Touching Down in Cities: Territorial Planning Instruments as Vehicles for the Implementation of SDG Strategies in Cities of the Global South

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Abstract: We discuss municipal physical-spatial planning instruments as vehicles for the implementation of Sustainable Development Goals (SDGs) in cities in the Global South. We do this by focusing on Medellin, Colombia, a city that has endured significant challenges–mainly related to poverty and violence–, but has attracted significant international attention due to its approach to territorial planning and its innovative application of new and existing legal tools to transform realities and repay historical debts with the urban poor. We performed a review of the most important documents related to SDG implementation in the country and the city, as well as Municipal Development Plans and legal planning instruments issued from 1 January 2016. The article maps active planning instruments and suggests the analysis, already from the diagnosis and formulation phases, of the linkage among strategies and projects, and SDGs, and the inclusion of SDG considerations in citizen participation instruments such as so-called Local Development Plans.

Keywords: New Urban Agenda; 2030 Agenda; SDG localization; territorial development; Local Development Plans; complementary planning instruments

1. Introduction

National governments represent different societies in global negotiations and agreements on sustainable development. Sustainable Development Goals (SDGs), however, demand implementation at the urban level, which requires strong local actor involvement, sharing and learning across contexts, working collaboratively, and translating successful practices to fit local contexts (see [1–4]). Most importantly, the path to sustainability is not determined and linear, but evolutionary and context-dependent, so there is a need to reinforce local knowledge, bring to light successful local practices that could be compatible with global-scale frameworks, and empower local governments to defend vernacular initiatives [3,5,6].

In several different spheres, cities are seen to be better equipped than states to deal with complex problems, such as climate change [7]. Although there have been several attempts to include urban dimensions in initiatives to tackle global challenges, the role of cities in them had not been clear until relatively recently. There are numerous links among all SDGs, but with the establishment of the urban SDG, there is for the first time an attempt to define a single overall urban policy position concerning social, economic, and environmental aspects of cities and the urban system [8,9]. This is also reflected in the New Urban Agenda, which poses the question of how the urban condition affects our common future. In other words, it proposes a shift from the focus on development in cities to the role of cities in

development; from seeing cities as sites for sustainable development action to seeing them as drivers of global change, as Parnell [9] suggests.

Although broad challenges such as climate change and loss of biodiversity are global manifestations of unsustainable actions, most of these actions originate in cities [10]. Local governments are encouraged to localize SDGs to fit their contexts through robust, data-driven measurement and tracking tools. However, not all of them have the resources or knowledge needed to do so [5]. From a global perspective, implementation depends on the capacity to share and learn across contexts, and to work collaboratively with different actors [1]. In this line, Bansard et al. [7] highlight that local actions and global cooperation among cities could lead to pragmatism instead of politics, innovation rather than ideology, and solutions instead of sovereignty. Thinking of local actions, there is a greater challenge of including locally-generated knowledge and bottom-up considerations when implementing SDGs at the local level.

Cities in the Global South—where most of the world's urban population lives—are recognized today as fundamental components of discussions about the relationships between local places and global processes. The Global South has broadened its participation in global debates about urban issues as a response to the latent need to develop solutions that are appropriate to the large majority of people living in its cities [1]. The definition of SDGs has brought to the fore debates about appropriate governance forms and mechanisms, and how competencies have been and can be reordered, from national, to subnational levels [1]. In order for these goals to be translated at these levels, strategies must consider all relevant aspects, and understand the importance of the whole, as well as the interdependence of its parts [4].

Not all cities face the same challenges or, if they do, these do not necessarily present the same intensity. Moreover, cities are equipped differently to respond to local and global challenges, financially, institutionally, and culturally, so it is important to pay attention to which governance mechanisms can emerge or have emerged to deal with these challenges. Research needs thus to focus on "what works" [4].

1.1. Planning Instruments as Vehicles for the Implementation of SDGs

Meuleman and Niestroy [4] state that there is a great challenge in combining governance approaches, "differentiated" mixtures that are reflexive and dynamic and consider contextual conditions, while at the same time contributing to common, universal goals. The 2030 Agenda for Sustainable Development [11] mentions the importance of building on existing mechanisms at the regional level. It also highlights the autonomy each government has to advance sustainable development efforts and the importance of recognizing the capacities and resources available in each country to do so. Finally, it recognizes how "regional and subregional frameworks can facilitate the effective translation of sustainable development policies into concrete action at the national level" [11] (p. 10). The New Urban Agenda [12] takes a more regional perspective, discussing how subnational and local governments can make relevant contributions through integrated approaches to urban and territorial development. In particular, long-term and integrated urban territorial planning mechanisms are brought to the fore as indispensable tools to achieve sustainable cities and human settlements.

Klopp and Petretta [13] highlight the importance of not crowding out local measures of change, but rather complementing and strengthening them. Short-term needs must be balanced with long-term aspirations and goals. This, as the UN [12] suggests, can be achieved through strengthening institutionalized urban and territorial planning mechanisms for sharing and exchanging information that promotes evidence-based governance and supports the process of policy formulation.

The literature review revealed few studies focusing on planning instruments for the implementation of SDGs. Metternicht [14], for example, discusses land use planning for advancing internationally agreed development goals such as the SDGs. The article highlights how planning can address systemic issues of policy, institutional coherence, multi-stakeholder partnerships, and data availability to implement SDGs through participation, integration, and resource assessment.

At the city level, Almeida et al. [15], for instance, focus mainly on high-level instruments, such as Master Plans, for the implementation of SDG #11 in Brazilian cities. They highlight that existing planning instruments could accelerate its implementation only if past lessons–e.g., MDG implementation strategies–strengthen local sustainability agendas. They also emphasize the importance of integrated and systemic evaluations, and of clearly identifying how these high-level plans can deliver sustainable development at the local level. Although their study focuses on SDG #11, they found that integrated planning has a positive effect on health, education, and environmental policy (cf. SDGs #3, #4, #6, #7, #14 and #15).

Finally, Holloway [16] discusses local planning in general as an important instrument to implement SDGs, with a focus on Sydney, Australia. The study highlights the role of strategic planning in connecting global aspirations in the SDGs to the local action, by "adopting a process of research, setting mechanisms, implementation, monitoring and evaluation" [16] (p. 181), and providing a common language for scoping policy. In particular, she mentions the relevance of a focus on the local to highlight spatial differences that national reporting cannot identify, setting priorities and reflecting on local circumstances based on sound evidence. Finally, she highlights that local-level monitoring can provide a stronger connection between actions and outcomes.

The most important planning instrument for many cities is the Master Plan, which mandates in a general way their occupancy model (i.e., how the city will grow and develop). However, it cannot achieve it on its own, which is why it defines complementary planning, financing and management instruments to actually do it (e.g., second and third-level planning instruments), and their geographic and normative scope. Therefore, having identified the lack of focus on lower-level planning instruments in the literature, the aim of this article is to discuss municipal physical-spatial planning instruments at this level as vehicles for the implementation of SDGs in cities in the Global South. We do this by focusing on Medellin, Colombia, a city that has endured significant challenges, mainly related to poverty and violence. The city has attracted significant international attention due to its approach to territorial planning, and its innovative application of new and existing legal tools to transform realities and repay historical debts with the urban poor [17–19]. The municipality chose to promote participation and develop new models at the scale of neighborhoods, putting special attention into creating dignified spaces in the most marginalized ones: '[v]iolence is silenced by beauty' [20] (p. 109). Forman and Cruz [21] (p. 5) highlight in their study of global justice at the local level that "[w]hile the attention and envy of the world was focused on sites of abundance, the most creative models of equitable urbanization were emerging in sites of conflict and scarcity, particularly in Latin America."

