

Environmental Management Instruments In Public Administration: Green Procurement And Emission Mitigation In Latin American Cities

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Summary

This study analyzes the use of environmental management instruments (IGA) by public administration in Latin American cities, with special attention to green public procurement and greenhouse gas (GHG) emission mitigation strategies. Through a documentary review and semi-structured interviews with environmental officials from three countries, the degree of implementation, institutional challenges and opportunities for improvement in regulatory frameworks are examined. The results show that, although the regulations have made progress in recognizing the importance of IGAs, technical, budgetary and governance barriers still persist. It is concluded that the strengthening of technical capacities, multilevel articulation and access to sustainable technologies are key factors to consolidate effective green contracting and emission reduction policies in urban environments.

Keywords: *environmental management, green procurement, public administration, emissions, sustainability, Latin America*

INTRODUCTION

Rapid urban growth in Latin America has intensified pressure on natural ecosystems, generating significant environmental and social imbalances. Latin American cities, which are home to more than 80% of the regional population, are responsible for a substantial proportion of greenhouse gas (GHG) emissions, solid waste generation, and energy-intensive consumption (UN-Habitat, 2022). In this context, the public administration is positioned as a strategic actor to promote more sustainable urban development models through the implementation of effective environmental policies.

One of the main mechanisms available to governments is the application of **environmental management instruments (IGA)**, understood as regulatory, administrative, economic, and planning tools that allow environmental criteria to be incorporated into public decision-making (Bermúdez & Salazar, 2021). Within these instruments, **green public procurement (VPP)** has gained relevance as a cross-cutting policy to reduce negative environmental impacts through the acquisition of products, services, and works with a smaller ecological footprint (Gómez et al., 2022). In addition, IGAs are key to meeting the climate commitments made in international frameworks such as the Paris Agreement and the Sustainable Development Goals (SDGs), especially SDG 11 on sustainable cities (ECLAC, 2023).

However, the implementation of these tools faces several challenges. The absence of binding regulatory frameworks, the lack of environmental performance indicators, and the limited technical training of public staff often hinder the effective inclusion of sustainability criteria in administrative management (Torres & Benavides, 2024). Added to this is the difficulty of harmonizing environmental objectives with the economic and social needs of urban communities, especially in territories marked by structural inequalities. On the other hand, mitigating emissions in urban environments requires the coordination of multiple sectors and levels of government, as well as access to clean technologies and climate finance (Gutiérrez & Molina, 2022). Sustainable mobility policies, energy efficiency in public infrastructure, waste management and integrated urban planning are some of the strategies that municipalities can adopt to

reduce their carbon footprint. However, its success depends on adequate institutional coordination and the availability of technical capacities and financial resources.

In this framework, this study aims to **analyze the degree of implementation of environmental management instruments, especially green contracting and emission mitigation strategies, in Latin American cities**, identifying advances, obstacles and opportunities. It is based on the assumption that urban environmental management cannot be conceived solely from the normative logic, but must be integrated into a systemic vision of public governance, where sustainability is a cross-cutting axis of the planning, execution and evaluation of local policies (Pérez & Rodríguez, 2023).

2. Theoretical Framework

The theoretical framework addresses three essential components to understand environmental management from the public sphere in Latin America: environmental management instruments (IGA), green public procurement (CPV) and emission mitigation strategies in cities. Its conceptual and operational foundations are developed below.

2.1. Environmental Management Instruments (IGA)

IGAs are tools designed to incorporate environmental criteria into the decision-making processes of the public administration, with the purpose of preventing, correcting and mitigating negative impacts on the environment. These instruments can be classified as regulatory, economic, administrative, and voluntary, and their effective implementation requires solid institutional frameworks and trained personnel (Bermúdez & Salazar, 2021).

According to Gómez & Ríos (2022), the most widely used IGAs in Latin America are environmental impact assessments (EIAs), environmental audits, environmental licenses, ecological fiscal instruments, and recently, sustainable public procurement schemes.

