



Management and Execution of Environmental Royalties in the Province of Tundama, Boyacá: Regulatory Challenges and Barriers in Project Formulation

Lindaura Alexandra Quintana Fuentes¹, Juan Pablo Ladino², Hilda Lucia Jiménez Orozco³

¹ Universidad Tecnológica y Pedagógica de Colombia, lindaura.quintana@uptc.edu.co, ORCID: 0009-0006-2168-24601

² Universidad Tecnológica y Pedagógica de Colombia, juanpabloladinob@gmail.com, ORCID: 0009-0005-7326-1011

³ Universidad Tecnológica y Pedagógica de Colombia, hilda.jimenez@uptc.edu.co, ORCID: 0000-00019316-91363

Abstract

This study analyzes the management and execution of environmental projects financed with resources from the General Royalties System (SGR) in the Tundama Province, Boyacá. The main problem identified is the lack of execution of projects due to the lack of knowledge of the requirements and processes necessary for their approval. The research was developed under a mixed methodological approach, which included a documentary review of current legislation, surveys to key actors in the administration of royalties and the analysis of royalty management platforms. The results show that, despite efforts to allocate resources to environmental projects, regulatory and administrative barriers persist, such as the lack of training and the complexity of procedures. Therefore, the research concludes that it is necessary to strengthen the training of local officials, simplify procedures and control to ensure the effective execution of environmental projects and the optimization of allocated resources.

Key words: Project Management, Regulations, Tundama Province, Environmental Projects and General Royalties System.

Received: 12 Oct 2023

Accepted: 29 Nov 2023

Published: 14 Dec 2023

Introduction

In Colombia, the General Royalties System (SGR) is a key instrument for financing regional development, as it allows the distribution of State revenues from the exploitation of non-renewable natural resources, based on a scheme implemented after the amendment of Articles 360 and 361 of the Political Constitution made in 2011, which incorporated a model for the management of royalty resources, contemplating both revenues, and allocations, bodies, procedures and regulations.

This model was initially regulated by Law 1530 of 2012 and subsequently modified through Law 2056 of 2020, which implemented a new royalty allocation scheme that seeks to improve equity in the distribution of resources, strengthen decentralization and prioritize strategic projects for the sustainable development of the country (Congress of the Republic of Colombia, 2020).

With the new distribution structure, greater strength and importance is given to investments to mitigate the adverse effects generated by the exploitation of non-renewable natural resources, and seeks to promote sustainability in the affected territories. In this sense, environmental projects acquire greater relevance within the royalty investment scheme, so that, through Law 2056 of 2020, specific provisions are

established for the financing of environmental projects, introducing financing mechanisms that include aspects such as investment planning, as well as the requirements and procedures that territorial entities must comply with to access the funds created for this purpose (National Planning Department, 2021).

However, the implementation of these mechanisms has faced several challenges, which are related not only to the difficulty in the formulation of projects, but also to the limited technical capacity of the entities to comply with the technical and regulatory requirements for the presentation of projects, and even with the application of processes and procedures, aspects that affect the effectiveness and execution of the resources allocated to the environmental component, limiting the viability of the projects (Office of the Comptroller General of the Republic, 2022).

The viability of environmental projects is a constant challenge due to various institutional and technical limitations. Currently, few projects are submitted for this financing mechanism, so their execution is low; in addition, a large percentage of the projects that are feasible, prioritized and approved do not achieve the expected impacts, which leaves unsatisfied needs in the sector and generates inefficiency in public spending.

According to Sanabria (2019), one of the main causes of this problem is the lack of knowledge of processes and procedures, the low institutional capacity for project formulation, the lack of qualified professionals in the area, and the low priority assigned to the environmental sector. These factors negatively affect project formulation, as well as the development and execution of initiatives aimed at environmental sustainability and conservation.

Therefore, the purpose of this research is to analyze the current regulatory and procedural framework based on the provisions of Law 2056 of 2020 and its amendments, in order to identify the procedures, requirements and mechanisms for the allocation of royalties for environmental projects and their impact on the low execution of resources allocated to this funding mechanism. To this end, a documentary review of the regulations and platforms that provide information on municipal management in the investment of environmental royalties has been carried out.

This approach allows obtaining a clear understanding of the context in the administration of resources allocated for environmental purposes, and also considers the assumption that the low viability and approval of environmental projects is due to the lack of knowledge of the requirements, processes and procedures necessary for the approval of projects with resources from the environmental allocation of the SGR.

Theoretical Background

This section expands the knowledge inherent to some constructs that are relevant to understand and interpret the object of study, including aspects of the General Royalties System and its impact on environmental management, barriers in the formulation of environmental projects with SGR resources, challenges in the prioritization and implementation of environmental projects, and public policies and necessary reforms in the use of environmental royalties.

General royalty system and its impact on environmental management

The SGR in Colombia was created as a response to the need to configure a scheme for equitable distribution of revenues derived from the use of non-renewable natural resources, which were allocated only to the producing territorial entities. This generated a concentration of resources in a few municipalities and departments, which did not have results and impacts with the efficient use of revenues resulting from royalties.

Based on this situation, in 2011 Articles 360 and 361 of the PC were modified, creating the SGR with the objective of promoting the socioeconomic and environmental development of the country, based on a distribution of resources that seeks not only to mitigate the negative externalities of exploitation, but also to promote equitable economic development among the different regions of the country. Thus, according to Law 1530 of 2012, a significant portion of royalties would be allocated to environmental protection, with

the understanding that the ecological damages derived from mining, oil exploitation and other resources must be compensated with actions for the restoration and conservation of the affected ecosystems. However, the resource distribution structure did not contemplate a specific allocation for environmental projects, as happened in 2020 with the issuance of Law 2056.

With this new model, a project financing mechanism was implemented through the environmental allocation, which allows resources from royalties to be directed specifically to the implementation of initiatives aimed at the recovery and preservation of natural resources. This mechanism seeks to guarantee that the regions impacted by the exploitation of resources have the necessary allocation to implement ecological restoration projects, biodiversity conservation, and the development of sustainable practices that mitigate the negative effects of these activities.

In essence, the aim is to contribute to sustainable development, which, as a concept, requires an allocation of resources that not only aims at improving infrastructure, but also contemplates projects to restore ecosystem services and protect natural assets. As established by Brundtland (1987), development must meet the needs of the present without compromising the ability of future generations to meet their own needs. In this sense, SGR resources should be managed in such a way that the benefits of environmental projects are not temporary or local, but generate long-term value for the communities and the country.

The use of royalties in environmental projects stands out as a key strategy to mitigate the adverse effects of extractive activities. According to Vásquez et al. (2020), the financing of these projects is essential, but their effectiveness depends on adequate planning, efficient implementation and continuous monitoring to adjust strategies according to the results obtained.

Barriers in the formulation of environmental projects with SGR resources

Despite the positive intention of the allocation of royalties, according to Rudas (2022) regulatory, procedural and administrative barriers have been a recurring obstacle in the implementation of the mechanism for financing environmental investments, which has led to low project approval and therefore a low execution of resources.

Rodríguez and Perez (2021) emphasize that cumbersome administrative processes, lack of procedural clarity and excessive requirements often delay or stall important environmental initiatives. In addition, inadequate coordination between local authorities and entities responsible for assessing project feasibility limits the ability to effectively formulate and carry out many of these initiatives.

On the other hand, Fowler (2017), highlights that environmental governance is an essential factor for the effectiveness of royalty management aimed at environmental protection. This governance should involve the participation of various stakeholders, such as local authorities, communities, NGOs, the private sector and the general public. Participatory management is considered a pillar to ensure that projects are relevant, aligned with local needs and have the support of the communities that will be affected by their implementation.

