Comparative study on SDG monitoring systems at local and regional levels

Agencia Andaluza de Cooperación Internacional para el Desarrollo
Consejería de Igualdad, Políticas Sociales y Conciliación

Diputació Barcelona

UCLG
United Cities and Local Governments

UNDP

This study was commissioned and co-published by the Region of Andalucía, Spain (through its International Cooperation Agency, AACID); the Barcelona Provincial Council; United Cities and Local Governments (UCLG); and United Nations Development Programme (UNDP).

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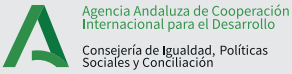
We also wish to acknowledge the financial support provided by the Region of Andalucía.



Andalusian Agency for International Development Cooperation (AACID)

The region of Andalusia has 8,427,000 inhabitants and administratively, apart from the regional government, it has 785 municipalities and 8 provincial councils. AACID is the body in charge of coordinating and promoting the international solidarity policies of the Region of Andalucía. Its mission is to contribute to the eradication of poverty and to the consolidation of the processes aimed at ensuring sustainable human development. It raises awareness of the Andalusian population towards the problems generated by the current development model, promoting critical reflection and fostering participation and the spirit of solidarity among citizens.

The Andalusian cooperation is based on a multilevel model that is able to articulate actions at local, regional, national and global levels, working localization and territorialisation processes of the SDGs as a process in which governments at different levels work and execute jointly actions aimed at the implementation of the 2030 Agenda. It is also a multi-stakeholder model that is capable of mobilising civil society and its organisations, universities, trade union and business organisations and local authorities under the leadership of the Andalusian Agency for International Cooperation.

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Barcelona Provincial Council is a local government institution that promotes the progress and well-being of the citizens of its territorial area; the province of Barcelona, 311 municipalities in a network, which represents 24 percent of the total area of Catalonia and 74.4 percent of the total Catalan population. It acts directly by providing services and, above all, in cooperation with the city councils, giving support (technical, economic and technological) to the municipalities so that they can provide quality local services in a more homogeneous way throughout the territory, respecting the principle of subsidiarity and local autonomy. Among its main goals is to promote the sustainable development of the territory in a climate emergency context, promoting the achievement of the Sustainable Development Goals and the New Urban Agenda.

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UCLG is the global organization of local and regional governments and their associations that represents and defends their interests on the world stage. Representing 70 per cent of the world's population, UCLG members are present in all world regions: Africa, Asia Pacific, Europe, Eurasia, Middle East-West Asia, Latin America and North America - organised in seven continental sections, a metropolitan section and a regional forum. This network covers more than 250,000 cities, regions and metropolises and more than 175 local and regional government associations present in 140 countries. UCLG includes among its main areas of political interest local democracy, climate change and environmental protection, the achievement of Sustainable Development Goals, the role of culture in sustainability, local finance, urban development and city diplomacy for peacebuilding.

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In 2015, the United Nations opens a window of opportunity with the approval of the 2030 Agenda; countries and their citizens embarked on a new path that aims to improve the lives of all people and leave no one behind.

Since then, events have occurred and have shown that now more than ever we must advance towards the achievement of the 17 Sustainable Development Goals (SDGs), hand in hand with all the institutions and all the actors so that, collectively, we can contribute to the achievement of the SDGs.

The Andalusian Agency for International Development Cooperation, through its Andalusian Development Cooperation Plan, is committed to facing global challenges on the path of the 2030 Agenda. An Agenda that allows to promote sustainable development in a more inclusive way.

Starting from a new paradigm where global coexistence guarantees sustainability, we also need to reflect on a new framework for international cooperation. We should learn from the opportunities offered by a cooperation such as the Spanish one, which is characterized by its high degree of decentralization. This strong decentralized nature of the Spanish development cooperation is unique in the global level must be reinforced and positioned within global agendas.

Therefore, the Andalusian Agency for International Development Cooperation, in its alliance with UNDP, UCLG and the Barcelona Provincial Council, aims at showcasing territorial experiences at global level; all of them based on the understanding that it is LRGs with their decentralized competences that develop the actions closest to the citizenry. This allows a more horizontal cooperative relationship and with a clear commitment to the fundamental rights of people and social justice. We talk about territories and the localising of the SDGs because it allows us to be more inclusive, diverse and human centred, and to address climate change without any further delay. COVID 19 has put us on alert, and it is in the territories where transformative actions become reality; it is where change can be made possible.

Undoubtedly, localizing the SDGs has become a key aspect of the 2030 Agenda. Achieving the Agenda requires a multilevel approach to objectives, goals and indicators, which in many strategic aspects needs the involvement of regional governments such as the Andalusian. Regional autonomous governments and local governments take on these challenges by connecting local government action with global problems.