Table 1. Classification of Environmental Management Instruments in Public Administration

Instrument Type	Common Examples	Application in local governments
Regulatory	Environmental Impact Assessment, environmental laws	Territorial planning plans with an environmental focus
Economic	Green taxes, environmental subsidies	Tax incentives for efficient buildings
Administrative	Environmental Licenses, Audits	Municipal solid waste management
Volunteers	Environmental certifications, sectoral agreements	Community Environmental Education Programs

Source: Adapted from Gómez & Ríos (2022)

In the urban context, these instruments make it possible to regulate land expansion, improve efficiency in the use of resources and ensure that public investments respond to sustainability criteria.

2.2. Green Public Procurement (VPP)

CPV consists of the inclusion of environmental requirements in public procurement processes, such as ecological technical specifications, environmental assessment criteria, or environmental certifications for products and services (Gómez et al., 2022). Public procurement can be a key catalyst for sustainable markets, mobilizing between 10% and 20% of GDP in Latin American countries (ECLAC, 2023).

Table 2. Potential Benefits of Green Public Procurement

Benefit	Estimated impact
Reduction of GHG emissions	Up to 25% in sectors such as construction and energy
Lifecycle savings	Up to 20% reduction in total operating costs
Boosting the sustainable market	Increase in the supply of certified products
Institutional strengthening	Enhancing technical and regulatory capacities

Source: Torres & Benavides (2024)

However, its implementation still faces obstacles such as the lack of green suppliers, the absence of binding regulations or approved technical criteria, and poor interoperability between public procurement platforms (Valderrama & Núñez, 2021).

In countries such as Colombia, Peru, and Mexico, guides and technical manuals have been developed to include environmental criteria in tenders, although their use is not yet widespread or mandatory (MinAmbiente, 2023; SEMARNAT, 2021).

2.3. Emissions Mitigation in Latin American Cities

Cities represent a significant source of greenhouse gas emissions, especially in sectors such as transport, land use, and waste management (World Bank, 2020). In this sense, urban mitigation policies seek to reduce these emissions through the design of compact cities, the promotion of sustainable transport, energy efficiency in buildings, and the management of urban solid waste (Gutiérrez & Molina, 2022).

Table 3. Urban Emission Mitigation Strategies in Latin America

Strategy	Implementation examples	Reported Results
Sustainable mobility	Electric buses, bike paths	30% reduction in transport emissions
Energy efficiency	LED lighting in public spaces	Energy savings of 40%
Comprehensive waste management	Composting and municipal recycling	Reduction of waste to landfills
Sustainable urban planning	Eco-neighbourhoods, mixed land uses	Lower energy consumption per capita

Source: Pérez & Rodríguez (2023)

These strategies require a multisectoral approach, strong articulation between levels of government, and access to international financing, such as climate funds or public-private partnerships (Luna & Martínez, 2020).

METHODOLOGY

This study adopts an **exploratory-descriptive qualitative approach**, due to the need to understand the institutional frameworks, operational barriers and regulatory advances associated with the implementation of environmental management instruments (IGA) in urban contexts in Latin America. This methodology allows complex phenomena to be interpreted in specific contexts, considering the perceptions, practices, and discourses of the actors involved (Denzin & Lincoln, 2021).

3.1. Research design

A comparative multi-case **design was used** that included three Latin American cities representative for their size, regulatory progress and urban climate policies: Bogotá (Colombia), Mexico City (Mexico) and Lima (Peru). This design made it possible to identify similarities, differences, and conditioning factors in the application of green procurement and emission mitigation strategies in each local context (Yin, 2020).

Table 4. General characteristics of the case studies

City	Estimated population (millions)	Current environmental policy	CPV Level	Implementation
Bogota	7.4	Climate Action Plan 2020–2050	Moderate	(pilots and technical guides)
Mexico City	9.2	Environmental and Climate Change Program 2021–2026	High	(mandatory CPV regulations)
File	9.5	Local Climate Change Plan 2022	Low	(non-binding recommendations)

Source: Own elaboration based on data from local governments (2023)

3.2. Data collection techniques

Two main techniques of information collection were used:

- **Documentary review:** Included the analysis of national and municipal regulations, strategic plans, contracting manuals, management reports and documents from multilateral organizations between 2020 and 2024. This technique made it possible to contextualize public policy actions from a technical-legal approach (Bermúdez & Salazar, 2021).
- **Semi-structured interviews:** Interviews were conducted with 12 public officials linked to the areas of contracting, environment and urban planning, distributed equally among the three cities. The interviews were conducted virtually, with thematic scripts adapted to each context. The objective was to obtain perceptions on the degree of progress, obstacles, technical capacities, and proposals for improvement in the application of IGAs (Valderrama & Núñez, 2021).