However, as indicated by Rodríguez and Pérez (2021), the lack of coordination and collaboration between the different levels of government and social actors is one of the main limitations in environmental governance. Likewise, the lack of integrated approaches and the disconnection between key actors hinder the effective planning and execution of projects. To improve this situation, it is essential to promote greater inter-institutional coordination, allowing all actors to work towards the same objectives and avoid duplication of efforts or waste of resources.

It should also be noted that the rigidity of the procedures for resource allocation, particularly the viability, prioritization and approval of projects, has generated situations in which projects are not adapted to local realities. This is due to the fact that administrative processes are often centralized and do not consider the particularities or needs of each region, which hinders access to this financing mechanism. The lack of regulatory flexibility in the management of royalties is presented as a significant barrier that limits the financing of viable, relevant and impactful projects that are adapted to the needs and particularities of the

territory. As Kalmanovitz (2013) warns, the centralized design of public policies tends to ignore regional dynamics and reproduces inequalities in the allocation of resources, weakening local institutional capacity and the effectiveness of public investment.

Challenges in the prioritization and implementation of environmental projects

The socioeconomic impact on local communities is a critical factor influencing the prioritization, implementation and success of royalty-financed projects. In many producing regions where natural resources are exploited, poverty and unemployment are prevalent conditions that, in some cases, can generate resistance to environmental projects. This is because communities, faced with immediate economic needs, often prioritize immediate economic benefits over long-term environmental objectives. This reality, which is influenced not only by the communities but also by the management and vision of local authorities, reflects the lack of long-term planning and the absence of a culture that values sustainability as a fundamental axis of development (Rodríguez, 2011).

In this sense, according to Carrillo (2023), mayors, as the main local authorities, face the challenge of making strategic decisions in contexts where urgent economic and social demands predominate. In practice, priority is often given to infrastructure projects or activities that generate visible and rapid economic benefits, relegating environmental objectives that, although fundamental, present less tangible results in the short term. This lack of focus on environmental investments perpetuates cycles of deterioration in local ecosystems and affects the quality of life in the long term, demonstrating a disconnect between economic development and environmental conservation.

González et al. (2020) suggest that for projects to be sustainable and well received by local communities, they must be accompanied by social inclusion and environmental education strategies. Awareness-raising and training on the importance of environmental protection can change the perception of communities towards projects, fostering a sense of ownership and responsibility for natural resources. These awareness and training campaigns should be designed not only for communities, but also for local authorities, so that they understand how environmental investments can become a strategic development tool. Likewise, the creation of jobs or the promotion of initiatives that combine economic development with environmental conservation are fundamental to overcome initial resistance and generate a cultural change (Florez, 2017).

From this perspective, the articulation between different levels of government and key actors is vital for the success of these projects. This requires a collaborative approach where mayors lead the environmental agenda and manage resources equitably and efficiently, involving communities in decisions that directly impact their territories. Strengthening public policies that encourage investment in environmental projects can transform the short-term vision and turn royalties into catalysts for sustainable development that favor both the economy and the preservation of natural resources.

Public policies and necessary reforms in the use of environmental royalties

Public policies are essential to guide the use of royalties in environmental protection projects. However, despite legislative advances in Colombia, such as Law 1530 of 2012 and, more recently, Law 2056 of 2020, the regulations still present legal gaps and lack of coherence between national and local policies. This generates a disarticulation in the efforts to use royalties in an effective and equitable manner.

Rodríguez (2021) proposes legislative reforms that allow greater flexibility in the allocation of resources, as well as greater adaptation of policies to local realities. Reforms could simplify administrative procedures, reduce bureaucracy and allow projects to be more agile and dynamic, better adapting to the needs and capacities of the producing regions. In addition, transparency in resource allocation and accountability are essential to avoid corruption and improve efficiency in project implementation.

Materials and Methods

This research was based on a quantitative approach, which sought to obtain a comprehensive understanding of the management of royalties in environmental projects in the Tundama Province, in the

department of Boyacá - Colombia. The methodology used combined documentary review, analysis of digital platforms that allowed a multidimensional and dynamic approach to the analyzed problem.

The study design integrates the descriptive and exploratory method. The descriptive phase allowed characterizing the current state of royalty management, examining the regulatory frameworks, administrative dynamics and the actors involved in the execution of the projects. At the same time, the exploratory approach identified the challenges, barriers and opportunities faced by territorial entities, establishing critical points and areas for improvement.

The documentary review constituted the first methodological pillar, facilitating a detailed analysis of norms such as Law 2056 of 2020 and its amendments, which establish the guidelines for the distribution and execution of royalties in Colombia. This stage also included the review of technical documents, management reports and academic publications, providing a solid basis for interpreting the dynamics of environmental projects in the research scenario.

On the other hand, the analysis of digital platforms such as the Royalties Project Management Index and the Transparency Portal of the Ministry of Finance provided updated data on the allocation of resources, available balances and efficiency in the budget execution of the municipalities studied. These tools made it possible to identify management patterns, as well as discrepancies in the use of resources earmarked for environmental projects.

The combination of these methods and tools made it possible to build a comprehensive picture of royalty management in environmental projects, identifying not only existing deficiencies, but also opportunities to optimize processes and ensure greater sustainability in the execution of resources.

Research phases

The research was structured in three main phases, each designed with a specific focus to ensure systematic, comprehensive data collection aligned with the objectives of the study:

- Phase 1 Academic literature review and regulatory framework

During this initial phase, a detailed review of the academic literature related to the General Royalties System (SGR) and the current regulations governing environmental projects financed with royalties was carried out. Various sources were consulted, including scientific publications, official documents and specialized articles, which provided an enriching perspective on the historical evolution, legal framework and challenges in the management of royalties in Colombia. This analysis made it possible to identify the main normative elements that regulate the distribution of resources and to highlight the key aspects that affect the implementation of environmental projects in the country.

- Phase 2 Allocations and balances analysis and identification of DNP procedure and requirements

In this phase, a detailed study was conducted on the allocation of balances in the SGR, focusing on the guidelines and procedures established by the National Planning Department (DNP). The specific requirements necessary for the formulation and approval of environmental projects were explored, highlighting the administrative and operational barriers faced by territorial entities. In addition, recurring patterns in the execution of resources were identified, which allowed proposing adjustments to improve the efficiency of the processes related to the planning and allocation of royalties.

- Phase 3 Review of indicators, application of surveys and formulation of a consultation tool

The third phase focused on the evaluation of key indicators that measure the performance of municipalities in the allocation and management of resources from royalties. Structured surveys were designed and applied to strategic actors in the municipalities of the Tundama Province, public officials. These surveys offered a detailed vision of the perception, challenges and priorities of the actors involved in environmental management. The data collected made it possible to evaluate the effectiveness of the projects financed with royalties and to highlight areas of opportunity to improve their impact in environmental and social terms.

In addition, a consultation guide is formulated to orient the entities in the processes and procedures for the formulation and approval of projects financed by the SGR.