This focus also challenges us to become aware of the new reality, the results of our actions and our co-responsibility as Government with our citizens. For this, it is necessary to have multilevel and multi-actor measurement and monitoring systems, considering the multidimensionality of the problems in this interconnected and interdependent world.

The Ministry of Equality, Social Policies and Conciliation, to which the Andalusian Agency for International Development Cooperation belongs, is the leader of the 2030 Agenda in Andalucía. The ministry, based on the integral approach of the Agenda, coordinates actions of the Andalusian government with a multidimensional approach. The Andalusian Institute of Statistics and Cartography, therefore, embarks on an effort

to innovate measurement of sustainable development, applying comprehensive and multidimensional systems, as also promoted by the European Union and the Spanish government.

For all these reasons, the Andalusian Agency for International Development Cooperation, together with UNDP, UCLG, and the Barcelona Provincial Council, sought to map global sys-

tems and approaches to monitoring the implementation of the SDGs at the local level. The goal was to look at the systems measuring the impact of our actions to achieve the SDGs and ways of measuring the daily realities of people in their municipalities and regions.

This alliance between AACID, UNDP, UCLG and the Barcelona Provincial Council has started from the need to deepen our knowledge of monitoring and evaluation systems focused on the generation of evidence-based policies related to the SDGs. It considers that a new generation of public policies and systems of measurements are needed, which respond to the new challenges, with territories at the centre of such efforts. Andalusia made a clear commitment to the cohesion of its territory as a key element in the fight against inequalities and social justice.

We hope that this study establishes a good starting point for a debate on systems and approaches on the monitoring of SDG localization. From Andalusia we invite you to join this reflection on monitoring progress on implementing the 2030 Agenda at the local level and how best to measure progress in this decade of action. COVID 19 has once again shown us that in our complex world change is only possible if we all work hand in hand.

María Luz Ortega Carpio
General Director
Andalusian Agency for International
Development Cooperation

Figures and tables

List of abbreviations

CEMR
Council of European Municipalities and Regions

CESOP
Centre for Studies and Opinion Surveys

CIS
Community Indicator System

CNM
National Confederation of Municipalities

CPI
City Prosperity Initiative

CSOs
Civil society organizations

EC
European Commission

ESPON
European Spatial Planning Observation Network

EU
European Union

IAEG-SDG
United Nations Inter-Agency and Expert Group on SDG Indicators

IISD
International Institute for Sustainable Development

IOs
international organizations

JRC
Joint Research Council

LMSs
local monitoring systems

LRGs
local and regional governments

OECD
Organisation for Economic Co-operation and Development

PEMB
Metropolitan Strategic Plan of Barcelona

REDS
Spanish Network of Sustainable Development

RFSC
Reference Framework for Sustainable Cities

RKA
Council for the Promotion of Municipal Analysis

SALAR
Swedish Association of Local Authorities and Regions

SDGs
Sustainable Development Goals

SDSN
Sustainable Development Solutions Network

UCLG
United Cities and Local Governments

UN-Habitat
United Nations Human Settlements Programme

VLRs
Voluntary Local Reviews

VVSG
Association of Flemish Cities and Municipalities

WCCD
World Council on City Data

Introduction

There is widespread consensus at the global level about the important role that local and regional governments (LRGs) play in the quest for sustainable development. Localizing the 2030 Agenda for Sustainable Development[1] constitutes a major challenge, since most of its 17 Sustainable Development Goals (SDGs) and 169 targets fall within the areas of competence of LRGs worldwide. In fact, one third of the 232 SDG indicators defined by the United Nations[2] can be measured at the local level, while 65 percent of the SDGs depend on the direct action and involvement of local governments for their achievement.[3] In recent years, an increasing number of LRGs worldwide have shown their commitment to the 2030 Agenda by aligning their strategies and public policies with the SDGs and developing various innovative solutions for their effective implementation.

Monitoring LRG interventions and measuring their achievements is crucial for understanding SDG progress at the territorial level and for recognizing LRG contributions to the 2030 Agenda, not only at the local or regional level, but also on a national and global scale. An increasing number of LRGs are defining monitoring and evaluation tools as well as accountability systems that measure their compliance with the 2030 Agenda and the results achieved to date. Since 2016, LRGs have also started to produce Voluntary Local Reviews (VLRs) and Voluntary Subnational Reviews, which serve as tools for evaluating their achievements and contributions. However, the number of LRGs that have undertaken these exercises across the world remains scarce, partly as a result of the limited capacity and resources available at the subnational level.