Table 5. Profile of interviewees by city and sector

City	Environment	Public Procurement	Urban Planning	Total
Bogota	2	1	1	4
Mexico City	2	2	0	4
Lima	1	2	1	4

Source: Own elaboration (2024)

3.3. Data analysis

The analysis was carried out using **thematic coding**, using NVivo 14 software, which allowed the identification of common patterns, emerging categories and relationships between variables. The initial categories included: regulatory framework, institutional capacities, monitoring and evaluation, operational barriers and opportunities for improvement.

The approach adopted was **inductive**, to the extent that the categories were refined during the analysis process based on the recurrences and meanings given by the interviewees (Gutiérrez & Molina, 2022). Methodological triangulation was used between the documentary review and the interviews to strengthen the validity of the study.

3.4. Criteria of rigour

To ensure the **credibility** and **transferability** of the results, strategies were applied such as:

- Triangulation of sources (documents and interviews);
- Peer review of analytical categories;
- Verification with key informants (external validation).

These actions ensured the transparency of the process and the robustness of the findings (Díaz & Rocha, 2020).

RESULTS

The results of this research allow us to identify uneven progress in the implementation of environmental management instruments (IGA) in the cities analyzed, as well as common challenges and emerging practices that offer opportunities for improvement.

4.1. Regulatory developments in green public procurement

The three cities have incorporated, to varying degrees, environmental sustainability guidelines in their public procurement processes. Mexico City has made the greatest progress, thanks to the mandatory implementation of environmental criteria in tenders since 2021, in compliance with the Law on Acquisitions, Leases and Services of the Public Sector (SEMARNAT, 2021). Bogota has developed a sustainable contracting manual, but its use is still voluntary. Lima, for its part, has barely begun the incorporation of green purchasing guides without binding regulatory support.

Table 6. Comparison of regulations on green procurement by city

City	Binding regulatory framework	Technical manuals	Mandatory application	Leading institution
Mexico City	Yes	Yes	Yes	Ministry of the Environment (SEDEMA)
Bogota	Partial (resolutions)	Yes	No	District Secretariat of the Environment
Lima	No	Partial	No	Metropolitan Municipality of Lima

Source: Authors' elaboration based on documentary review (2020–2024)

According to Torres and Benavides (2024), clear and mandatory regulations increase the effective inclusion of sustainable criteria in public procurement by 35%.

4.2. Institutional and operational barriers

The interviews revealed five common barriers to IGA implementation:

1. **Limited technical capabilities** in procurement teams.
2. **Lack of regulatory knowledge** on the part of public officials.
3. **Lack of incentives for green suppliers.**
4. **Restricted budget**, which generates a preference for the lowest immediate cost.

5. Weak monitoring and evaluation of environmental compliance in the contracts awarded.

Table 7. Perceived barriers in the implementation of CPV by city (frequency of mention)

Barrier	Bogota	Mexico City	File
Lack of technical capabilities	3	2	4
Absence of unified criteria	2	1	3
Budget	2	2	4
Lack of supply of certified products	3	1	3
Poor follow-up and monitoring	2	2	3

Source: Interviews with public officials (2024)

These barriers coincide with those found in other studies on urban environmental management, such as those by Valderrama and Núñez (2021), who identify that in 65% of Latin American municipalities, technical staff lack specialized training in sustainable procurement.