Results and Analysis

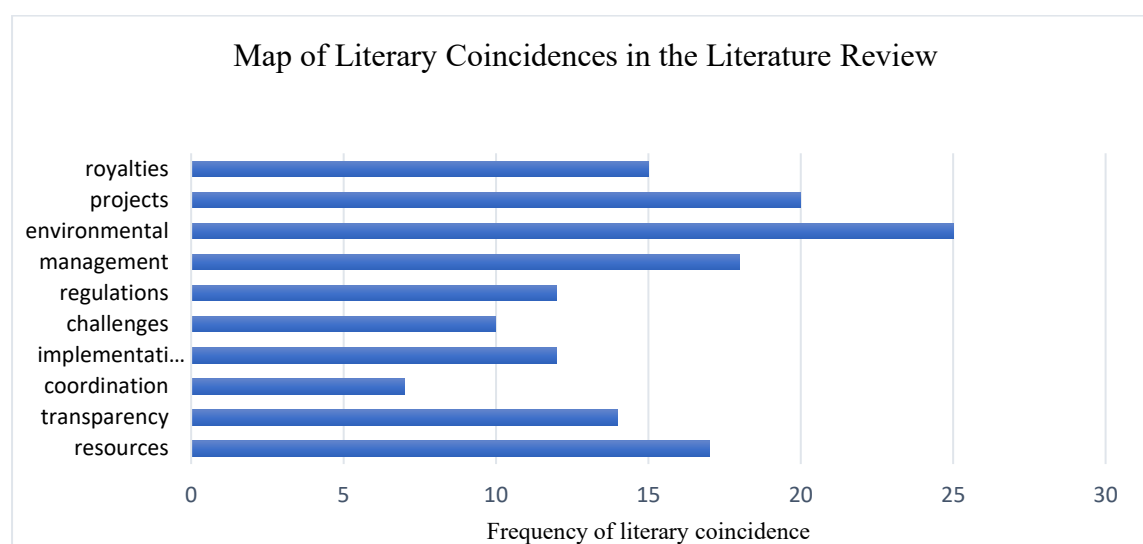
This section presents the results obtained from a review of relevant sources, organized in phases that respond both to the research objectives and to the dynamics of the General Royalties System (SGR). This allows understanding how regulations, institutional planning and management practices affect the formulation of environmental projects financed with royalties.

Results First phase: Conceptual and normative development

As part of the literature review, the data collection process was carried out through an exhaustive documentary review of various relevant sources, including academic articles, specialized publications and official documents on the General Royalties System (SGR) and its application in environmental development projects. The selection of these sources was based on their ability to provide a critical overview of the regulatory context, the challenges in project formulation and execution, and the impacts of royalty implementation on environmental management.

Figure 1

Literature Review



Source. Own elaboration.

Figure 1 presents the map of literary coincidences obtained from the literature review. This graph illustrates the interrelationships and frequency of keywords present in the analyzed documents. Among the most recurrent terms, “royalties”, “projects”, “environmental”, ‘management’ and “regulations” stand out. The high recurrence of these terms clearly identifies the priority areas of the research, evidencing both the problems in the execution of environmental projects and the importance of the regulatory framework that governs their financing.

The analysis of the map of coincidences identified two main thematic axes. On the one hand, the words “royalties” and “regulations” reflect the central role played by the legal framework in the allocation and use of resources for environmental projects. On the other hand, the terms “projects”, ‘environmental’ and “management” underline the operational and technical challenges faced by territorial entities when implementing sustainable development initiatives, as well as the need to effectively articulate these projects with the socioeconomic realities of local communities.

These findings highlight the importance of strengthening the clarity and flexibility of regulatory processes, as well as improving coordination between local and national authorities. They also highlight the need to

promote strategies that facilitate the formulation of viable environmental projects, overcoming current administrative barriers and allowing investments in sustainability to generate significant and long-term impacts for regional development.

Regarding the analysis of royalty regulations in the environmental sector, the review of the SGR in Colombia, especially with regard to Law 2056 of 2020 and Legislative Act 05 of 2019, shows substantial progress in the search for a more equitable and efficient use of resources, but also reveals significant challenges in the administration of funds for environmental projects. These regulatory changes seek to orient the SGR towards environmental sustainability, the conservation of strategic ecosystems and the fight against deforestation, transforming the way in which royalties are distributed and managed at the territorial level.

One of the main findings of this review is the resource distribution scheme for environmental projects. Current regulations establish that 15% of SGR revenues are allocated to municipalities with high rates of Unsatisfied Basic Needs (UBN), and of this percentage, at least 2% must be used for environmental projects. However, it has been observed that a significant portion of these resources is not executed, which is largely attributed to the lack of technical and administrative capacity in the beneficiary municipalities.

This limitation prevents the formulation and implementation of initiatives that respond to the objectives of ecosystem conservation and restoration.

In addition, the implementation of environmental projects faces serious operational challenges. The low utilization rate of conservation resources is affected by the lack of clear guidelines and the inherent complexity of administrative procedures, making it difficult to develop effective projects adapted to local needs. The poor training of officials in charge of structuring and managing these projects aggravates the situation, reducing efficiency in the use of funds and the achievement of significant environmental impacts.

On the other hand, it is important to highlight the positive impact of the funds aimed at combating deforestation. One percent of the SGR resources is specifically allocated to the conservation of strategic areas and the fight against deforestation. However, the effectiveness of these projects depends to a large extent on inter-institutional coordination between territorial entities, the Ministry of Environment and the National Planning Department (DNP); a collaboration that, in some cases, is still insufficient to guarantee the adequate implementation of the initiatives.

The allocation of 10% of the SGR for science, technology and innovation (STI) projects is another critical aspect. Projects funded under this heading have been used to a limited extent, as they are not always aligned with national environmental priorities, such as climate change mitigation and the promotion of non-conventional renewable energies. This disconnect between financially supported research and its practical application in ecosystem conservation limits the transformative potential that could be obtained from a more coherent integration of science and environmental management.

In terms of monitoring and control of environmental projects, although the SGR allocates 2% of its revenues to the operation and supervision of these processes, the existing mechanisms still show shortcomings. The lack of robust systems to ensure transparency and continuous supervision increases the risk of misuse of funds and limits the effectiveness of initiatives designed to protect and restore the environment.

Finally, the implementation of Agreement 006 of 2022, which regulates the investment of royalties in environmental projects, faces significant challenges. The absence of a National Strategy for the Protection of Strategic Environmental Areas and the insufficient human resources in local entities to manage projects hinder the adequacy and effective execution of these resources. This scenario demands, therefore, not only a thorough review of regulatory processes, but also the adoption of measures to strengthen the technical and operational capacity of the institutions involved.

This analysis of the regulations highlights that, although progress has been made towards a fairer and more sustainable distribution of royalties, the effectiveness of environmental projects is hampered by structural and operational challenges. The findings point to the need to implement reforms that simplify

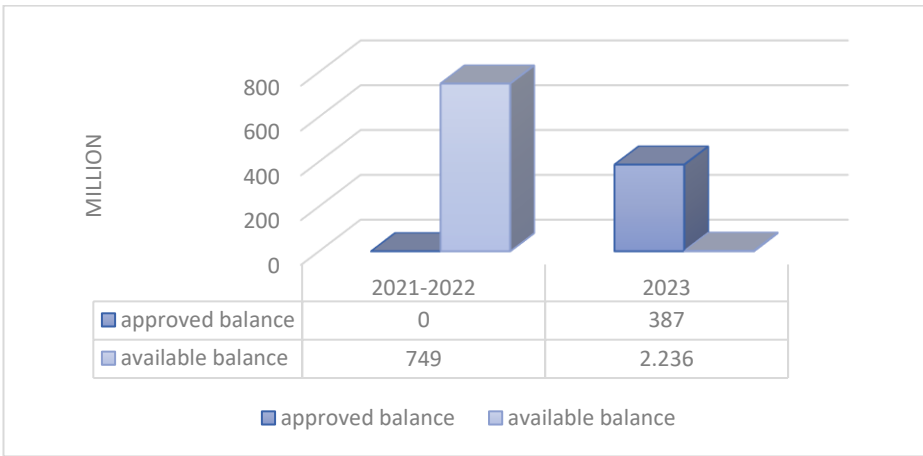
administrative procedures, strengthen the training of local officials and promote greater interrelation between the different entities responsible for the execution and supervision of these resources, in order to maximize the positive impact of investments in the environmental sector.