The 2030 Agenda can serve to promote accountability as a way of improving and reinforcing policymaking at the local level. This is relevant not only for tracking progress towards achieving the SDGs, but also for measuring the impact and the results of LRG public policies worldwide. An increasing number of organizations are developing systems to monitor how regions and cities are performing in relation to the SDGs and designing tools that support LRG efforts to track and report progress. These systems, together with those designed by LRGs themselves, constitute a diverse ecosystem of indicators, data sources, dashboards, tools and guides.

However, despite their importance and relevance for attaining the SDGs, LRG efforts to measure contributions to the 2030 Agenda through a wide array of local monitoring systems (LMSs) remain understudied. There is limited understanding of how LMSs inform national and global strategies and how they track the performance of regions and cities. Furthermore, key aspects such as the scope of these local systems, the types of indicators applied, the data sources used, the stakeholders involved or the type of reporting conducted, have received limited attention to date. Given the diversity of monitoring systems developed by a wide range of stakeholders, a thorough individual and comparative analysis is required in order to determine which LMSs respond better to the different interests and capacities of LRGs.

Objectives and scope

This study serves three key purposes. First, it seeks to fill existing knowledge gaps on the variety of LMSs that currently exist by showcasing a wide range of initiatives and analysing their advantages and limitations. Second, the study seeks to facilitate knowledge- and experience-sharing among actors as they engage in developing their own LMSs and methodologies by helping to draw lessons learned. Third, the study gives visibility to these initiatives, with a view to inspiring relevant actors working to strengthen their own SDG monitoring practices.

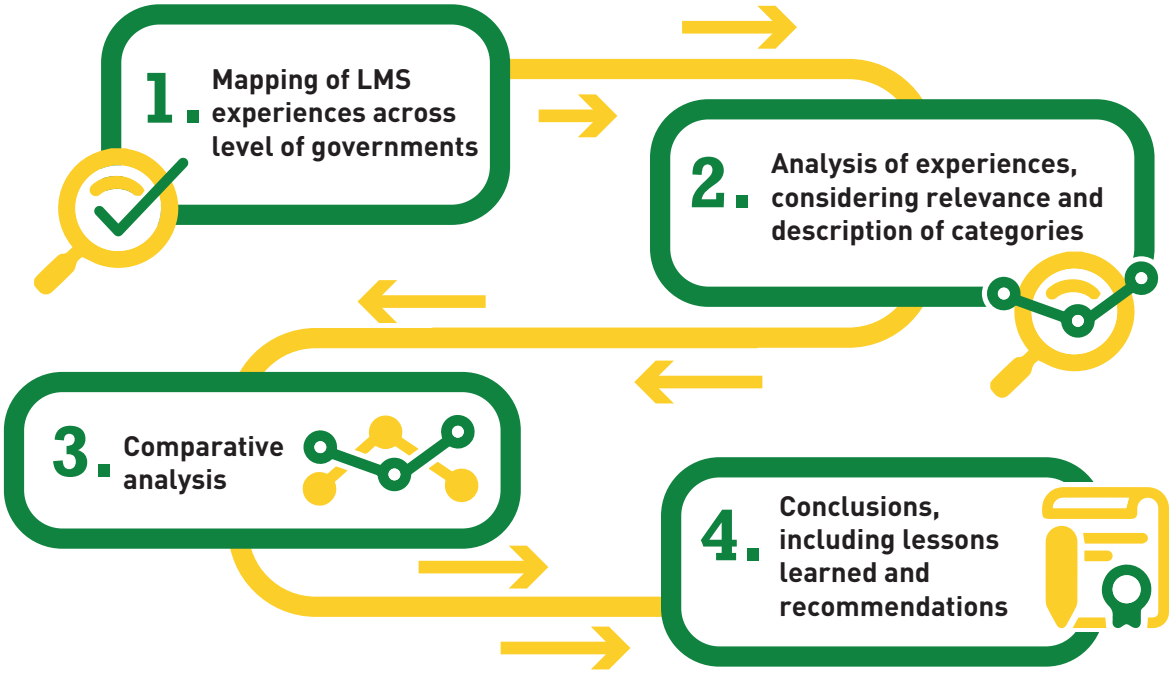
This study analyses a wide range of LMSs that measure progress towards achieving the SDGs at the local level. It includes a mapping of systems designed and developed by various actors organized into five categories: (a) LRGs; (b) LRG associations and networks; (c) national Governments; (d) international organizations (IOs); (e) universities, research centres, civil society organizations (CSOs) and private corporations.

Methodology

A conceptual framework has been developed for the purposes of this study. This framework has served to categorize mapped experiences at different levels and to structure the analysis of this wide spectrum of LMSs. LMSs take many forms according to how the different defining elements interact with each other. The study considers key aspects of LMSs, such as their purposes and mandates, target groups, governance structures, number and types of indicators applied, SDG coverage, territorial scope, data sources and modalities, reporting systems, frequency of data collection and cost.