Such transformations have had of course the aim to improve the quality of life of citizens all over the city–in line with international guidelines such as UN-Habitat's [22], but especially of the before-neglected periphery. Most of the projects through which Medellin has attracted international attention started being implemented in the first decade of the 2000s (e.g., gondola lifts, public libraries, science parks, and integrated housing projects). The city has worked hard to achieve significant improvements in city indicators. For example, utility coverage has reached important levels, compared to similar cities in the country and the region: aqueduct > 96%, sewage > 93%, electricity 100%, waste collection 99%, and natural gas 100% [23]. This is a significant step towards the achievement of SDGs: Adshead [24], for example, report on the important contribution of infrastructure–energy, waste collection, and water in particular.

Some of the most significant physical-spatial transformation projects in Medellin have happened thanks to the application, since the beginning of the 2000s, of innovative planning instruments such as *Proyectos Urbanos Integrales* (PUI), *Planes Parciales* (PP) and other instruments that offer an integrated approach to transforming low-scale administrative divisions (i.e., *comunas* and *barrios*) [18,25,26]. The idea is that these benefits spread to the rest of the city. The improvement of violence indicators in the Northern *comunas*, for instance, has been found to be related to the construction of the first gondola lift in this area [27]. These territorial planning mechanisms will be explained in more detail in Section 3.

Cities in low- and middle-income economies often concentrate on complex problems such as poverty and weak governance, which makes them more vulnerable to the impacts of, e.g., climate change [28]. Every city has its strengths and many have worked hard to include SDGs in different plans and policies. CEPAL [29], for instance, showcases many initiatives and best practices in Latin America and the Caribbean. However, to the best of our knowledge, none of these cases have analyzed lower-level territorial planning instruments, which is the analysis we offer here.

The "Medellin model" has also been criticized, especially from a political economics point of view (see, e.g., [25,30]). Issues like unemployment and some questioned low-income developments are highlighted by some authors as problems that have received less attention internationally. However, some of its models and experiences–especially those related to physical/spatial planning and mobility–have been replicated by other Colombian and Latin American cities like Caracas (Venezuela) and La Paz (Bolivia), with mixed results. Darabi [31], for example, reports on the negative experience of building gondola lifts in one of Rio de Janeiro's *favelas*.

Despite its shortcomings and remaining challenges, we focus on Medellin considering the vast experience it has acquired in applying territorial instruments and, especially, the important benchmark it has become for many cities in the region and in the Global South. Although it is not completely clear at the moment through which mechanisms SDGs will be implemented, we consider the fact that the city has made important steps in the localization of the SDGs in relation to cities with similar characteristics (mainly from measuring and monitoring perspectives) as an important stepping stone towards the pursuit of global sustainability goals. This article analyzes existing territorial planning instruments as vehicles for a more efficient implementation of SDGs, also considering the significant impact they have on intervened areas and the subsequent improvement of many of the city's quality of life indicators. In particular, we focus on instruments that are more flexible and reach the level of projects, impacting physical, social, and economic transformations, both in the short and long term. These are called complementary (second and third-level) planning instruments. In addition, we go a step further and analyze other small-scale instruments focused on local development, especially those that have stronger citizen participation and involvement components, looking to further close the gaps among the bureaucracy, technocracy, and citizens. We discuss how efficient bottom-up inclusion can inform and transform top-down urban policies. These instruments will also be explained in more detail in Section 3.

2. Materials and Methods

Colombia is a decentralized, unitary republic. This means that a large part of the State's administrative duties is shared among lower-level entities. Municipalities are thus given political, fiscal, and administrative autonomy. Although not guaranteeing success, decentralization plays an important role in SDG implementation (see, e.g., [32]). Thus, we analyzed strategies and reports related to SDGs at both the national and the city level, such as the national strategy for the implementation of the SDGs, the city's Analysis of Goals and Strategies for monitoring and evaluating SDGs, and the Medellin 2030 Agenda. We looked at how the different government levels discuss implementation strategies and how the city's government localizes SDGs, adapting them to its own context. This is important, considering that cities are given implementation responsibilities, but efforts must be aligned in order to contribute to national follow-up and reporting. Literature reports high-level commitments in numerous countries (see, e.g., [32]). Colombia, for example, has to date submitted two Voluntary National Reports (VNR). However, we found it important to assess whether this commitment is reaching all the way down to cities, considering their important role in SDG implementation, as discussed in Section 1.

We also reviewed Municipal Development Plans (MDP) (which will be explained in detail in Section 3.4), considering their direct influence on the definition of cities' priorities and budget allocation during the time each administration is in office and on the implementation of middle- and long-term objectives such as SDGs. As of the time of writing, there were two MDPs formulated since the adoption of the Agenda 2030, i.e., one in 2016, and one in 2020.

Finally, we reviewed the city's Master Plan and second and third-level planning instruments in force. We focused on instruments issued from January 2016, with the exception of the city's Master Plan (hereon referred to as POT, for its acronym in Spanish), which was issued in 2014 (its main structure will not be reviewed until 2026). Technical Support Documents (DTS) (i.e., diagnosis and formulation studies that support complementary planning instruments) and administrative acts such as decrees, agreements, and resolutions were also reviewed, as they are fundamental parts of the planning instruments' adoption process.

Our review consisted of assessing how SDGs are appropriated and included in these documents' different parts and how explicitly SDGs are included in the different development plans, projects, and planning instruments. We pay special attention to whether SDGs are mentioned, included, connected, or described in each one of them, considering that there lies the actual possibility of changing the realities of the city. This will be explained in more detail in Section 3.

As it was discussed in Section 1.1 and will be further discussed in Section 3, planning instruments have the power to change realities in the city, have an impact on its citizens' quality of life, and help it pursue important development objectives. This said, and in order to evaluate the compatibility between and among important city-level development plans and strategies, and the SDG framework, we performed a series of interviews with people involved–whether currently or in the past–with the formulation and/or implementation of physical-spatial planning instruments in the city, with SDG implementation strategies, and leading or participating in citizen development initiatives or city planning. The interviewees included a former Director of the city's Planning Department, a former Manager of the Urban Development Agency (EDU) (an urban development, real-estate management and urbanism consulting company owned by the municipality of Medellin), a contractor from the city's planning department (who coordinated the diagnosis and formulation phases of a second-level planning instrument recently issued and included in this study), an advisor for the formulation and adoption of the POT currently in force and of other planning instruments at different levels in Medellin and other cities in the country, and a community leader from one of the city's Northern *comunas*. Such interviews were semi-structured; guidelines related to the topic of interest were designed before each encounter, but interviewees were free to expand their opinions if they considered it necessary. Interviewees were selected after defining the time frame and the issue of interest. We tried to ensure convergence through data triangulation, by including actors from different sectors [33,34].