4.3. Local emission mitigation strategies

In terms of emission mitigation strategies, the cities evaluated have developed various initiatives:

- **Bogotá:** Implemented the Sustainable Mobility Strategy with 1,485 electric buses in operation (IDU, 2023). This has represented an estimated reduction of 70,000 tonnes of CO₂ per year.
- **Mexico City:** It has reduced energy consumption in government buildings by 18% since 2020 thanks to the "Green Building" program (SEDEMA, 2023).
- **Lima:** Initiated a pilot recycling plan with citizen participation, which managed to process 1,200 tons of solid waste in 2023, although without a clear measurement of emissions impact (Municipality of Lima, 2023).

Table 8. Major urban mitigation strategies (2020–2024)

City	Main strategy	Result Indicator	Estimated reduction	CO ₂
Bogota	Electric public transport	1,485 electric buses in operation	70,000 CO ₂ /year	tonnes
Mexico City	Energy efficiency in buildings	-18% energy consumption in 120 buildings	22,000 CO ₂ /year	tonnes
File	Urban Recycling Program	1,200 tonnes of recycled waste	Unavailable	

The above data show that cities with greater environmental institutions and technical capacity are able to implement more effective and quantifiable mitigation policies (Gutiérrez & Molina, 2022).

Source: Local Government Reports (2023)

4.4. Perceptions of opportunities for improvement

The interviewees agreed that it is urgent:

- Establish **standardized indicators** to evaluate environmental impact in contracting.
- Promote **public-private partnerships** that boost the supply of green products.
- Access international **funding** to scale pilot programs.
- Promote **continuous training** of personnel in environmental regulations and sustainable procurement.

Pérez and Rodríguez (2023) state that local governments that invest in environmental training increase their capacity to implement climate programs successfully by 40%.

CONCLUSIONS

The findings of this study reveal that, although there is a growing recognition of the strategic role played by **environmental management instruments (EMIs)** in urban public policies, their effective implementation in Latin America still faces significant limitations of a regulatory, operational and institutional nature.

Firstly, **green public procurement (CPV)** is emerging as a key tool to transform institutional consumption patterns and promote a more sustainable economy from the State. The cities analyzed have adopted regulations and guidelines for their incorporation to varying degrees, with Mexico City being the most advanced case with mandatory legislation and a consolidated operational structure (SEMARNAT, 2021).

However, in contexts such as Lima and Bogotá, a gap between regulation and practice persists, reducing the real impact of green procurement in reducing environmental footprints (Torres & Benavides, 2024). Second, **institutional barriers**, such as the limited technical capacity of recruiters, the scarcity of certified green products, and the lack of systematic follow-up in procurement processes, represent structural bottlenecks. These barriers not only prevent the effective application of IGAs, but also generate internal resistance to change in traditional administrative dynamics (Valderrama & Núñez, 2021). Therefore, it is essential to promote reforms in the formation of human capital and strengthen the environmental units of local governments.

Third, in terms of **emissions mitigation in the urban environment**, the experiences of Bogotá and Mexico City show that investments in sustainable public transport and energy efficiency can generate quantifiable and positive impacts in the reduction of greenhouse gases. However, these successful experiences often depend on access to international financial resources, stable institutional frameworks, and political leadership (Gutiérrez & Molina, 2022). In contrast, Lima's experience reflects the challenges of sustainability in cities with limited environmental planning and financing capacities.

In addition, the results show that the **multilevel articulation** between national and local governments and multilateral organizations is a critical factor for the success of environmental programs. Institutional fragmentation and overlapping competencies often lead to inefficiencies in the implementation of mitigation and green contracting policies (Pérez & Rodríguez, 2023). Overcoming this fragmentation requires integrated environmental governance strategies, based on inter-institutional cooperation and shared capacity building.

In conclusion, strengthening environmental management instruments in Latin American cities requires a **comprehensive strategy** that combines solid regulatory frameworks, technical capacities, economic incentives, and the participation of private actors. Green procurement should not be seen as an ancillary mechanism, but as a lever for structural transformation towards more sustainable, resilient and inclusive urban models. To move in this direction, it is necessary to create robust monitoring frameworks, promote purchases based on the life cycle of products and foster an institutional culture committed to climate and sustainability objectives.

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