The following steps were followed:

Figure 1 The four-step process



Source: Author.

The first phase of the study involved mapping a selection of existing monitoring systems through a desk review that focused on LMSs that:

- **Aim to track progress towards implementing the 2030 Agenda at local and regional levels (as opposed to the national or international level)**
- **Are based on reliable and standardized indicators (whether aligned or not aligned with SDG indicators)**
- **Use different data sources available (local, national or international)**

The following additional criteria were applied in order to select LMSs for the mapping exercise:

- **Consolidated existence and sufficient availability of information: the selected LMSs have a minimum level of maturity and sufficient data/information available.**
- **Geographic distribution: the selected LMSs cover a wide variety of geographic areas and represent a balanced sample of experiences from several territories across the world.**
- **Different focus and purpose: since LMSs differ in terms of focus and/or objective, the selected cases reflect a wide variety of approaches, set-ups, mechanisms, etc.**

This analytical framework was applied to a selection of LMSs with a focus on those with specific added value and relevance for comparison in order to draw lessons and recommendations. Data collection for the study was carried out through an extensive desk review that was complemented with a series of interviews and a survey involving key stakeholders.

The information collected and analysed was systematized in a summary matrix and through several fact sheets. A comparative analysis was conducted with a focus on the main cross-cutting elements, with a view to drawing conclusions, action-oriented recommendations and lessons learned. These recommendations seek to support policy orientation; improve existing systems; and promote effective monitoring, evaluation and reporting systems at the local and regional levels.

Main categories of systems to monitor Sustainable Development Goals[4]

Category 1 :
Local and regional monitoring systems

The section dedicated to the first category includes LMSs for LRGs designed and/or carried out by the local and regional governments themselves.[5] Three regional government experiences are analysed in this section of the study: the regions of Andalusia and the Basque Country (Spain) and the state of Oaxaca (Mexico). Five municipal initiatives are also discussed, namely the cities of Barcelona (Spain), Helsinki (Finland), eThekwini (South Africa), La Paz (Bolivia) and Barcarena (Brazil).

As stated in the introduction, LRGs play a crucial role in the quest for sustainable development and the achievement of the SDGs. Their public competences and the policies they define and implement worldwide are closely linked to most of the targets established in the 2030 Agenda. Hence, LRGs must also play a key role in monitoring the achievement of the SDGs at the local level.

Monitoring public policies and measuring results are key for allowing LRGs to make themselves accountable to the populations they serve and to report results and impacts. Lessons can also be extracted from these processes and the results achieved in order to improve policymaking processes and identify best practices that might be useful for other LRGs.

In this context, LRGs can ensure that citizens and other stakeholders have a say by ensuring that all relevant data, including the ones produced by non-governmental actors, are integrated in the LMSs. They can also make sure that information and the results of LMSs are available to all. Likewise, they can create feedback mechanisms that allow the participation of local stakeholders and react with the design of public policies that respond to jointly identified priorities. Therefore, without the commitment of LRGs and the involvement of local stakeholders, monitoring the SDG achievement will remain incomplete.

On the other hand, LRGs can also ensure cooperation among different departments of their offices by improving the flow and exchange

of data. And finally, they can make sure that this information is being integrated into other monitoring exercises being carried out in their country.

By ensuring the implementation of these different actions, LRGs can improve the quality of the public policies and services provided and showcase their contributions to the 2030 Agenda. According to the fourth Local and Regional Governments' Report to the 2020 High-Level Political Forum,[6] produced by United Cities and Local Governments (UCLG) on behalf of the Global Taskforce of Local and Regional Governments, the localization movement has been gaining ground in all the regions, albeit with different scopes and at different paces. Hundreds of cities and regions have embedded the SDGs in their local strategies and medium-term planning objectives and have strengthened partnerships with local stakeholders. However, the analysis presented in this study shows that, when it comes to considering LMSs implemented by LRGs around the world, significant differences remain since diverse capacities and resources produce a wide array of LMSs.