3. Territorial Planning Instruments in Local Legislation

In 1997, Colombia adopted the Territorial Development Law [35], through which the general criteria and guidelines for the issuing of Territorial Ordering Plans were defined. This law establishes that territorial plans must consider, among other things, the design and implementation of different instruments that "make it possible to execute comprehensive urban interventions and articulate sectorial actions" [35] (Article 6) and define an occupancy model that can be materialized in the short, middle and long terms. The instruments established in the POTs are some of the tools available to the State to materialize SDGs and their targets, considering that the comprehensive and integrated development of the territory is pursued through these processes.

In compliance with this law, the Municipality of Medellin included the Territorial Equality Management System in the POT that is currently in force (i.e. 2014-2026). This system defines the Complementary Planning Subsystem, which in turn establishes the planning instruments that aim at materializing the occupancy model defined by the Municipality of Medellin. This model was built based on the collective vision of the future city, which states that:

> "*In 2030, Medellin will have a well-balanced territorial system for human beings: culturally rich and diverse, and ecologically, spatially and functionally integrated to the national, regional and metropolitan Public and Collective System. This will contribute to the consolidation of a region of cities, where social and collective rights are wholly exercised, landscapes and geographies are valued, and competitiveness and rural development are promoted. All this in order to leave future generations a*

territory that is socially inclusive, globally connected and environmentally sustainable, with economic development strategies that fit regional and metropolitan contexts". [36] (p. 6)

3.1. Second-Level Planning Instruments

Currently, Medellin has three second-level planning instruments: *Macroproyectos*, Integrated Hillside Urban Projects (PUIAL), and Rural Farming Districts.

Macroproyectos include a large portion of what is termed Strategic Intervention Areas. These areas respond to the city's topography (i.e., a valley crossed by the Medellin river—whose waters run south to north—and hillsides that border the city's rural land) and to so-called treatment polygons, which encompass areas with similar needs and characteristics. *Macroproyectos* encompass the following areas:

- The riverbanks, which represent the greatest urban transformation potential, considering that they currently host industrial facilities, and have thus low residential occupancy and inefficient use of valuable urban land.
- The basins of two important creeks that flow into the Medellin river (*Santa Elena* from the east, *La Iguaná* from the west) and encompass a portion of the hillsides (both on urban and rural land). These require planning interventions, mainly due to the growth of informal settlements in those directions.
- Finally, the limits between urban and rural land, which require interventions to plan and orient the city's growth and expansion.

Some of the main objectives of *Macroproyectos* are to define the location of public space and amenities and identify needs and problems related to housing, mobility, utilities, and the environment. They can also define the intensity of land use, looking to guarantee well-balanced public-private urban conditions. The transformation of the municipal land depends to a great extent on the formulation of planning instruments such as *Macroproyectos*. Without their adoption, the development of smaller-scale interventions through third-level instruments (explained in Section 3.2) would stay frozen.

Medellin is located in a deep valley (1400 to 2600 meters above sea level), with steep hillsides that have been occupied, both legally and illegally. Hills in the north are where most informal settlements are located, and where the city continues to grow despite control efforts and environmental risks associated with geological features. Integrated Hillside Urban Projects (PUIAL) have the objective to identify interventions and projects that are required to contribute to the strengthening and ordering of neighborhoods located on urban land, but outside Strategic Intervention Areas.

Besides sixteen urban *comunas*, the municipality administers five rural districts, all of them located in the periphery. Rural Farming Districts are a planning instrument whose objective is to orient the planning and environmental sustainability of rural land. Additionally, to consolidate rural production systems and promote the improvement of the quality of life of rural inhabitants.

3.2. Third-Level Instruments

Third-level instruments are composed of:

- *Planes Parciales* (PP), which are applied to areas that need to be renewed in their entirety, due to physical and social deterioration. They also apply to what is termed expansion land, i.e., areas towards which the city is expected to grow.
- Urbanistic Legalization and Regularization Plans (PLRU), which are instruments that allow interventions in areas that require comprehensive improvements, due to the presence of informal settlements that lack adequate infrastructure to guarantee decent living conditions for their inhabitants.
- *Planes Maestros* (PM), which are instruments oriented towards consolidating the ordering of areas with high concentrations of public amenities, public spaces, and environmentally-important sites.

- Rural Planning Units (UPR), which encompass rural areas with complex historical development that require articulated interventions in order to guarantee territorial planning in the middle and long run.
- Special Management Plans for the Protection of Heritage (PEMP), which are planning instruments that address areas that require the conservation of infrastructure classified as heritage.

All these instruments overlap with second-level instruments and make part of the mechanisms established in the POT to define, in detail, the ordering of smaller areas within the city. The main objective of these instruments is to define the interventions and projects required to organize these areas, according to their characteristics. In line with these areas' carrying capacity, third-level instruments aim to identify and define applicable urban norms that help the city concrete its occupancy model. Figure 1 shows the areas covered by second and third-level planning instruments in Medellin.
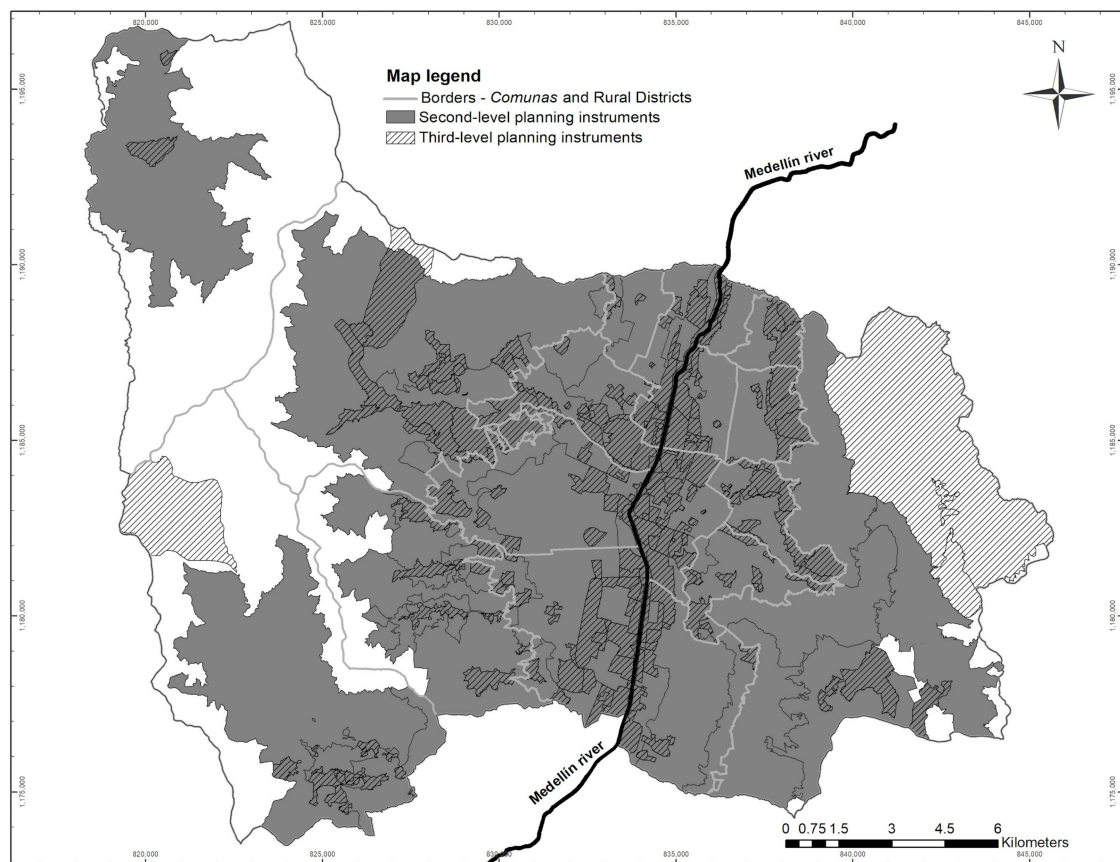

Figure 1. Medellin's administrative divisions and second and third-level planning instruments defined in the Master Plan (hereon referred to as POT, for its acronym in Spanish) currently in force (Based on [36]).

