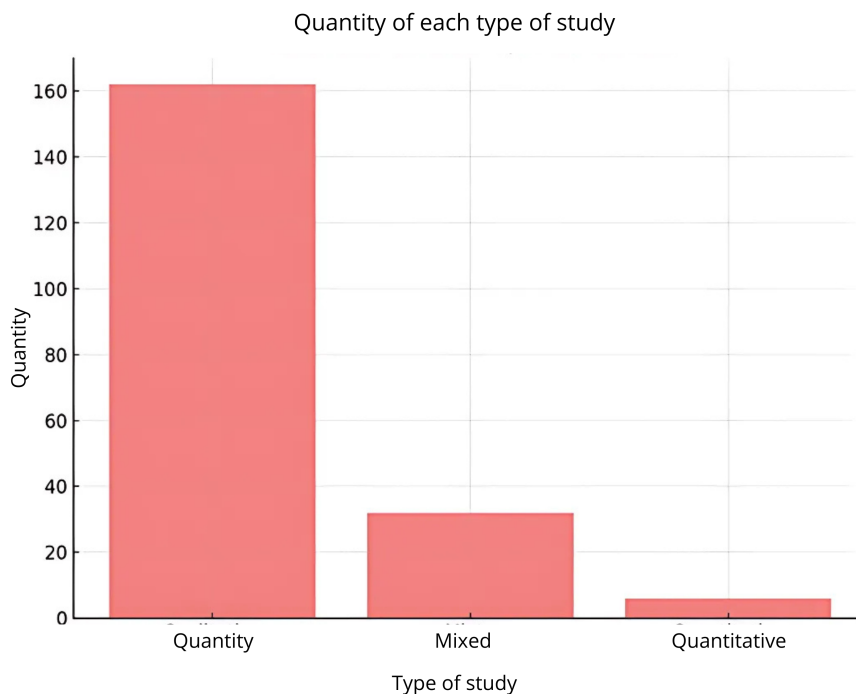


Figure 5. Results by study type.

## 6 ES in Latin America and the Caribbean

ES in Latin America and the Caribbean challenges the foundations of modern Western thought, extractivist development, and colonial logics that have shaped relationships between modern society and nature. Emerging currents of thought in the LATAM and Caribbean context face a crucial challenge—and opportunity—in rethinking development models to ensure ES in specific territories. As Slutzky (2012) notes, the crisis is an articulated process that requires adopting a pathway toward ES as a transformative solution.

Within this panorama, it is urgent to reverse absolutist trends that have dominated environmental dynamics in LATAM and the Caribbean (Leff, 2009), where the region's biocultural wealth demands an approach that integrates the dialogue of knowledges, promoting sustainable practices (SP) and alternatives to development grounded in environmental justice and respect for ecosystems (Romero and Vázquez, 2012).

Among the key references in LATAM are environmental rationality, which critiques an extractivist and technocratic model that has subordinated territories and traditional knowledge of Indigenous