Despite the increasing number of LRGs that are reporting their contributions towards achieving the SDGs through VLRs—50 since 2017, according to UCLG[7]—both the quality and strength of most LRG monitoring systems remain very limited. Many LRGs, whether they have developed a VLR or not, have difficulties measuring the implementation of the 2030 Agenda in their territories, and the systems established to support them remain scarce. Furthermore, the majority of national systems show insufficient disaggregated data available to fully capture the main territorial challenges.[8]

Nonetheless, the mapping conducted within the framework of this study has shown that LMSs are developed by LRGs with different capacities and resources. Some of the LRGs considered in this study have adequate monitoring capacities (i.e. bodies and professional teams specialized in producing data, statistics and information, as well as measurement systems in place to monitor their public policies). These LRGs can be found in some federal countries (such as Austria, Belgium, Canada, Germany, South Africa (see Gauteng), Spain and the United States of America) and in many metropolitan cities (e.g. New York, Los Angeles, Barcelona, Helsinki, Seoul, Buenos Aires, São Paulo).

One of the mapped LRGs that fall under this category is the **Government of the Basque Country** (Spain) and its strategic and participatory approach for SDG monitoring. It promotes the participation of civil society in monitoring the SDGs[9] in three ways: 1) by involving them in its governance system, composed of three SDG Monitoring Commissions (interdepartmental, inter-institutional, Advisory Council); 2) by ensuring their involvement in the definition and implementation of public policies through sectoral agents in each of the government areas and 3) by encouraging them to reflect their commitment to the 2030 Agenda in their own specific action plans.

The Basque Statistics Institute Eustat[10] has built and manages a scorecard system for the Basque Country 2030 Agenda. It is the result of combining the 80 tier 1 indicators of the United Nations, the 100 indicators of the 2030 Agenda of the European Commission (EC) and the 100 strategic indicators of the Basque government. The final set is composed of 30 indicators that the three institutions have in common, including 8 that coincide with United Nations indicators, 5 with EC indicators and 7 new indicators with no coincidence. It serves the different statistical bodies of the Basque government (Eustat, statistical bodies of the departments and the Cabinet of Sociological Surveys, among others). Although this system

functions well, strengthening vertical data integration would help to ensure that locally collected data inform policymaking efforts in a more systematic manner and at all levels.

In **Barcelona** (Spain), the Barcelona City Council has considerable capacity to gather and produce data and information through its Municipal Data Office[11], which works in close coordination with other municipal departments. Barcelona's system aims to monitor progress through an initial set of 205 indicators (to be reviewed and reduced in the future) that covers all the SDG targets of relevance to the city. Data are obtained from a wide range of municipal sources—from statistical productions, opinion polls, observatories and mappings to big data—as well as national and European sources (Eurostat, Eurostat Urban Audit) and other stakeholders (QS World University Ranking, Spanish Network for Sustainable Development (REDS) [Red Española para el Desarrollo Sostenible] or the Spanish Federation of Municipalities and Provinces).

To elaborate this set of indicators, the City Council uses various references, such as the Sustainability Indicators of Barcelona[12]; a series of measurable targets included in the Strategy for Social Inclusion and Reduction of Inequalities; the 85 indicators defined by REDS[13] for monitoring the achievement of the SDGs in 100 Spanish cities; and a list of local, national (National Institute of Statistics urban indicators) and international systems of indicators (the City Prosperity Initiative of the United Nations Human Settlements Programme (UN-Habitat), the VLR of New York City,[14], the indicators developed by the association of German cities Deutscher Städtetag, the 'Mandala' produced by the Brazilian National Confederation of Municipalities (CNM) [Confederação Nacional de Municípios]).

In 2019, the city of **Helsinki** (Finland) conducted a VLR[16] that tracks how the city is contributing to five selected SDGs (Goal 4 on quality education, Goal 8 on decent work and economic growth, Goal 10 on reduced inequalities, Goal 13 on climate action and Goal 16 on peace, justice and strong institutions) through the key projects included in the 2017–2021 Helsinki City Strategy, the Carbon-neutral Helsinki 2035 Action Plan and other

The region of Andalusia (Spain) has channelled the development of SDG indicators through the **Institute of Statistics and Cartography of Andalusia**, a specialized public agency composed of approximately 150 staff and managing a budget of around 12 million euros per year. The Institute is in charge of producing data and indicators and may request information, data and support from the statistical and cartographic unit of each of the regional ministries. The system of indicators developed for monitoring and evaluating the Andalusian Strategy for Sustainable Development, based on the SDG indicators of the European Union (EU) set by Eurostat, constitutes a good example of horizontal organizational integration[15]. In addition, the Institute is part of the Spanish Interterritorial Statistics Committee and the working group in charge of coordinating the SDG monitoring systems. However, monitoring the SDGs under a multi-stakeholder lens is still a challenge for the Andalusian Council for Statistics and Cartography.

action plans implemented by various city divisions. The report's comprehensive approach is based on a system of 40 indicators primarily selected from the monitoring parameters of the Helsinki City Strategy and complemented with a few context-specific indicators with which Helsinki monitors the city's state and development. The report provides evidence-based information on how the city is performing in key areas, outlines trends in key sectors and provides valuable insights and learnings for future policies.