Resources, balances, procedures and requirements

The analysis of the allocation of balances destined for environmental projects in the province of Tundama shows relevant challenges in the execution of SGR resources. Figure 2 shows the accumulation of funds during the last two biennia. In the first biennium, it stands out that no projects were approved, which resulted in a significant accumulation of available resources. This phenomenon is linked to various barriers, such as the limited technical capacity of local entities to formulate viable projects and the lack of alignment with national conservation and sustainable development priorities. The accumulation of funds without effective execution highlights the urgency of improving the mechanisms for approving and executing environmental projects so that these resources are used optimally in the protection and restoration of ecosystems

Figure 2

Environmental Balances Tundama Province

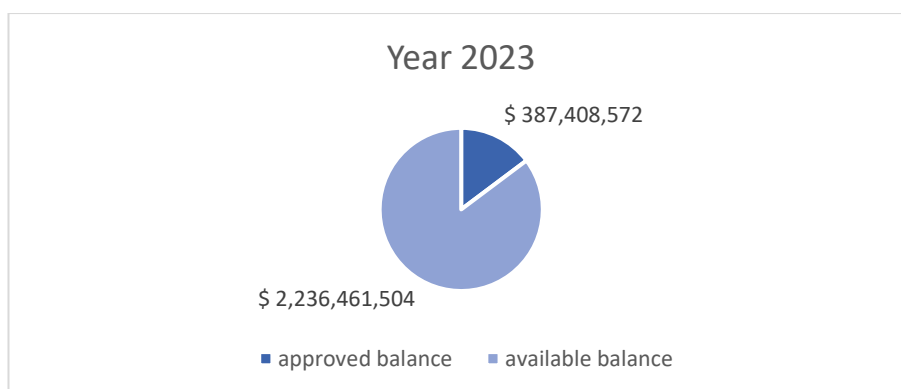


Source. Own elaboration

Figure 3 shows the percentage of resources approved for environmental projects in the municipalities of the province during the year 2023. Despite the fact that 15% of the allocated economic resources have been approved, the analysis reveals that more than 85% of these funds have not been committed to environmental projects. These figures highlight the need to reinforce the training of officials in charge of royalty management, as well as to clarify the requirements and procedures for approval according to current regulations. Taken together, these findings show the importance of promoting reforms and operational strategies that facilitate the formulation and execution of environmental initiatives in the municipalities, thus guaranteeing an effective and sustainable use of SGR resources.

Figure 3

Balance Percentages



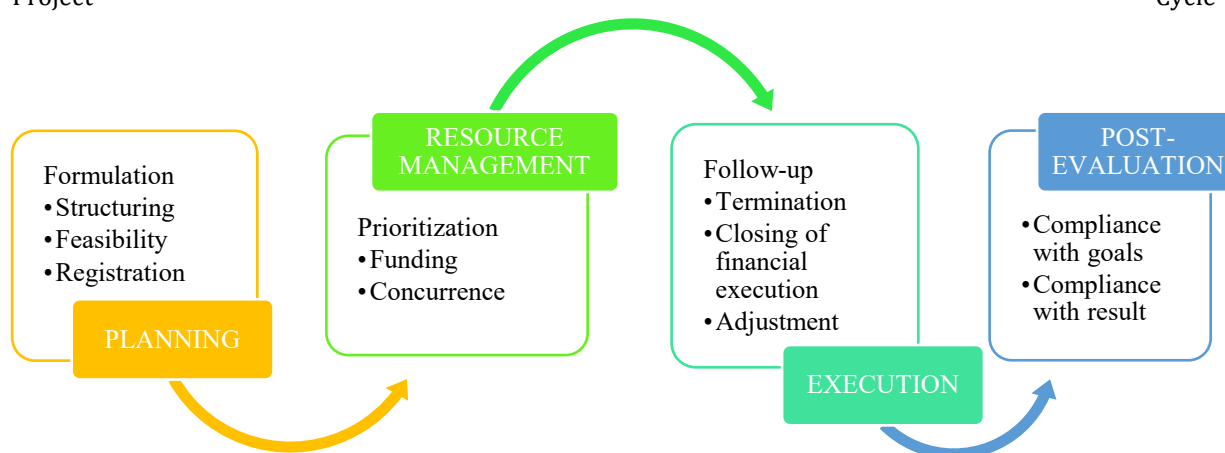
Source. Own elaboration

For the allocation of these resources, i.e., for their feasibility, prioritization and approval, the regulatory framework for projects financed with royalties establishes procedures and requirements that guarantee adequate formulation, approval and execution of environmental investments. In this context, the National Planning Department (DNP) defines the guidelines and regulations for the management of these resources. In accordance with the provisions of Decree 1082 of 2015, there is evidence of the existence of a conceptual cycle that covers from initial planning to final evaluation, which is also reflected in the management process in the SGR.

Figure 4

Project

Cycle



Source. Own elaboration

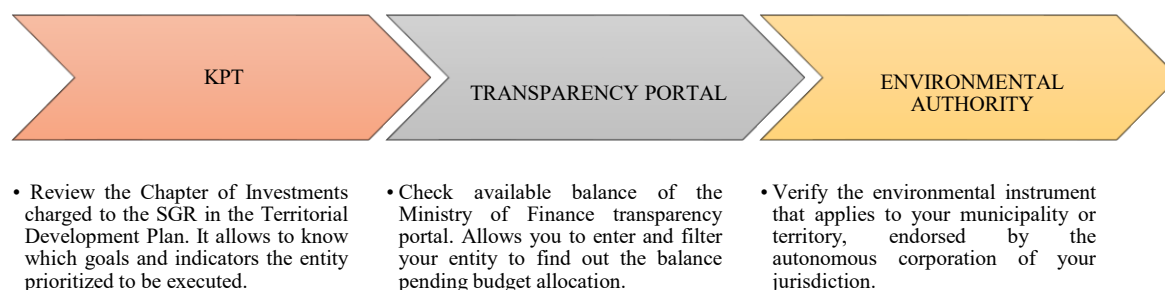
Figure 4 illustrates this project cycle, which includes planning, resource management, execution and subsequent evaluation. For this study, the analysis focused on the planning stage, which includes key processes such as formulation, structuring and determining the feasibility of the project. In the formulation phase, the objectives, goals and activities are precisely defined, the corresponding budget is prepared and a timetable is established. It is in this initial phase that the project idea emerges, which must be based on a thorough knowledge of the territory and an analysis of the environment to identify both opportunities and threats. This analysis must verify that the territorial entity's development plan is in line with departmental and national guidelines, as well as the availability of the necessary budget.

Once the idea has been defined and the environmental project has been structured, it is recognized that, within the framework of royalties, there is a cycle that begins with formulation and moves on to approval, in stages in which the DNP and other responsible entities review and validate the proposal. The execution phase involves the implementation of the project in accordance with the established guidelines and supervised by the competent authorities. Finally, there is continuous monitoring and evaluation to ensure that the project complies with the objectives and regulations in force.

In addition, for environmental projects it is essential to know and properly use the environmental planning instruments that operate in the jurisdiction. This is evidenced by the use of applications such as SISPT, the Transparency Portal and the environmental authority's determinants, tools that facilitate the consolidation of the project and its proper execution, as shown in Figure 5.