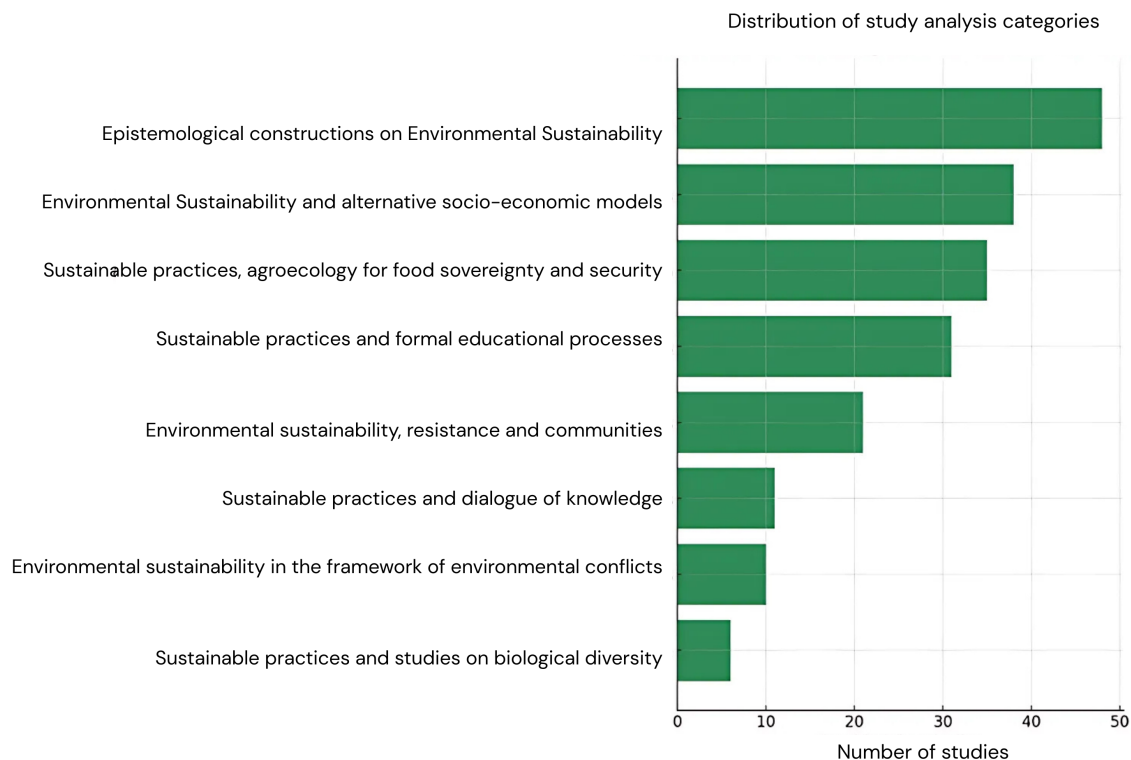
and local peoples (Leff, 2004), and post-extractivism and environmental ethics, which propose an ES approach rooted in political commitment to ecological and social justice (Gudynas, 2014).

ES, social-justice struggles, and educational processes have been pillars of an alternative civilizational project to the modern hegemonic model, including Paulo Freire's critical and emancipatory education (Paiva, 2004). This serves as a bridge for the dialogue of knowledge, challenging the hegemony of Western scientific knowledge and integrating the worldviews of Indigenous and peasant communities (Cruz, 2020). From this perspective, education becomes a political, ethical, and environmental act capable of rebuilding the bonds between humans and nature.

These postulates bring together ethics, education, social justice, dialogue, and culture around en-

vironmental dynamics, opening new ways of dwelling and co-dwelling in harmony with territories and nature across LATAM and the Caribbean—also known as *Abya Yala*. Hence, it is necessary to analyze how ES has been approached through SP in LATAM and the Caribbean via academic research in this context.

Figure 6 displays the distribution of analytical categories in studies on SP, offering a detailed view of predominant areas of focus. Each category represents a crucial facet of ES and shows the number of studies devoted to that topic. This distribution not only reflects research priorities and trends but also highlights areas needing greater attention and development. Below is a detailed analysis of each category, from the most to the least represented, to better understand current dynamics and approaches in the ES field.



**Figure 6.** Results by analytical category on ES in LATAM. Source: Authors.

## 6.1 Epistemological Constructions on ES

The analysis of epistemological constructions on ES encompasses a variety of studies offering critical approaches and diverse methodologies. A notable example is the work associated with Manfred Max-Neef, which critiques productivism and extractivism in LATAM and advocates for human development grounded in ecological foundations at the local scale, challenging macroeconomic models historically imposed since colonial times (Valenzuela-Van Treek et al., 2021).

A significant model is Environmental Education (EE) for sustainable human development in the Chontal community of Olcuatitán, Tabasco. Rooted in tradition and local knowledge, this model promotes a critical, constructivist EE adapted to the community's ecological and cultural conditions. Its implementation has proven effective in forming community groups and generating sustainable projects, underscoring the importance of contextualized education for lasting impacts.

Another line of inquiry on subjectivation and citizenship in Latin American environmental territories explores integrating politics and epistemology for social and epistemic emancipation. It stresses recognizing diverse actors and forms of knowledge, employing ethnographic methodologies to challenge hegemonic scientific visions, and proposing systematization of experiences that acknowledge and reconstruct practices of historically dominated sectors.