3.3. The Adoption Process

The planning instruments' adoption process requires the development of a series of phases, some of them defined by the POT. In this sense, every time a planning instrument is developed, the first phase that must be completed is the Diagnosis phase. The following phases are Formulation, and Citizen Participation and Public Announcement. The final phase is Adoption and requires the issuing of an administrative act.

These phases seek, firstly, to identify the needs and problems that territories have, where each instrument can be applied. Likewise, the opportunities and strengths that must be reinforced. Secondly, the aim is to formulate programs and projects that give shape to the development and transformation of a certain area, once they have been publicly shared and the participatory activities have ended.

As it was mentioned before, the occupancy model defined for each of the territories to which the planning instruments can be applied must contribute to the materialization of the vision of the future city Medellin wants to become in the short, middle and long run.

It is at this point that we identify the potential these instruments have for the implementation of SDGs. These instruments facilitate scenarios in which it is possible to realize what are the actions required to have a city in line with goals such as ending poverty, protecting nature, and guaranteeing sustainable human settlements. It is through the completion of the abovementioned phases–together with citizen participation processes–that data is obtained, samples are analyzed, censuses are conducted and different achievements are verified. It is through these activities that we can have better-informed decision-making processes and support evidence-based governance in our cities. Each activity can be further articulated with each SDG, which in turn helps cities follow a framework that can transcend administrations—without hurting their autonomy—and connect to global sustainability dynamics and international agendas [32,37].

3.4. Other Relevant Territorial Development Instruments for the Concretion of SDGs

The state has other instruments through which SDGs can be implemented. Important to highlight are Municipal Development Plans (MDP) and Local Development Plans (LDP). MDPs and LDPs are not complementary planning instruments, as those defined by the POT, but they are allocated financial resources and, by law, must be articulated with it. They represent an opportunity to materialize projects, especially considering that they have a strong participatory component, many times built from the bottom-up. These plans adapt to changing conditions and result in short-term action plans.

MDPs are formulated by incoming mayors and their teams every four years, which is the period each administration is in office. It is important to highlight that MDPs consolidate, within each strategic line, a series of programs and projects, which are publicly communicated in order to be adjusted, complemented, and, finally, approved by the city council. In this line, MDPs are considered a vehicle to transform the territory in the short term. This is why it is important to align political discourses and proposals to SDGs.

LDPs are applicable to low-level administrative divisions such as *comunas* and rural districts. The city has, to date, twenty-one LDPs, which allow citizens to identify problems and prioritize projects required to fulfill their needs in the territories they inhabit in social, cultural, economic, environmental, and physical-spatial terms. In addition, LDPs include a financing tool that allows *comunas* and rural districts to materialize said projects. This tool is called the Participatory Budget (PP) and represents 5% of the municipal budget [38].

LDPs are highlighted in this article as a potential tool, not only for the transformation of territories through bottom-up prioritization of projects but also because they allow for the allocation of financial resources that contribute to the achievement of long-term objectives. Therefore, LDPs are considered a territorial planning and management instrument that must be aligned with SDGs, keeping in mind that they are an important contribution to the improvement of the quality of life of citizens and to the achievement of the shared vision of the future city, all of this from a lower scale of action. It is important to mention that LDPs must be also articulated with second and third-level planning instruments, with the aim to unify transformation proposals and guarantee coherence between the different tools available for the local government to act on its territory.

4. Results

In this section, we analyze the inclusion of SDG considerations in the revised documents. We start by giving an overview of national and local SDG implementation strategies. Then, we continue by analyzing MDPs and LDPs and, finally, we analyze territorial planning instruments.

4.1. National and Local Strategies for the Implementation of SDGs

Colombia is recognized as one of the initial promoters of the inclusion of new dimensions in global efforts toward sustainability, which led to the formulation of the SDGs. The National Council for Economic and Social Policy (CONPES) issued document 3918, which highlights four main challenges for the implementation of these goals: (i) strengthening inter-institutional coordination to promote transversal actions, (ii) the government's capacity to quantify advances, (iii) the agenda's alignment with territorial policy instruments, and (iv) coordinating actions with different stakeholders. Importantly, the national government sees SDGs as a framework that is compatible with many of its development efforts (e.g., National Development Plans, Colombia's admission into the Organisation for Economic Co-operation and Development (OECD), the peace agreement with the Revolutionary Armed Forces of Colombia (FARC) guerrilla, climate change commitments and the Green Growth Strategy) [39].

The government recognizes that MDGs were not territorialized. Therefore, goals had to be monitored at the national level. For SDGs, there was an emphasis on strengthening regional monitoring and policy guidelines which contribute to monitoring the evolution of SDGs implementation and help close development gaps in the country's interior [39].

DNP [39] establishes national indicators for each SDG, e.g., Multidimensional poverty index (%) for SDG 1, Access to drinking water (%) for SDG 6, GINI coefficient for SDG 10 and Murder rate per 100,000 inhabitants for SDG 16. However, the document highlights that

> "*even if SDGs pursue global objectives, their achievement depends on the ability to materialize them in cities, regions and municipalities. It is at this scale that goals and targets, and implementation means must be defined, as well as the use of indicators to define baselines and monitor their progress*". [39] (p. 43)

Finally, the national government recognizes that SDGs require regional and local governments to build efficacious policy-making processes that strengthen multi-sector, multi-stakeholder, multi-level collaboration. In particular, it highlights the need to rethink the role played by the public sector in order to become an essential tool for the achievement of SDGs [39].

The local government takes on this challenge and expresses its commitment through the document COMPES Nº 1, issued by the Municipal Council for Economic and Social Policy (COMPES): "the municipality of Medellin actively assumes the inclusion of SDGs in the city's planning processes with the aim to achieve better well-being, equality and sustainability levels" [40] (p. 5). After a detailed analysis, the administration found 16 goals, 110 targets, and 190 indicators to be applicable to its context and see territorial planning, programs, projects, and strategies focused on SDGs as the right mechanisms to close social gaps. Although the national strategy was issued in 2018, the city had started the localization process before that, according to some of the interviewees. It had thus to validate and align its work when it was officially issued. In fact, the Municipal Development Plan 2016–2019 included SDG considerations (discussed in Section 4.2).

COMPES Nº 1 highlights four challenges for the monitoring and evaluation of the SDG Agenda: (i) lack of a territorial monitoring framework focused on SDGs, (ii) deficient information for the disaggregated follow-up of indicators, (iii) lack of a strategy at the territorial level, and (iv) disconnection with other actors and lack of shared objectives between the private and public sectors in relation to SDGs. The document mentions the need to include all SDG indicators found to be applicable to the city in all Municipal Development Plans from 2020 to 2030.