Figure 5

Project Consolidation Tools



Source. Own elaboration

In this way, an integral cycle is articulated that not only responds to the theoretical and conceptual approach defined by Decree 1082 of 2015, but is also fully integrated into the resource allocation and execution cycle in the SGR. This approach highlights the need to optimize each of the processes involved, from formulation to evaluation, to ensure that funds earmarked for ecosystem protection and restoration are used efficiently and effectively.

The structuring of an environmental project under the SGR must follow clear guidelines established in the transitional guidelines, which determine the minimum requirements for its formulation as shown in Figure N° 6. It is essential that the project be framed within the territorial, departmental and national development plans, and that budget availability be verified. This ensures that the proposal is aligned with national sustainable development and environmental conservation policies, creating a solid basis for its approval and implementation.

All projects financed with SGR resources must be submitted following the Adjusted General Methodology (AMM), a standardized approach that facilitates the evaluation and validation of proposals. The AMM ensures that the initiatives comply with the technical, financial and regulatory requirements established by the National Planning Department (DNP) and other competent entities. Although any citizen with an account in the application can fill out the proposal, it is the official formulator designated by the territorial entity who endorses and transfers the information through the SUIFP SGR system, generating the corresponding BPIN. Figure 7 illustrates the essential components of the AMS, covering the identification, preparation, evaluation, programming, presentation and transfer of the project.

Figure 6

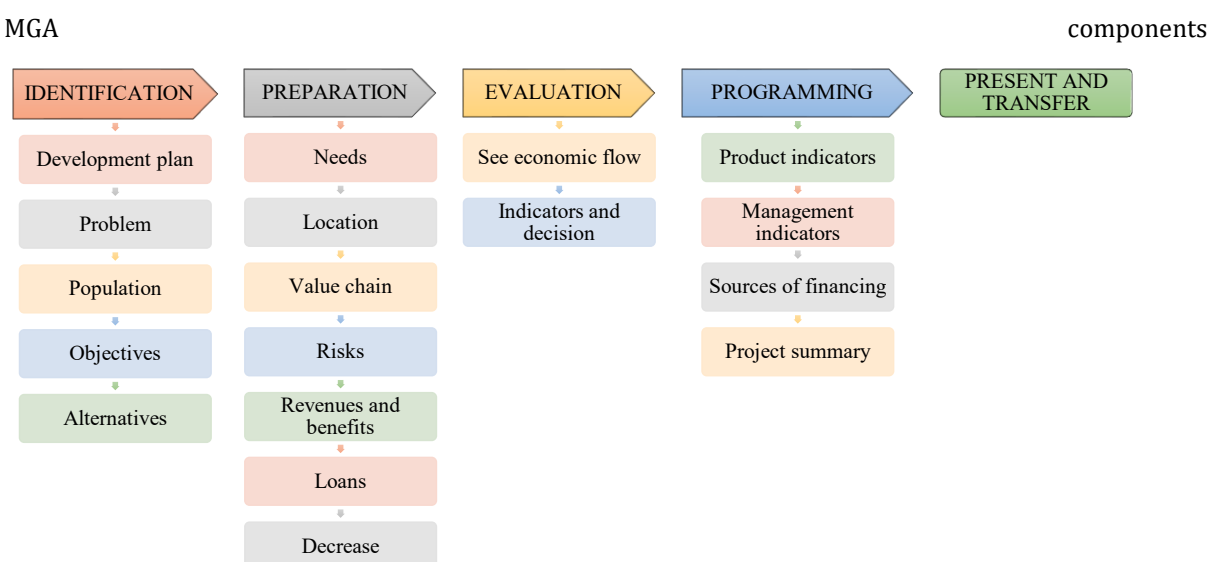
General Requirements

GENERAL	GENERAL PHASE III	PURCHASE OF PROPERTY (IF applicable)	ENVIRONMENT AND DEVELOPMENT SECTOR
☐ MGA ☐ Detailed budget ☐ Certification of regional prices ☐ Certificate of non-financing ☐ Certificate of no risk and EOT	☐ Studies and designs NTC Certificate ☐ Technical document ☐ Ownership ☐ Certificate of public services ☐ Sustainability certificate ☐ Risk analysis	☐ Location map ☐ Technical, legal and financial justification ☐ Land use ☐ Commercial appraisal ☐ Title studies	☐ Certificate from the environmental authority ☐ Articulation with Environmental instrument ☐ Identification of properties

Source. Own elaboration

Figure 7

MGA



Source. Own elaboration

Project feasibility is determined in the SUIFP SGR application, accessible exclusively to territorial entities through the role of technical secretary. In this process, several critical chapters must be completed as shown in Figure 8, which include the presentation of the project, registration of basic data, formal verification of its feasibility, prioritization and approval, as well as the designation of the project executor and, in applicable cases, the determination of the value of the supervision. This process requires clear definitions of the source of financing and the amounts available in cash in the SPGR, which are fundamental elements to ensure orderly execution in accordance with regulatory guidelines.

Figure 8



Source. Own elaboration

Together, the integration of the minimum requirements of Agreement 012 of 2024, the use of the AMS and the verification of feasibility through SUIFP SGR constitute an integral framework that strengthens the formulation, approval and execution of environmental projects. This articulated system not only contributes to mitigate risks during the execution stage, but also promotes an efficient use of SGR resources, supporting sustainable development and the protection of ecosystems in the beneficiary territories.

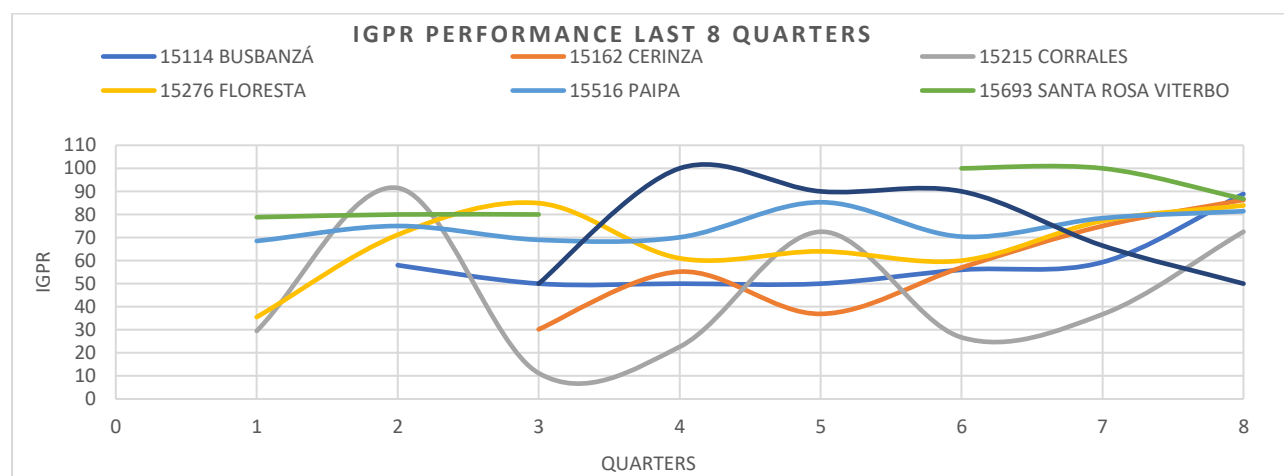
Indicators and data: a reflection of the state of the municipalities of the Tundama province in the last three years.

The figures analyzed in the framework of this research offer a comprehensive overview not only of the state of project management in the municipalities of the Tundama province, but also of their institutional capacities, based on their geographic and population conditions.