In business, studies on replicating sustainability best practices in fast-moving consumer goods companies in Colombia, and environmental sustainability strategies in human resources, reveal how organizations can align their practices with Sustainable Development Goals—albeit often from a Eurocentric perspective (Gómez, 2014).

Collectively, these studies foster an understanding of socio-ecological resilience and the need to develop more robust, less vulnerable systems to confront contemporary environmental uncertainty. They also demonstrate the richness and diversity of ES approaches, highlighting the importance of integrating local, participatory, and critical knowled-

ge to address environmental challenges holistically and effectively.

## 6.2 ES and Alternative Socioeconomic Models

The relationship between ES and alternative socioeconomic models is fundamental for addressing current global and local challenges. One example is Max-Neef's framework of fundamental human needs, together with Amartya Sen's human development theory, both emphasizing the importance of economic, cultural, and social dimensions in development. These theories suggest designing economic policies that account for social and cultural conditions to more effectively and sustainably address poverty (Valenzuela-Van Treek et al., 2021).

Community-based tourism with an environmental focus illustrates how alternative models can integrate sustainability, conserve nature, and strengthen local communities through education and participation—experiences in Colombia show that such tourism can generate sustainable economic benefits while preserving natural environments.

Water-resource management in specific industries—e.g., tanneries in Villapinzón—demonstrates how SP can improve economic efficiency and reduce environmental impact. Aligning environmental management policies with business strategies shows that corporate sustainability is not only viable but necessary for long-term survival.

In urban areas, environmental sustainability indices help identify and address priority interventions. Analysis of urban sustainability in the Mexico City megalopolis shows how public policies can improve distribution and management in the face of current sustainability challenges, tackling environmental and socioeconomic issues while considering climate-change mitigation and ecological-footprint reduction.

In rural contexts, socio-spatial practices and preservation through sustainability are vital. Agrotourism in Mexico and sustainable-development strategies in Bolivia's southern highlands—such as quinoa production—illustrate how sustainable agriculture, together with ecological and cultural

activities, can promote ES and enhance rural quality of life.

In Colombia, initiatives like *Mercados Verdes* integrate education, management, and ES, fostering more equitable economic development by promoting eco-products and responsible commerce—an opportunity for small and medium enterprises to adapt to new consumption demands (Díaz et al., 2016). A study in El Cocuy, Boyacá highlighted the participation of social groups in the production and consumption of foods grown using traditional practices, encouraging responsible land use and reinforcing a harmonious relationship among nature, society, and culture (Castillo et al., 2023).

These alternative models in LATAM and the Caribbean not only address emerging needs but also promote a fairer, more sustainable economy, underscoring the importance of local development and cultural preservation as pillars for achieving ES.

### 6.3 Sustainable Practices, Agroecology, and Food Sovereignty / Security

SP within agroecology represents a holistic approach spanning social, economic, and cultural dimensions. Deeply rooted in ancestral knowledge and complemented by contemporary innovations, these practices aim to ensure the food sovereignty and security of rural, peasant, and indigenous communities. Studies show that implementing such practices can yield positive outcomes in agricultural productivity, environmental conservation, and social strengthening (Cardona and Sierra, 2023; Chaga, 2012; Chaparro, 2017).

In southeastern Buenos Aires (Argentina), research on farmers' understanding of ecosystem services and SP adoption found that higher educational level and off-farm residence increased the likelihood of adoption, whereas economic uncertainty and operational complexity posed barriers—underscoring the need for technical/financial support and spaces for shared learning (Auer et al., 2022).

In Colombia's *Zona de Reserva Campesina del Valle del Río Cimitarra*, community organization and

resistance have advanced food sovereignty and improved living conditions, emphasizing public policies that revalue family economies and facilitate the transition to agroecology (Calvo, 2019).

In Boyacá (Colombia), research on food autonomy in family farms documented a shift toward agroecology, strengthening agrobiodiversity, seed conservation, and community self-governance—highlighting interconnections among agroecology, ancestral knowledge, and autonomy (Lucco, 2019).