According to COMPES Nº 1, Medellin did not have territorial mechanisms to monitor MDGs—something confirmed by one of the interviewees—, and recommends new approaches in order to not make the same mistakes during the SDG period. In addition, it warns about the short-term focus of MDPs and reminds of the importance of looking beyond electoral periods, considering that four years are not enough to address the urgent public policy issues raised by SDGs. The city's strategy for the implementation of SDGs is called Agenda Medellin 2030.

4.2. Municipal Development Plans (MDPs)

DNP [39] assessed the inclusion of SDG considerations in regional and local development plans. In this document, Medellin was given the highest grade (i.e., "high inclusion: SDGs are included in the different sections of the Territorial Development Plan and there is an explicit association between SDGs and the plan's programs, subprograms, goals or indicators") [39] (p. 11). An assessment performed by the watchdog city network *Cómo Vamos* found that not all local governments are meaningfully incorporating SDGs into their four-year development plans [37].

Since the issuing of Global Agenda 2030 in 2016, the city has had two administrations. In the previous administration's MDP [41], the Global Agenda 2030 is labeled as an "input" used for its construction. [42] highlight Medellin's as a good practice, claiming that numerous stakeholders were invited to define indicators and targets applicable to the city's realities. The plan differentiates six foci: Focus on people, focus on gender, focus on the territory, climate change, resilience, SDGs, and community-originated ideas. The document claims that SDGs "are included transversely through actions that are concreted in programs and projects identified with the corresponding symbol" [41] (p. 21). This link is only graphical, i.e., there is no meaningful discussion about the alleged connection with the SDG framework. Three SDGs (i.e., #2, #10, and #14) are not mentioned in the document. On six occasions, SDG #16 is mentioned, but the symbol used is the one belonging to SDG #17. All projects and programs have an associated symbol (not necessarily an SDG symbol). However, some of these symbols are clearly connected to the Global 2030 Agenda. For example, "resilience" can be linked to SDG #11; "climate change" can be linked to SDGs #11 and #13; "national articulation" and "regional articulation" can be linked to SDG #17; "victims" can be linked to SDG #16; and "woman" can be linked to SDG #5. This is not usually the case. In terms of projects, Project *Familia Educa*, for instance, is linked to "childhood", "woman", "resilience", and "youth". No SDG symbol is linked to this project (cf. SDGs #1, #4, and #5).

Many cities' efforts could be labeled following the SDG framework, but are not. For instance, the 2016-2019 MDP states that "every project oriented towards [Medellin's] development must contemplate the promotion of a healthy and sustainable environment, a city thought for and by its people, but in balance with the environment, where strategies for the conscious use of natural resources are promoted" [41] (p. 33). No SDG is mentioned at this point (cf. SDGs #8, #10, #11, and #12). Peace, which is one of the toughest challenges Medellin–and Colombia–faces, is discussed claiming that it

> "[…] is not an issue that can be addressed in one way, it is [diverse] and complex. It is necessary to recover [people's] confidence in local participation mechanisms, institutionalize processes and rules in the search of a stable peace that makes it possible to overcome the use of violence as a means to solve conflicts, promote social dialogue and sustainable economic and social development alternatives". (p. 164) [41]

No SDG is mentioned (cf. SDGs #11, #12, and #16). The 635-page plan only mentions explicitly (i.e., apart from icons), but with no clear link to projects or programs, SDGs #2 (once), #5 (once), and #11 (thrice).

The MDP proposed by the current administration (i.e., January 2020 to December 2023) was recently approved by the city council [43]. The initial proposal did not include a coherent strategy to include SDGs in the development plan but claimed to use global guidelines such as SDGs, the Paris Agreement, and the New Urban Agenda as models (see [44]). The plan changed drastically in terms of the role that SDGs play in it. After several debates, the administration presented a final version that discusses in detail the inclusion of SDGs and defines them as central for the city, by connecting them explicitly to its five strategic lines:

- Economic reactivation and the software valley—SDGs #8, #9, and #10.
- Educational and cultural transformation—SDGs #1, #2, and #4.
- *Medellín me cuida* (health and human rights)—SDGs #1, #2, #3, #5, #10, and #16.

- Ecocity—SDGs #6, #7, #11, #12, #13, and #15.
- Governance and governability—SDG #17.

In addition, it discusses each of the sixteen SDGs and the respective targets defined by Agenda Medellin 2030 to be applicable to the city, their baseline indicators, and objectives for 2020, 2025, and 2030. Each strategic line is divided into components, which in turn are divided into programs. SDGs are linked down to these levels. Finally, the plan highlights that SDG indicators will be measured according to Agenda Medellin 2030.

4.3. Local Development Plans (LDPs)

According to the City Council's Public Policy Oversight Office (OPPCM) [38], since the conception of the first LDP in 2005, there has not been a system in place to monitor, evaluate and control these plans in terms of the development and impact goals and indicators in order to identify problems and challenges that need to be addressed. In fact, they claim, Participatory Budgets and LDPs are in danger of disappearing, due to the lack of a comprehensive tool to perform these activities.

Some LDPs were revised in 2019 (i.e., *comunas* 3, 8, 9, 12, 13, and 16, and Rural District 90). The remaining LDPs were last revised in 2015 (i.e., they are outside the SDG period), so they were not included in this study. The reviewed LDPs show a standard text mentioning SDGs, resulting from the technical support provided by the municipality. This inclusion is repeated in all LDPs' introductory sections, saying that this update "embraced the new world Sustainable Development Goals -SDG-agenda with the objective to locally promote the definition of context-adapted targets and, in this line, contribute to the targets set by the SDG agenda for 2030" (see, e.g., [45] (p. 13)). They also say that the updating process included a reflection about "how are ideas and projects in respect to SDGs" (see, e.g., [45] (p. 14)) and some of them (i.e., *comunas* 3, 9, 12, and 90) mention a workshop in which project ideas were analyzed to see their contribution to SDGs. The results of these workshops are not presented in these documents, nor is there information about how they influenced the plan. Only *comuna* 13's LDP includes an additional claim about how this plan must be permanently articulated with other higher-level plans (e.g., the MDP) and "at least some international-level plans such as SDGs, which are currently orienting international cooperation from multilateral agencies such as the UN" [46] (p. 206).