Figure 9 is based on official data from the National Planning Department (DNP) and presents the behavior of the Project Management Index (IGPR) financed with royalty resources over the last 12 quarters. This graph reveals a non-linear evolution in the IGPR, highlighting periods in which, due to the absence of current projects, the index shows abrupt drops.

Figure 9

IGPR Behavior Last 8 Quarters



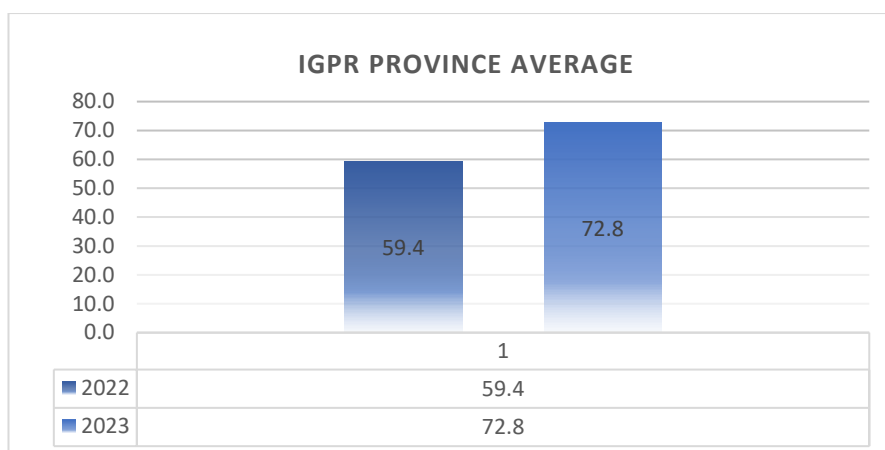
Source. Own elaboration

These variations indicate the high susceptibility of the IGPR to operational and administrative fluctuations. In addition, current regulations establish that the index score must not fall below 60 points for two consecutive years, as this would trigger sanctions that would restrict the entity's ability to approve and execute new projects. This regulatory mechanism underscores the imperative need for municipalities to strengthen their processes of formulation, execution and monitoring of projects financed with SGR resources, which is fundamental to promote local development and improve the quality of life of their inhabitants.

On the other hand, Figure 10 complements this analysis by presenting the average Project Management Index of the municipalities of the Tundama province during the last three years. The upward trend in this indicator suggests an improvement in reporting efficiency and in the monitoring and control processes implemented in the GESPROY platform.

Figure 10

IGPR Average Tundama Province



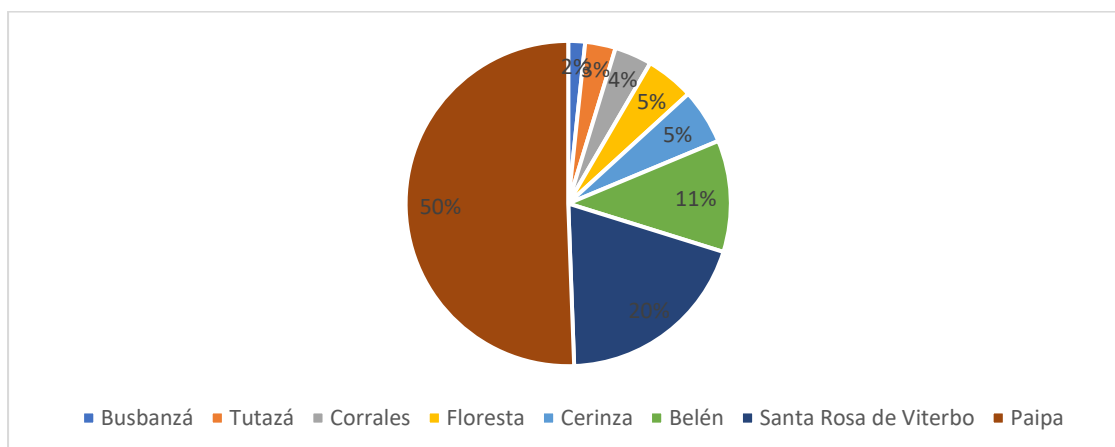
Source. Own elaboration

This growth can be attributed, in part, to greater efforts in the training of personnel and the optimization of the project closure and evaluation processes, factors that have strengthened the presentation and timely execution of initiatives financed through the rule.

In relation to geographic and demographic analysis, population distribution, illustrated in Figure 11, is essential for the design and implementation of environmental projects. In this sense, it is observed that the Paipa region concentrates approximately 50% of the population, which positions it as a priority focus for environmental interventions. However, it is equally important to address the other areas of the province, since each region, although less densely populated, has its own characteristics and demands that affect the environmental impact and sustainability strategies.

Figure 11

Population

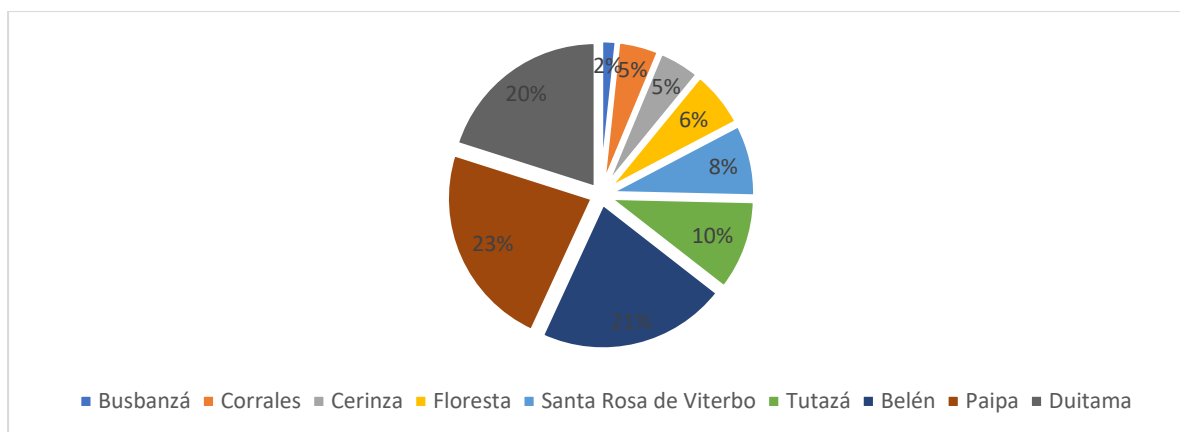


Source. Own elaboration

The territorial analysis also shows differences in the size and demographic characteristics of the municipalities. For example, Paipa exhibits favorable conditions for the development of environmental projects thanks to the presence of environmental planning instruments and the diversity of its ecosystems, such as lakes, moors and protected areas. In contrast, municipalities such as Busbanzá, with relatively small areas and lower population density, face greater challenges for the generation of environmental planning instruments, a fundamental requirement for the viability of projects in the sector.