A second trend identified by this study includes LRGs with small technical units or professional teams that often need complementary resources and support (such as stronger collaboration with national authorities) to gather and produce data, implement monitoring systems and report on the implementation of their public policies. Examples include several regions in non-federal countries, large cities in low-income countries and medium-sized cities in high income countries (Europe, Canada, etc.). Many of them are increasing their efforts to monitor and report progress on SDGs, strengthen their commitment and mobilize resources and capacities. As highlighted in this study, international institutions, national Governments, LRG associations and networks and other stakeholders are providing support to these LRGs.

A good example of this second trend is the **eThekwini** municipality (South Africa), which has pioneered SDG localization globally. In accordance with the Municipal System Act adopted in 2000 (which requires all municipalities to develop their own Integrated Development Plan[17]), eThekwini has now aligned its action and budget to the SDG targets and indicators. In 2017, 66 of 98 SDG indicators had been aligned with investment projects; in 2018, this number increased to 75. This alignment has focused on four main pillars, which are human rights, people, planet and prosperity, and can be visualized through a monitoring and reporting framework.

The municipality of **La Paz** (Bolivia) has also made a significant effort to align its sustainable development plan ('La Paz 2040') with the 2030 Agenda[18]. Indicators are based on municipal and national data sources. A new report presents the different actions that the municipality is developing to achieve objectives and targets defined in both La Paz 2040 and the 2030 Agenda to achieve a more sustainable development. The 2018 VLR[19] uses cartography to showcase the most relevant results. The Municipal Secretary for Development Planning[20], through its Municipal Direction for Research and Information (composed of five staff), manages the municipal information system that is equipped with a territorial information system, gathers indicators and data from municipal dependencies and national sources and provides basic statistics on municipal performance.

In the state of **Oaxaca** (Mexico), the state government decided to create in 2020 two SDG indicator systems: one at state level and one at municipal level (with the support of the German Agency for International Cooperation). In the definition and implementation of the former, an inter-institutional group has been set up that involves representatives from different areas of the state and federal governments, although no participation of municipalities and local stakeholders is foreseen. The development of this system has resulted in better coordination at the interdepartmental level and with the federal Government, particularly with the National Statistical Office[21]. However, according to the institution, there is an important lack of data disaggregated by gender, age and municipality, and the number of impact indicators has been lately reduced—all of this hampering the possibility of tracking changes in the populations over time.

Lastly, a third trend includes LRGs with very limited monitoring capacities and resources. Despite these limitations, several LRGs display great commitment to reporting their progress towards the achievement of the SDGs. Examples include medium-sized LRGs in the Middle East (e.g. Bakirköy in Turkey), Latin America (e.g. Barcarena and Santana de Parnaiba in Brazil), Africa (e.g. Busia County in Kenya) or Asia (e.g. Riau Province in Indonesia), which have received support from national associations, national Governments or IOs.

Barcarena in Brazil provides a good example of commitment. This medium-sized city aligned its planning and management instruments and legislation with the Millennium Development Goals and with the 2030 Agenda after 2015 and has involved all local stakeholders in decision-making processes.[22] According to the United Nations Partnerships for SDGs platform,[23] these actions promoted a paradigm shift in the municipality. However, measuring concrete results is still challenging for the city. Although the City Council announced the creation of an Observatory to monitor progress on the localization of the 2030 Agenda, the 2017 VLR shows certain limitations in the use of indicators and the delivery of results-oriented data. Indeed, the 2017 VLR offered mostly qualitative information on projects contributing to indicators defined by the United Nations. The definition of city-specific available indicators that are also results-oriented was missing. However, the city has worked since then on an SDG indicator system that will be an input to the overall Pluriannual Plan indicator set.

Category 2:
Associations and networks

This section includes an analysis of various LMSs for LRGs designed by LRG national associations and international networks. In terms of international networks, entities with exclusive LRG membership (such as Metropolis and the Council of European Municipalities and Regions (CEMR)) are taken into consideration, as well as entities that are open to LRGs and other stakeholders (such as the World Council on City Data (WCCD)). In total, five national local government associations and two international LRG networks are examined under this second category.

Since the adoption of the 2030 Agenda, many different types of associations and networks across the world have shown great dynamism and strong commitment to raising awareness among their respective members on the importance of localizing the SDGs. These organizations have seized the opportunity to advocate for greater LRG involvement in this process, by highlighting the key role they play, calling for an enabling environment and developing learning tools with a special focus on planning and alignment processes, as well as facilitating platforms for the transfer of knowledge and good practices.