4.4. Second and Third-Level Territorial Planning Instruments

Out of twenty-five reviewed documents, which included both second and third-level planning instruments (see Figure 2), only one of them mentions SDGs and their alignment with rural development, ending poverty and reducing inequalities. These ideas are not developed further in relation to the SDG framework. The remaining documents, some more than others, use expressions related to sustainable development, such as sustainable mobility, ecotourism, and sustainable consumption and production, but show no explicit link to SDGs. All these instruments have been adopted and/or adjusted after 1 January 2016, without SDGs considerations (Figure 3). Table 1 summarizes all the reviewed documents and the findings.
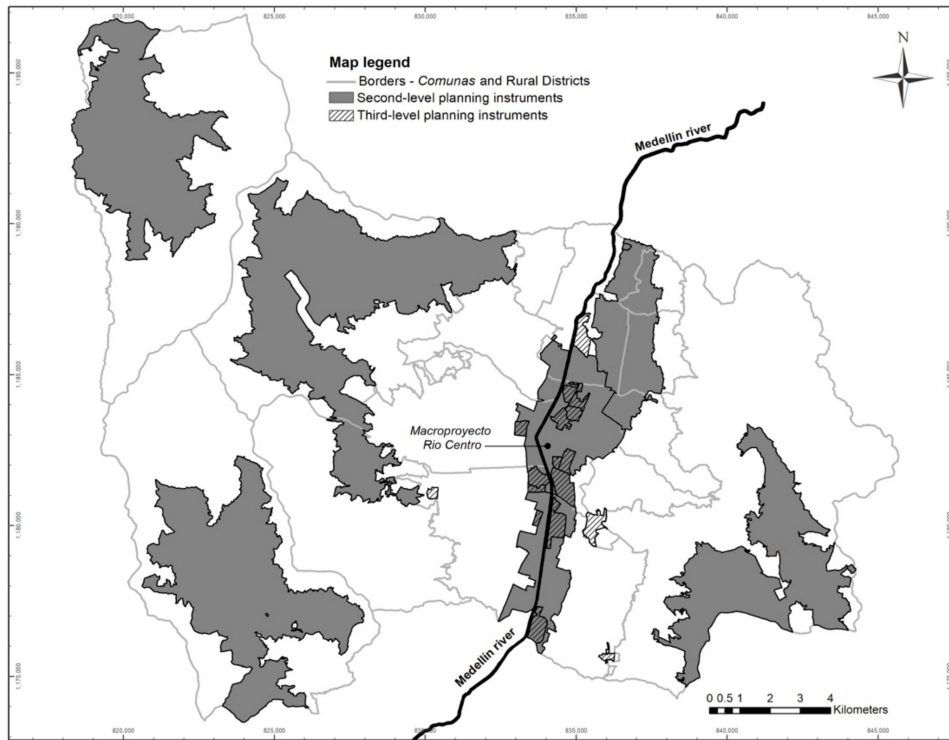
Figure 2. Second and third-level planning instruments adopted and/or adjusted since 1 January 2016, to the date of writing. Second-level *Macroproyecto Río Centro* is highlighted in the center (Based on [36]).
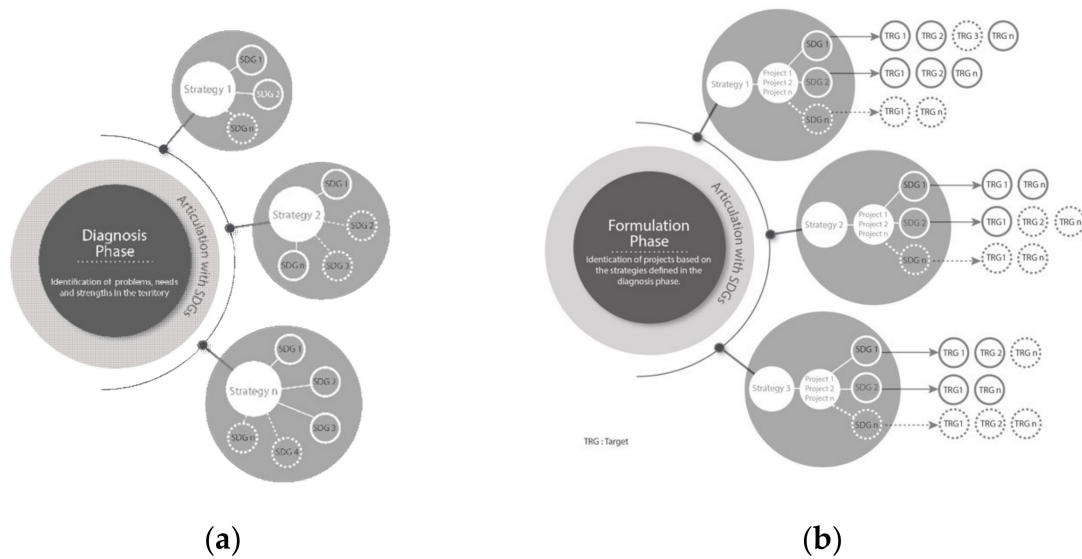

(**a**)　　　　　　　　　　　　　　　　　(**b**)

Figure 3. Sustainable Development Goals (SDGs) linked to strategies at the diagnosis phase (**a**) and targets linked to projects at the formulation phase (**b**). Continuous lines represent direct impacts, while dash lines represent indirect impacts.

Table 1. Summary of reviewed documents and findings. Green indicates a thorough inclusion, yellow indicates loose inclusion, red indicates no inclusion.

Level	Name	Area/Geography	Discusses SDGs		Findings	Discusses Sustainable Development	Findings
N/A	Municipal Development Plan (2016-2019)	City	-	Yes	SDGs are highlighted as an important input for the plan. SDG symbols are used in connection to strategic lines (with the exception of 2, 10 and 14), but only SDGs 2, 5 and 11 are mentioned in the text (although there is no important discussion about their relevance). There is no connection to second or third-level planning instruments.	Yes	Wide use of expressions related to sustainable development and discussion of second and third-level planning instruments such as *Macroproyectos*, *Planes Parciales*, *Planes Maestros*, PLRU, UPR and PEMPP.
N/A	Municipal Development Plan (2020-2023)	City	-	Yes	All SDGs identified by Agenda Medellin 2030 are discussed in the document in connection to the plan's strategic lines. Rural Farming Districts (second level) is discussed for the achievement of SDG 2.	Yes	Wide use of expressions related to sustainable development and some discussions about second and third-level planning instruments.
N/A	Local Development Plan	Comuna 3	-	Yes	Standard introduction mentioning SDGs. Mentions workshop to identify the LDP's contribution to SDGs, but no information about its results. Agenda 2030 used as a reference.	Yes	Wide use of expressions related to sustainable development. No discussion of second and third-level planning instruments.
N/A	Local Development Plan	Comuna 8	-	Yes	Standard introduction mentioning SDGs.	Yes	Wide use of expressions related to sustainable development. No discussion of second and third-level planning instruments.
N/A	Local Development Plan	Comuna 9	-	Yes	Standard introduction mentioning SDGs. Mentions a workshop to identify the LDP's contribution to SDGs, but no information about its results.	Yes	Wide use of expressions related to sustainable development. No discussion of second and third-level planning instruments.
N/A	Local Development Plan	Comuna 12	-	Yes	Standard introduction mentioning SDGs. Mentions a workshop to identify the LDP's contribution to SDGs, but no information about its results. Agenda 2030 used as a reference.	Yes	Wide use of expressions related to sustainable development. No discussion of second and third-level planning instruments.