Figure 12

Surface area km²

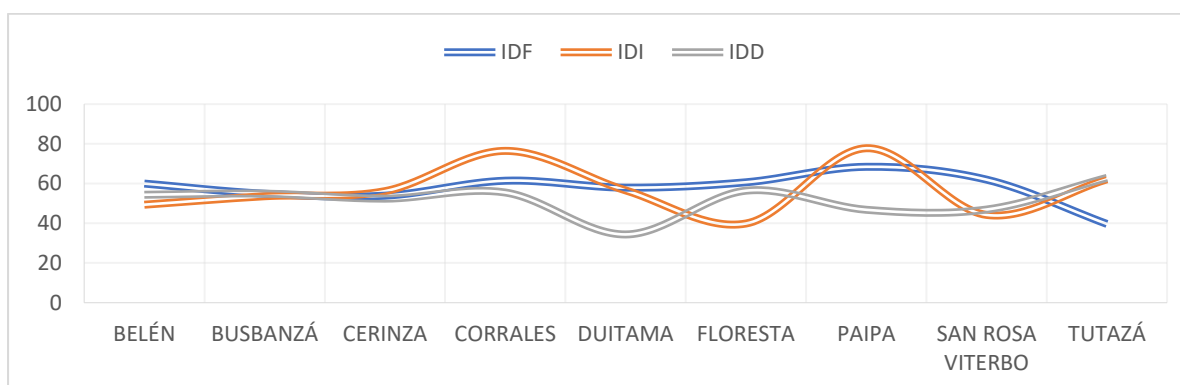


Source. Own elaboration

Finally, the dispersion in the typologies of the municipalities in the Tundama province stands out, ranging from entities with high institutional and fiscal capacity, generally characterized by low geographic dispersion, to municipalities with limited capacity and high dispersion in rural areas of difficult access.

Figure 13

Typology



Source. Own elaboration

This classification makes it possible to identify, for example, Duitama as an agglomerate center (SC), Paipa as a large municipality (typology 1), and other municipalities - such as Corrales, Belén, Busbanzá, Cerinza and Santa Rosa de Viterbo - that, depending on their productive and demographic characteristics, are grouped into different typologies.

Table 1

Typology Municipalities Tundama Province

TUNDAMA		TPOLOGY
15087	BELÉN	3
15114	BUSBANZÁ	3
15162	CERINZA	3
15215	CORRALES	2
15238	DUITAMA	SC- Agglomeration center
15276	FLORESTA	4
15516	PAIPA	1

15693	SAN ROSA VITERBO	3
15839	TUTAZÁ	4

Source. Own elaboration

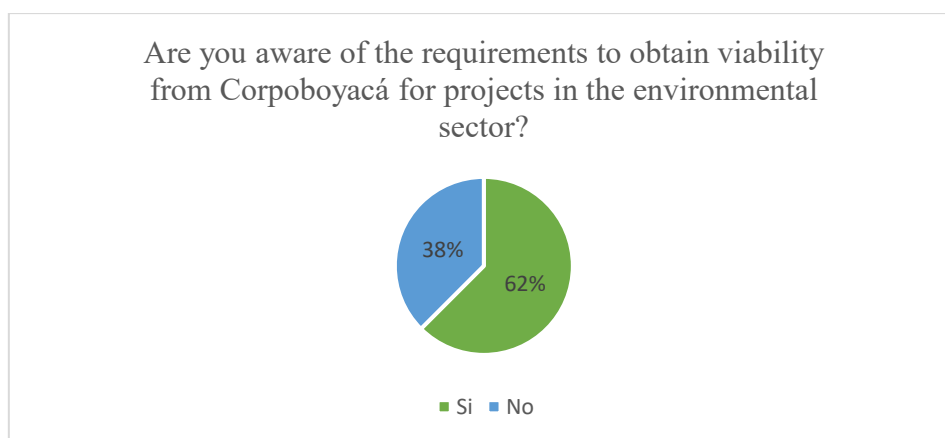
Understanding this diversity is crucial to adapt strategies for the formulation and implementation of environmental projects to the specific realities of each territory.

To complement this panorama, the evaluation of the investment of royalties in environmental projects developed in the Tundama Province has been enriched with the application of surveys to key actors involved in the administration of these resources. Government officials, those responsible for project planning and execution and other relevant actors were identified in order to deepen the obstacles and opportunities present in the formulation and execution processes of environmental initiatives financed with royalties.

The results obtained from the eight beneficiary municipalities reveal that 62.5% of the respondents stated that they were aware of the necessary requirements to obtain the viability of environmental projects before Corpoboyacá, while 37.5% indicated that they did not have adequate information. This result shows that, although most of the stakeholders are familiar with the procedures, there is still a significant gap in knowledge that limits the correct formulation of projects. The need to strengthen training and facilitate access to detailed information becomes evident in order to increase the chances of feasibility and, consequently, improve the implementation of environmental projects.

Figure 14

Knowledge Feasibility

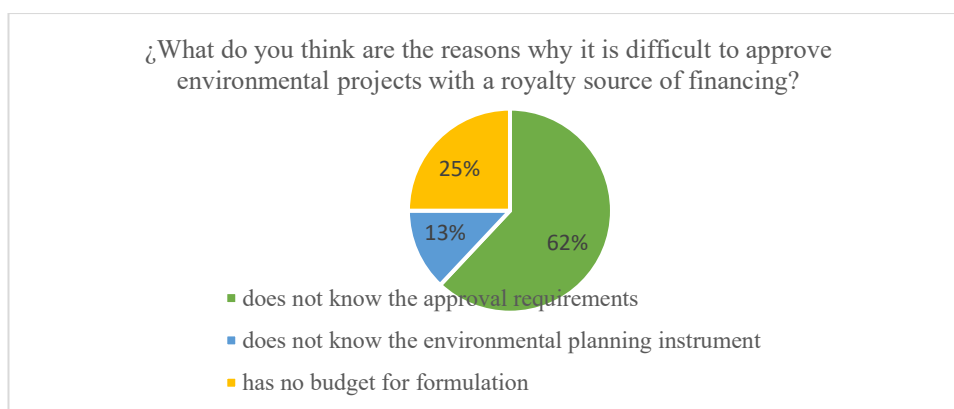


Source. Own elaboration

On the other hand, when analyzing the reasons that facilitate or hinder the approval of projects financed with royalties, it is observed that the main obstacle, pointed out by 62.5% of the participants, is the lack of knowledge of the approval requirements. This finding is crucial, as it suggests that the most important barrier is not technical or financial capacity, but the lack of clear and precise dissemination of regulatory procedures. Additionally, 25% of respondents mentioned that lack of budget for project formulation contributes to the difficulties, while 12.5% noted that lack of knowledge of the environmental planning instrument also plays a role. It is important to note that none of the respondents considered the lack of experienced professionals as an obstacle, which reinforces the idea that the biggest challenge lies in information and training around approval requirements.

Figure 15

Reasons for Approval of Environmental Projects



Source. Own elaboration

These results allow us to draw some initial conclusions: the effectiveness of royalty investment in environmental projects is closely linked to the level of knowledge that key actors have about the required procedures. The discrepancy in access to this information suggests that training initiatives and informative workshops could significantly enhance the capacity of municipalities to formulate viable projects. Improving mastery of the requirements and strengthening monitoring and control processes would not only increase success in project approval, but would also contribute to a more efficient use of SGR resources, generating a positive impact on local development and environmental sustainability in the Tundama province.

Discussion

The results of this research show that, although the Colombian regulatory framework has advanced in the allocation of resources for environmental projects through the General Royalties System (SGR), structural obstacles persist that limit the transformation of these resources into concrete impacts in the territories. The disconnection between the legal provisions and the operational capacity of the territorial entities suggests a mismatch between the institutional design and the administrative reality of the municipalities, especially in contexts where technical knowledge and experience in project formulation are limited.

Furthermore, the evidence gathered confirms that the accumulation of unexecuted balances, despite budget availability, is not only due to management inefficiencies, but also to regulations that are excessively rigid for local contexts. This operational regulatory gap not only slows down environmental investment, but also tends to discourage the formulation of new proposals. Thus, the planning and implementation cycle becomes vulnerable to administrative bottlenecks that hinder the effectiveness of the model.