As mentioned above, LRGs operate in very heterogeneous realities and, in some cases, they face difficulties in monitoring and evaluating policymaking processes, including SDG achievement. Addressing this specific issue remains a complex challenge.

National associations and international networks have contributed by demanding support for LRGs in their efforts to monitor and report achievements and contributions under the 2030 Agenda. They have also been building tools to provide LRGs with solutions for improving their capacities, which ranged from

training sessions to dashboards and sets of indicators. This also offered a good opportunity to raise awareness on the importance of monitoring and evaluating policymaking processes and to improve LRG skills, capacities and resources, as illustrated by the examples presented below.

National associations for local and regional governments

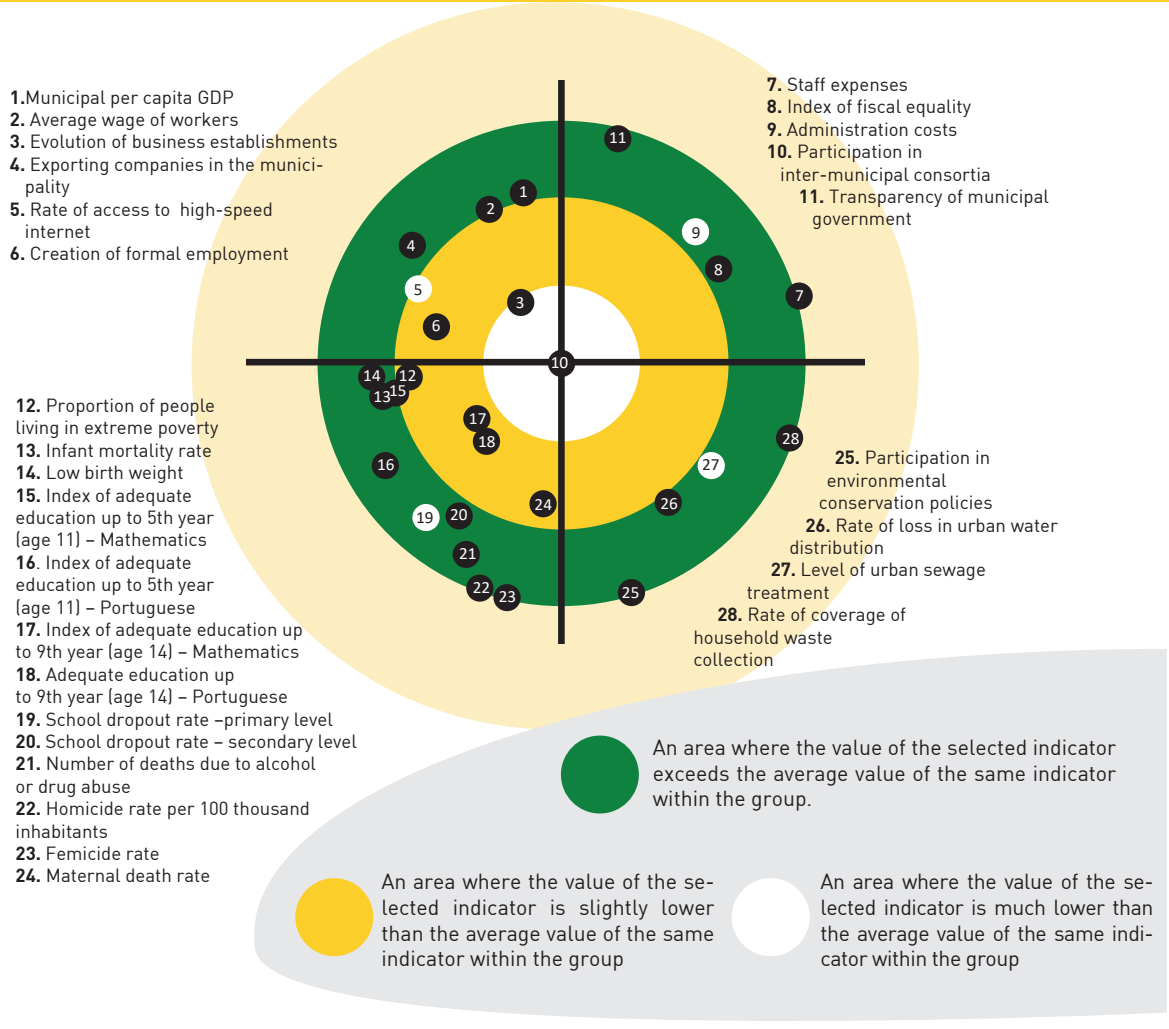
CNM in Brazil was the first association to launch a dashboard to monitor progress at the local level. The so-called 'Mandala'[24] provides a set of 28 indicators, linked to national data sources, and a powerful graphic representation of the performance of the 5,570 municipalities on the four dimensions of sustainable development (economic, social, environmental and institutional). Data are collected by a team of CNM experts with limited direct participation of the municipalities. The system provides an excellent comparison of performance between municipalities, also according to seven levels of local development. However, its potential to enhance the policymaking process is limited by the lack of qualitative information that contributes to understanding the results of the different indicators, and thus realities, and the fact that data have been collected mainly at the national level. To enhance the comparability between municipalities and overcome these challenges, according to CNM, a second version of the 'Mandala' will focus on linking SDG indicators to municipal services. This will allow for showing the big development imbalances existing in the country from a gender, environmental, social and technological point of view, and for better addressing the different realities and needs from each city and public service. This project is, however, stagnating due to a lack of funding.