Table 1. *Cont.*

Level	Name	Area/Geography	Discusses SDGs		Findings	Discusses Sustainable Development	Findings
N/A	Local Development Plan	Comuna 13	-	Yes	Standard introduction mentioning SDGs. Highlights the need to articulate LDP to the master plan and international agendas such as the SDG's.	Yes	Wide use of expressions related to sustainable development. No discussion of second and third-level planning instruments.
N/A	Local Development Plan	Comuna 16	-	Yes	Standard introduction mentioning SDGs.	Yes	Wide use of expressions related to sustainable development. Discussion of the impact of one third-level instrument (i.e. *Plan Parcial*) on public space and ammenities.
N/A	Local Development Plan	Comuna 90	-	Yes	Standard introduction mentioning SDGs. Mentions a workshop to identify the LDP's contribution to SDGs, but no information about its results. Agenda 2030 used as a reference.	Yes	Wide use of expressions related to sustainable development. No discussion of second and third-level planning instruments.
Second	Rural District	All five Rural Districts	Formulation	Yes	Mentions alignment with rural development, ending poverty and reducing inequalities. Also, the adoption of an index said to be "directly related" to SDGs.	Yes	Wide use of expressions related to sustainable rural development, such as "sustainable agriculture," "sustainable practices," "sustainable production," "sustainable use," "sustainable territory," "sustainable management," "sustainable life projects for the youth" and "sustainable tourism."
			Resolution	No	No mention of SDGs.	Yes	Wide use of expressions related to sustainable rural development.
			DTS1	No	No mention of SDGs.	Yes	Some use of expressions related to sustainable rural development.
			DTS2	No	No mention of SDGs.	Yes	Some use of expressions related to sustainable rural development.
			DTS3	No	No mention of SDGs.	Yes	Some use of expressions related to sustainable rural development.

Table 1. *Cont.*

Level	Name	Area/Geography	Discusses SDGs		Findings	Discusses Sustainable Development	Findings
	Macroproyecto	Río Centro	Decree	No	No mention of SDGs.	No	No mention of sustainable development.
	PUIAL	Northeast	Formulation	No	No mention of SDGs.	Yes	Loose mention of sustainable development.
			Resolution	No	No mention of SDGs.	No	No mention of sustainable development.
	Plan Maestro	Cerro Nutibara	Decree	No	No mention of SDGs.	Yes	Loose mention of sustainable development.
		Zoo	Decree	No	No mention of SDGs.	Yes	Loose mention of sustainable development.
		UdeM	Decree	No	No mention of SDGs.	Yes	Loose mention of sustainable development.
Third		Moravia	Decree	No	No mention of SDGs.	Yes	Loose mention of sustainable development.
			DTS Diagnosis	No	No mention of SDGs.	No	No mention of sustainable development.
			DTS Formulation	No	No mention of SDGs.	Yes	Some use of expressions related to sustainable territorial development.
	Plan Parcial	La Cumbre	Decree	No	No mention of SDGs.	No	No mention of sustainable development.
			DTS	No	No mention of SDGs.	Yes	Loose mention of sustainable development.
		Villa Carlota	Decree	No	No mention of SDGs.	No	No mention of sustainable development.
			DTS	No	No mention of SDGs.	Yes	Loose mention of sustainable development.

Table 1. *Cont.*

Level	Name	Area/Geography	Discusses SDGs		Findings	Discusses Sustainable Development	Findings
		Santa María de los Ángeles	Decree	No	No mention of SDGs.	No	No mention of sustainable development.
			DTS	No	No mention of SDGs.	Yes	Loose mention of sustainable development.
		Naranjal 1	Decree	No	No mention of SDGs.	Yes	Loose mention of sustainable development.
			DTS	No	No mention of SDGs.	Yes	Loose mention of sustainable development.
		Naranjal 2	Decree	No	No mention of SDGs.	No	No mention of sustainable development.
		Asomadera	Decree	No	No mention of SDGs.	No	No mention of sustainable development.
			DTS	No	No mention of SDGs.	Yes	Loose mention of sustainable development.

On the other hand, to illustrate the relevance of these instruments for SDG implementation, we consider it relevant at this point to briefly describe one *Macroproyecto* implemented in 2015 and modified in 2018:

The Medellin river is a natural corridor that divides the city. The city's mobility and industrial systems were designed to run parallel to it, accentuating this divide. As a result of devoting this space to automobiles and industry, the area lacks public space, has high levels of chemical and auditive pollution, and presents an inefficient use of valuable urban land. *Macroproyecto Río Centro* (a second-level planning instrument, see Figure 2) analyzed these problems and proposed a series of public amenities related to, among others, education, culture and community life, and the densification of the area to manage urban sprawl. It included the construction of the first phase of a large metropolitan park that addresses many of these problems by increasing available public space, mitigating auditive pollution—it proposes to bury sections of the highway—and connecting the riversides to promote connectivity in the city. Although there is no explicitly recognized connection to SDGs, the instrument has a direct relation to SDGs #3, #4, #9, #10, #11, #13, and #15.

5. Discussion

Following the results from Section 4, we will focus our discussion on two main topics: the inclusion of the SDG framework already from the early phases of second and third-level territorial planning instruments applicable to the city and the inclusion of SDGs in development plans.

Medellin has already made great efforts to create, renew, apply, and maintain planning instruments that have had a clear impact on city indicators such as utility coverage, violence, and public space. On the other hand, it has worked hard to contextualize SDGs to its reality and define indicators to contribute to national reporting. However, we encountered that these two efforts do not necessarily coincide, and claim that, if they did, SDG implementation in the city would take another dimension, as it could count on a coherent framework, independent of political flags and whims, and could join the global sustainability narratives it openly claims it wants to be part of.

According to an interviewee, there has not been a municipal guideline to include SDGs in the diagnosis and formulation processes. Since the POT does not include these considerations either (i.e., it was issued in 2014), the inclusion of new frameworks is a decision of the team involved in these processes. The inclusion of SDGs in the POT has to wait until its main structure is revised, the soonest, in 2026, which is why we have focused on complementary (i.e., second and third-level) planning instruments.

Another interviewee mentioned that there is a tendency to innovate all the time. This is not a bad thing in itself. However, innovation must be shaped in relation to long-term social objectives. Administrations want changes because of the reputation and public image that comes with them. Nevertheless, continuity beyond administrations is one of the keys to successful long-term city projects. The golden era of urban planning in Medellin (i.e., Social Urbanism—2004–2012), which gave the city its current reputation and made it become an international benchmark, was a special chapter in the city's history, considering that two back-to-back administrations were aligned politically and gave continuity to important city projects. The city must, therefore, find a framework that can transcend administrations without hurting their autonomy. Such a framework can strengthen the city's already-made effort to localize SDGs and set an example for other cities that are already looking at it for urban transformation efforts, both in Colombia and in the Global South.

The planning instruments' diagnosis and formulation phases define the path to implementation, which happens when an administrative act is issued based on them. This is why it is extremely important that they include SDGs considerations. In line with each phase, we propose the following:

1.   The diagnosis phase—Based on the identification of needs, strengths, and problems of different types (e.g. related to housing, utilities, public space, mobility, and the environment), the resulting study (called Diagnosis Technical Support Document) must define strategies to address them. These strategies are today not explicitly linked to sustainable development agendas, as it was

shown in the results. For future studies, the elaborating team can explicitly identify which SDGs are impacted by each strategy and how.

2. The formulation phase—This process's deliverable is a Formulation Technical Support Document, which, in turn, leads to the issuing of an administrative act (e.g., a decree, an agreement, or a resolution). Based on the strategies discussed during the diagnosis phase, the formulation team can define specific projects for each one of them. Up to this point, strategies will already be linked to SDGs. The team can continue further and identify the project's contribution to the level of targets. Such contribution can be direct or indirect, and the team must justify this relation. This analysis is highly important: infrastructure alone, according to [24], has a direct or indirect influence on 72% of SDG targets. The team has to base its analysis on Medellin Agenda 2030, which already identified which targets apply to the city's context.