In Mexico and Colombia, indigenous medicine and cultural practices linked to agroecology proved essential for community health and indigenous health sovereignty, notably during crises such as the SARS-CoV-2 pandemic (Muñoz, 2022).

Economically, green markets and short food supply chains contribute to the sustainability of food systems. The *Mercado Verde* project in Morelos (Mexico) promotes sustainability, responsible consumption, and fair trade, strengthening local economies and sustainable production.

In Ecuador, ES and SP in horticultural systems in San Joaquín were significantly strengthened by ancestral practices such as crop rotation, associativity, and biodiversity, improving production and the quality of life of peasant families (Pacheco and Ortiz, 2022).

Transitioning to agroecology entails transforming the social and economic structures that underpin agricultural production. Movements for food sovereignty and agroecology show that more just, sustainable food systems are possible through community organization, transnational solidarity, and the promotion of a shared peasant identity (Camacho et al., 2022).

### 6.4 SP and Formal Educational Processes

Integrating SP into formal education is an innovative and necessary approach to forming environmentally aware and responsible citizens. Research highlights how educational strategies supported by ICTs are transforming traditional teaching by fostering direct connections between students and their

surroundings (Ruiz, 2021).

Formal education provides fertile ground for creating and applying SP that encourage student participation in community projects; contextualized environmental/sustainability programs; and environmental management systems in universities—proven effective in shaping citizens committed to sustainable development (Tuay Sigua et al., 2016; Marín, 2011).

A notable case is the University of Chile, where institutional collaboration and local community participation have promoted social responsibility and sustainable consumption (Severino-González et al., 2021). School-based horticultural systems and eco-art also integrate sustainability with learning and artistic expression (Carnicer et al., 2020; Bernaschina, 2023).

Flórez (2012) sought to integrate social actors in the municipalities of Sugamuxi and Tundama to understand and develop the environmental dimension locally, underscoring collaboration between schools and communities to achieve shared goals in EE and sustainability.

At the university level, the National University of Colombia has worked to structure sustainability within its Faculty of Engineering. Grounded in critical realism and Anthony Giddens' structuration theory, this initiative aims to train professionals capable of meeting sustainable-development challenges and proposing innovative solutions (Cortés, 2018).

## 6.5 ES, Resistance, and Communities

Many human groups have shown remarkable resilience in the face of ecological, social, political, and economic challenges. For example, Barreiro Zamorano et al. (2021) examine biocultural heritage as a sustainable alternative in Mexico's Malintzin National Park, illustrating how ES is woven together with communities to adapt and resist environmental change. Across LATAM and the Caribbean, women's organizations have successfully confronted contemporary challenges through *Buen Vivir* (Cerna et al., 2022).

Community resilience has fueled movements that empower new generations by blending ancestral knowledge with contemporary science. In Brazil, Fauth and Antunes (2016) highlight the value of traditional knowledge as the basis for inclusive, resilient sustainability strategies. In Boyacá (Colombia), Lucco (2019) documents peasant communities' struggles for food security and sovereignty amid regional inequality and hunger.

In Tierradentro (Colombia), the Yaquivá Reserve has applied traditional knowledge to design sustainable strategies, integrating nature, culture, and education into a community Life Plan (Franco, 2021), strengthening identity and autonomy and underscoring the importance of social inclusion and community participation within a framework of customary law (Martínez, 2022).

Participatory mapping has been pivotal in indigenous and Afro-descendant communities' struggles for territorial and resource rights in LATAM, facilitating spatial representation and resource governance. It has been discussed in international fora as a form of resistance and recovery of cultural practices with an ES focus (Hale and Barry, 2013).

Women's leadership is vital in these processes. Cerna et al. (2022) on *Buen Vivir* in Paraguay emphasize women as agents of change in climate-change mitigation, promoting SP from a Guaraní worldview. Experiences in Sumapaz (Bogotá) describe the importance of the dialogue of knowledge in ES processes, through effective collaboration between institutions and local communities that strengthens traditional knowledge and builds trust and cooperation—key to robust community resistance to environmental challenges (Bayona and Pachón, 2014).