On the other hand, the data obtained in the surveys reflect a phenomenon consistent with what has been pointed out in the literature regarding the lack of knowledge of the requirements and regulatory tools on the part of the responsible actors as one of the main causes of poor performance in project execution. This result points to the need to rethink training strategies, not as specific actions, but as part of a structural policy aimed at strengthening local capacities.

Conclusions

The literature review and the analysis of the regulatory framework have shown significant legislative advances in the allocation of resources for environmental projects, especially from regulations such as Law 2056 of 2020 and the SGR guidelines. However, these advances are counteracted by persistent regulatory, procedural and administrative barriers that impede the effective implementation of such projects. The complexity of approval processes and the lack of inter-institutional coordination are critical challenges for the practical implementation of policies aimed at promoting sustainable development and ecosystem conservation.

A particularly relevant finding is the deficiency in project formulation, largely due to the lack of knowledge and inadequate training of local stakeholders, municipal and regional officials, regarding the requirements established in current regulations. This information gap not only limits the development of environmentally viable proposals aligned with national priorities, but also demonstrates the urgent need to implement specialized training programs that address both regulatory aspects and the development of technical capacities for the management of SGR resources.

Analysis of balances and allocation procedures has revealed that, despite the availability of funds, a considerable proportion of the investment earmarked for environmental projects is not committed. This phenomenon reflects management problems and the lack of technical capacity in municipal entities to formulate, execute and follow up on initiatives. Inefficiency in the use of these resources underscores the need to optimize execution and control mechanisms so that the investment not only materializes, but also generates a positive impact on local development and environmental protection.

Likewise, the identification of the procedures established by the National Planning Department (DNP) highlights the rigidity and lack of clarity in the requirements for project formulation. This situation hinders adequate access to available funds and generates uncertainty among the actors in charge of managing resources. Therefore, simplifying and making these processes more transparent is an indispensable measure to boost investment in environmental initiatives that respond to current challenges.

Finally, the review of indicators and the results of the surveys applied to key actors reveal that, although some municipalities have managed to improve their performance in the allocation and execution of projects, significant variations persist in the efficiency of these processes. Although the majority of respondents have a basic understanding of the requirements for accessing SGR resources, a considerable proportion lacks detailed information on procedures and regulations. This gap in understanding and practical application of the processes points to the imperative need to implement training strategies and strengthen monitoring and control systems to ensure that royalty investment has the expected impact on environmental sustainability and regional development.

Taken together, these findings suggest that, in order to achieve greater effectiveness in the use of resources allocated to environmental projects, it is critical to address both improvements in legislation and administrative processes as well as gaps in the training of local stakeholders. Only through a comprehensive approach that combines regulatory reforms, simplification of procedures and capacity building will it be possible to ensure that the investment of royalties contributes effectively to sustainable development and environmental protection in the Tundama province.

Recommendations

It is essential to establish ongoing training programs for local officials in charge of environmental project management. These programs should focus on specific RMS procedures, regulatory requirements and best practices for project formulation and implementation. This approach will strengthen both the technical and administrative capacities of the responsible teams, generating proposals that are more viable and aligned with sustainable development policies.

At the same time, closer coordination between regional and local entities involved in the management of these projects should be promoted. The creation of collaborative spaces and the implementation of participatory governance strategies would facilitate a better articulation of projects with local needs and national conservation policies. This collaborative approach will help to optimize institutional efforts and reduce duplication of processes, enhancing the impact of environmental initiatives.

Finally, it is recommended to promote a periodic review of the environmental planning instruments, ensuring that they provide detailed and updated information on the programs and projects that should be articulated with the municipality's environmental project. This review will allow the proposals to be properly submitted to the competent environmental authority, ensuring that they meet the established criteria and are in line with both local and national priorities.

Implementing these recommendations could lead to more efficient project formulation, improve the execution of allocated funds and, ultimately, help ensure that royalty investments generate sustainable benefits for local development and ecosystem protection.

References

1. Brundtland, G. (1987). *Informe de la Comisión Mundial sobre el Medio Ambiente y el Desarrollo*. Naciones Unidas. <https://sustainabledevelopment.un.org/content/documents/5987ourcommonfuture.pdf>
2. Carrillo, C. A. (2023). *Treinta años del Sistema Nacional Ambiental y las Corporaciones Autónomas Regionales*. Serie Políticas Públicas No. 54, Foro Nacional Ambiental – FESCOL.
3. Congreso de la República de Colombia. (2012). *Ley 1530 de 2012: Por la cual se regula la organización y el funcionamiento del Sistema General de Regalías*. Diario Oficial No. 48.308. <https://www.funcionpublica.gov.co/eva/gestornormativo/norma.php?i=47234>
4. Congreso de la República de Colombia. (2020). *Ley 2056 de 2020*. Congreso de la República de Colombia. <https://www.senado.gov.co/legislacion/ley-2056-de-2020>
5. Congreso de la República de Colombia. (2020). *Ley 2056 de 2020: Por la cual se regula la organización y el funcionamiento del Sistema General de Regalías*. Diario Oficial No. 51.410. <https://www.funcionpublica.gov.co/eva/gestornormativo/norma.php?i=146481>
6. Constitución Política de Colombia Acto Legislativo 05 de 2011. Congreso de la República de Colombia. <https://www.constitucioncolombia.com>
7. Contraloría General de la República. (2022). *Informe sobre la ejecución de proyectos ambientales*.
8. Departamento Nacional de Planeación. (2021). *Informes sobre proyectos de regalías ambientales*. <https://www.dnp.gov.co/>
9. Departamento Nacional de Planeación. (2021). *Manual operativo del Sistema General de Regalías – Ley 2056 de 2020*. https://colaboracion.dnp.gov.co/CDT/Sinergia/Manual_Operativo_SGR_Ley_2056_2020.pdf
10. Flórez-Yepes, G. Y. (2015). La educación ambiental y el desarrollo sostenible en el contexto colombiano. *Revista Electrónica Educare*, 19(3), 1–20. https://www.scielo.sa.cr/scielo.php?pid=S1409-42582015000300432&script=sci_arttext
11. Fowler, A. (2017). Gobernanza para el desarrollo sostenible: El rol de los procesos participativos. *Revista de Gobernanza Ambiental*, 34(2), 112–130.
12. González, M., et al. (2020). *Estrategias de inclusión social y educación ambiental en proyectos financiados con regalías*. Editorial ABC.
13. Kalmanovitz, S. (2013). *Colombia: una historia económica, 1537-2011*.
14. Rodríguez, J. (2021). *Reformas legislativas y la flexibilidad en la asignación de regalías*. Editorial Jurídica.
15. Rodríguez, J., y Pérez, M. (2021). Barreras normativas y administrativas en proyectos ambientales con regalías. *Revista de Gestión Ambiental*, 10(3), 123–135.
16. Rodríguez Becerra, M. (2011). *Colombia: una política ambiental en marcha*. Fundación Alejandro Ángel Escobar.
17. Rudas, G. (2022). *Análisis de las finanzas del Sector Ambiental Colombiano - 2022*. Foro Nacional Ambiental. <https://foronacionalambiental.org.co/wp-content/uploads/2023/02/Finanzas-Medioambiente-PresentacionRudas.pdf>
18. Sanabria Pulido, P. P. (2019). Las capacidades institucionales de los municipios colombianos. En E. Grin (Ed.), *Gobernanza multinivel en América Latina* (pp. 93–117). Editora FGV. <https://bibliotecadigital.fgv.br/dspace/handle/10438/27630>
19. Vásquez, P., et al. (2020). *Biorremediación en proyectos ambientales financiados con regalías*. Editorial Medioambiental.