Direct contribution refers to the immediate impacts of implementing the strategy or project, while indirect contribution refers to impacts that might arise as consequences of implementation. Adshead [24] and ONU-Habitat and INFONAVIT [47] illustrate this SDG-linking exercise to infrastructure and housing, respectively. Figure 3 illustrates our suggestions to link SDGs in the diagnosis and formulation phases of second and third-level planning instruments. Links to specific targets must be identified at the formulation phase, considering that it is at this phase that projects are formulated. Goals will already be defined for the strategies these projects belong to since the diagnosis phase.

Some of these technical processes are not translated into citizens. However, many of them include a public participation phase, which is an opportunity to make SDGs become part of the administration's communication efforts with citizens. Planning instruments can, therefore, become an additional tool to familiarize citizens with the SDG framework.

The municipality has given the responsibility of monitoring and reporting SDG progress to other administrative offices. Although the diagnosis and formulation of technical support documents will not necessarily link strategies and projects to indicators, these offices will already find a path to their measuring. Agenda Medellin 2030 will always be the guideline to follow in terms of which indicators apply to the city's context. The current MDP has taken significant steps towards the inclusion of SDGs. Strategic lines specify clearly which SDGs are impacted by them. In this way, the administration materializes its commitment to global sustainability agendas.

Finally, LDPs represent the opportunity to close the gap between top-down SDG implementation strategies and bottom-up local development initiatives. While LDPs are designed by communities, these are supported by technicians appointed by the municipality. These technicians must make sure that LDPs can communicate with legal territorial mechanisms. The process of LDP formulation is, therefore, a good opportunity to train citizens in SDG-related considerations and articulate citizen initiatives with the city's sustainability agendas. Speaking the SDG language, in addition, can guide public understanding of complex issues and connect grassroots ideas with global cooperation initiatives, giving communities access to resources and support to advance their ideas, and helping them further legitimize their initiatives, as one of the interviewees highlighted.

6. Conclusions

Despite efforts to make cities better places, institutional inertia, bureaucracy and tradition might lock-out ideas and frameworks that can help cities achieve local sustainability goals and fulfill national and international commitments. SDGs can provide a framework to support local development policies, which are compatible with territorial planning instruments. By including the SDG framework in those instruments, cities can join collective global narratives about sustainable development and gain access to cross-context collaboration, something we highlighted as necessary to advance towards shared sustainability goals.

We analyzed numerous important planning documents and instruments in Medellin and saw an explicit interest to join global agendas on sustainable development, especially Global Agenda 2030. However, these interests are not solidly materialized through the actual mechanisms the city has and

uses to impact realities and change living conditions. We proposed the inclusion of SDGs in territorial planning instruments in order to anchor city plans to global agendas. This will, in turn, help the city align its political discourse with its capacity to impact its territories and with national and global sustainability agendas. Administrations find the latter useful, be it to keep or improve its reputation, to access international cooperation resources, or to mobilize all actors to pursue the achievement of the shared vision citizens have of their city.

In some cases, like the one discussed here, current localization efforts have reached the level of the city administration (some others have stayed at a national or regional level, see, e.g., [32]). Our analysis shows that there is a need to focus on existing instruments for the further materialization of SDG strategies on the ground and the need to support initiatives that cities are already advancing in order to address endemic problems but without the SDG label. Not only will this help to localize SDGs downstream, all the way to the lowest levels (e.g., through citizen participation), but it will also support multi-level governance by helping different actors fulfill their upstream commitments and responsibilities. Figure 4 summarizes this analysis.
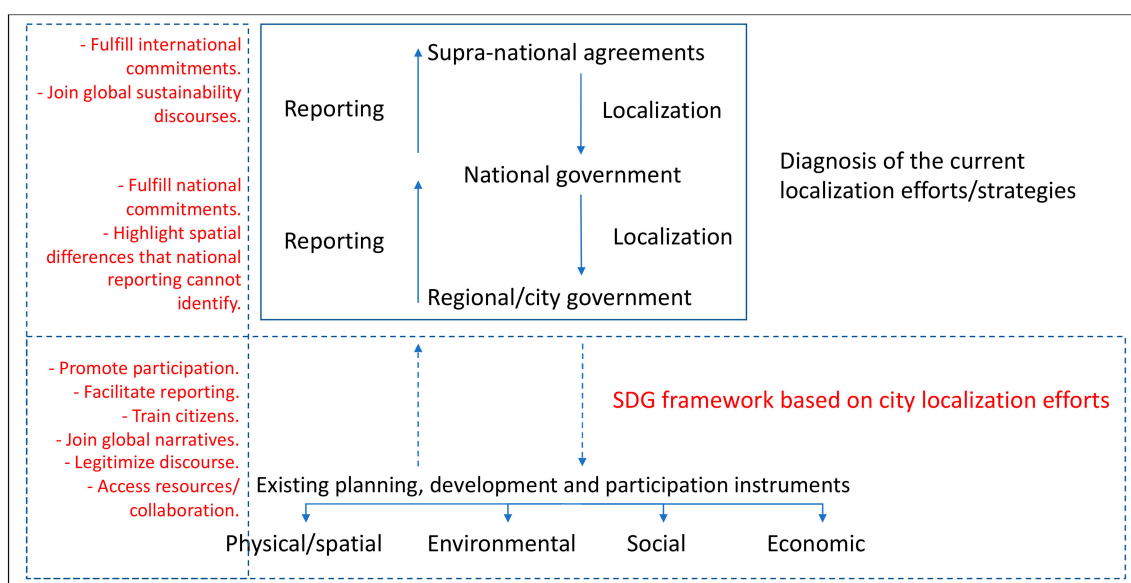

Figure 4. SDG localization flows. Continuous lines represent current localization efforts/strategies, while dash lines represent this study's proposal to further localize SDGs based on existent planning instruments, which have an actual impact on the city's development.

In 2020, Medellin took an important step in relation to its sustainable development, by articulating its MDP to SDGs, their targets, and their indicators. Although aided by a supporting technical team, this was a political decision. Territorial planning instruments, on the other hand, are of a completely technical nature, implemented by a vast number of scientists and field experts. This technical nature can provide the city with a robust, evidence-based contribution that sustainable development requires.

In our study, we focused on planning instruments, due to the vast experience Medellin has achieved while developing and applying them. Considering that Medellin has become a common national and international benchmark, mainly for cities in the Global South, we considered it useful to highlight how it can make use of well-known and proven mechanisms to continue pursuing sustainable urban development. Other cities with formal planning processes and instruments must find ways to have an impact on the territory to the level of projects and work to include the SDG framework in a coherent way in order to advance SDG implementation at the city level.

Author Contributions: Conceptualization, S.M.-D. and M.P.-C.; methodology, S.M.-D.; validation, S.M.-D. and M.P.-C.; investigation, S.M.-D.; writing—original draft preparation, S.M.-D. and M.P.-C.; writing—review and editing, S.M.-D.; visualization, S.M.-D. and M.P.-C. All authors have read and agreed to the published version of the manuscript.

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