These studies underscore communities' central role in advancing ES, integrating traditional and contemporary approaches to develop resilient, adaptive strategies for today's challenges.

## 6.6 SP and the Dialogue of Knowledge

The dialogue of knowledge articulates cognitive and cultural diversity with the study's analytical categories, highlighting communities as bearers of knowledge that promotes harmonious relations with nature and other forms of life. This rooted-

ness and resistance manifest in territorial defense, contributing to what some researchers describe as a “radical reconstruction of being, power, and knowledge” (Semanate and Alfonso, 2024).

Further studies (Sánchez-Zárate, 2016; Vergara, 2020) show how ethno-education fosters sustainable development in Indigenous and rural communities through ethnotourism and the sociocultural management of agroecosystems. The latter focuses on sociocultural management grounded in traditional knowledge and its effects on soils in agroecosystems in Guacarí (Valle del Cauca, Colombia), offering alternatives to problems such as soil degradation through peasant knowledge, agroecosystem characterization, and related processes.

### 6.7 ES within the Framework of Environmental Conflicts

This analysis reveals significant information on the challenges communities face regarding the environmental dimension and their role in articulating ES. Key concepts include natural-resource management, mitigation of negative impacts such as extractivism (Lehnert and Carrasco, 2020), and the preservation of biodiversity and quality of life in peasant, Indigenous, and local communities.

Rodríguez-Enciso (2020) examines environmental conflict from political ecology, focusing on reconciling conservation goals in peasant territories within Tinigua National Natural Park. The study proposes incorporating community-based forest management experiences, recognizing tenure rights, and implementing forest governance systems—crucial for aligning conservation with community well-being.

Additional conflicts identified stem from excessive exploitation of natural resources, irregular issuance of environmental licenses, poverty, dispossession, and forced displacement—factors that destabilize environmental dynamics, particularly in hydro-extractivist contexts (Luna-Nemecio, 2023).

A noteworthy example is Bocarejo (2022) on the Magdalena River, which sought to consolidate a participatory framework integrating SP as an effective response to environmental conflicts, promoting balance between conservation and community de-

velopment. This work intertwines analyses of causes and consequences of changes in water quality with sustainable alternatives aimed at conflict resolution around this environmentally significant river.

### 6.8 SP and Studies on Biological Diversity

In the realm of SP and biological diversity, several studies seek to harmonize human activities with nature conservation. One relevant example is the development of conservation strategies to protect paramo ecosystems in the upper Bogotá River basin (Colombia), which have faced significant socio-environmental conflicts (Bernal, 2017).

Biodiversity—essential to ecosystem health and human well-being—intersects with ethnobotany, a body of traditional knowledge linking the dialogue of knowledge with biological and cultural conservation (Farfán and Valderrama, 2023; Pachón-Barbosa et al., 2021).

The relationship between SP and biodiversity appears in activities such as agroecology and the dialogue of knowledge. An example is the adaptation of guidelines for conserving oak (*Quercus humboldtii*) in the Guantivá–La Rusia–Iguaque conservation corridor, integrating local practices and views with legal, political, and institutional criteria (Avella et al., 2013).

Other studies intersect multiple categories affecting biodiversity conservation, ES, and community economies—for instance, assessing the availability of adventitious roots of three wild species harvested for handicrafts in Santa Elena (Antioquia, Colombia) (Benavides and Hernández, 2015), providing a biodiversity-studies framework to understand demand for these roots and their sustainable use as raw material for utilitarian objects with economic value.

These community-centered studies and the creation of SP are key to advancing effective ES implementation, tailored to specific contexts and contemporary challenges.

## 6.9 Potential Biases and Limitations of the Study

In this systematic review, acknowledging limitations and biases enables us to question and reaffirm the standpoint and purpose from which these analyses are constructed, thereby avoiding reductionist, fragmented, or detached views of the realities surrounding Environmental Sustainability (ES) and Sustainable Practices (SP) in Latin America. Although grounded in a rigorous systematic review, the present study is not exempt from limitations that may affect the interpretation of its findings. Below are several biases and methodological constraints that could influence the scope of the results:

**Restricted source coverage.** The selection of articles was conducted through open-access databases—Google Scholar, Redalyc, SciELO, Dialnet, among others—using keywords such as *environmental sustainability* and *sustainable practices* in Latin America. However, reliance on specific databases entails access bias in relation to the broader scientific output. This approach excludes studies indexed in higher-impact international databases such as Scopus or Web of Science, limiting engagement with globally referenced research. Moreover, privileging open-access sources may bias the corpus against influential studies published in paywalled journals. Consequently, access to research subjected to more rigorous peer review may be constrained, potentially affecting the representativeness of the analysis.

## 7 Conclusions

The qualitative analysis underscores that Sustainable Practices (SP) in Latin America (LATAM) have advanced significantly, adapting to the region's cultural, social, and biophysical particularities. This evolutionary process has enabled these practices to consolidate as mechanisms for achieving community development that upholds social equity and maintains a harmonious relationship with the natural environment. The results show how diverse communities—from peasant to Indigenous—have adopted SP, integrating approaches that promote biodiversity conservation as well as the safeguarding of traditional cultures and ways of life.

The dialogue of knowledge emerges as an essential element in articulating ES, enabling interaction between ancestral and scientific knowledge. This convergence has proven effective for resource management and biodiversity conservation, particularly in areas where local communities play a leading role. It reinforces cultural identity, equips communities to confront and adapt to contemporary environmental challenges, and strengthens resilience. In this sense, it complements ongoing research in LATAM by creating participatory spaces—across peasant, Indigenous, and urban communities—that actively contribute to building ES strategies in community, policy, educational, economic, and social domains.

Research in this field focuses primarily on peasant, Indigenous, and local communities, emphasizing their pivotal role in implementing and sustaining SP—approximately 40% of the articles reviewed. This central finding highlights the capacity for resistance among local, peasant, and Indigenous communities in the face of ecological, social, and economic challenges. It also illuminates how ES is not reducible to mere resource management or technological application but converges with political dimensions of autonomy and re-existence developed by Latin American communities.

Community resistance is evident both in the preservation of traditional practices and in the ability to adapt and thrive in adverse contexts. A clear example is the ongoing struggle for territorial rights and the pursuit of alternatives to meet basic needs—such as agroecology for food sovereignty and security. Supporting these communities in conserving SP is crucial, recognizing their role in promoting fair and equitable development alternatives.

The incorporation of SP into formal education emerges as a vital strategy for forming environmentally aware and committed citizens. Through the integration of information and communication technologies (ICTs) and participation in community projects, educational institutions are transforming how students engage with their surroundings, preparing new generations to address environmental challenges from a local, practical, and transformative perspective.

The importance of developing public policies is emphasized—policies that not only facilitate the implementation of SP but also respect and value the region’s cultural and ecological diversity. Such an integrated approach is key to advancing toward a sustainable development pathway that benefits both local communities and the environment as a whole.

From a quantitative standpoint, the analysis identifies significant patterns and trends in academic and scientific output on SP and ES in LATAM during 2010–2024. Notable increases in publications occurred in 2016, 2020, 2021, and 2022, suggesting growing interest aligned with emerging trends in ES and SP. Countries such as Colombia and Mexico concentrate the largest number of studies, indicating vibrant research agendas and expanding lines of inquiry aligned with national realities and alternatives. In contrast, Peru, Cuba, and Uruguay display lower output, underscoring the need to foster research in these contexts to strengthen regional focus and reduce gaps in access to and production of knowledge.

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**M.C.C.R.:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Supervision, Validation, Visualization, Writing—original draft, Writing—review & editing. **L.P.A.C.:** Conceptualization, Formal analysis, Investigation, Methodology, Writing—original draft, Writing—review & editing. **D.A.V.:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Supervision, Validation, Visualization, Writing—original draft, Writing—review & editing. **N.A.P.B.:** Conceptualization, Investigation, Project administration, Supervision, Validation, Visualization, Writing—original draft, Writing—review & editing.

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