In Germany, the association of cities **Deutscher Städtetag** has implemented a multi-stakeholder and multi-governance initiative for developing a set of 47 indicators to measure sustainability performance in 80 cities (an extended version of 100 indicators is currently being developed). This indicator set is visually displayed for each of the 80 German cities and their communities in the 'SDG-Portal' platform.[25] The portal also allows for comparing achievements between cities. In principle, data are based on existing indicator catalogues (for instance, indicator catalogues of the United Nations, the EU, the German federal State, and selected German Länder, counties or LRGs). The initiative works with municipalities through various steps to compile relevant indicators, define or redefine them when necessary and, to the greatest possible extent, provide access to the indicator parameters. Indicator development consists of identifying and describing indicators for the relevant goals and subgoals, as well as surveying and analysing these parameters[26].

In Belgium, the **Association of Flemish Cities and Municipalities (VVSG) [Vereniging van Vlaamse Steden en Gemeenten]** ran a project between 2017 and 2019 with 20 Flemish pilot municipalities to explore how SDGs could be part of local policymaking and local policies.[27] Based on a request by the pilot municipalities, VVSG developed a basic chart with 54 indicators covering each of the 17 SDGs that took the local context into consideration. It was complemented by an additional set of 205 indicators for those municipalities that wished to measure more in depth.

The **Swedish Association of Local Authorities and Regions (SALAR)** and the Swedish State, through their Council for the Promotion of Municipal Analysis (RKA) [Rådet för Främ-

Figure 2 Example of the 'Mandala' portraying São Paulo's performance



Source: National Confederation of Municipalities (Brazil)

jande av Kommunala Analyser],[28] have developed an open database called 'Kolada'[29]. This database contains over 5,000 key indicators to measure activities conducted by municipalities and regions, including a set for monitoring the SDGs. Data are collected at the national level; SALAR, county councils and the municipalities themselves also contribute to this task. The indicators do not necessarily match the indicators proposed by the United Nations or the nationally adapted ones.[30] The reasons may be conceptual (i.e. "slums" under SDG 11 on sustainable cities and communities are not considered a relevant concept, but "overcrowding" is) or stem from the need to go further than the international or national agendas (i.e. the indicator under SDG 11 on "dependency ratio" as a priority for the Swedish welfare municipalities).

The following table shows a summary of the trends for the city of Gothenburg:

Figure 3 Example of Gothemburg

		2014	2015	2016	2017	2018	Trend.
SDG 1	No Poverty						
	Residents 0-19 years in economically vulnerable households, share (%) Total	15,3	14,4	13,4	12,7		↗
	Adult beneficiaies with long-term financial assistance, share (%) of population. Total	2,8	2,7	2,5	2,2		↗
SDG 2	Zero hunger						
	Residents with obesity, percentage (%) Total	12	12	12		12	→
	Organically cultivated arable land, percentage (%) Total	16	19	20	20	20	↗
SDG 3	Good healr and well-being						
	Life expectancy women, year	83,4	83,6	83,7	83,7	83,9	↗
	Life expectancy men, year	79,2	79,4	79,5	79,8	80,1	↗
	People on long-term sick leave with mental illnesses and syndromes and behavioral diorders, percentage (%)				55,1		→
	Fall injuries amond people 65+, durin 3 years period, number / 100,000inh	3273	3063	2926	2805		↗
	Antibiotics sales municipality, prescription / 1000inh	323,6	307,7	302,2	290,4	272,8	↗
SDG 4	Quality education						
	Students in year 9 who are elible for vocation programs, hometown, percentage (%)	84,7	82,8	84,5	81,7	81,9	↘
	Students in year 9: I feel safe in school, positive answers, percentage (%)			82,9		81,5	↘
	High school students with degree within 4 years, hometown, percentage (%)		63,7	66,6	65,8	67,5	↗
	Student at SFI (Swidish for immigrants) who have passed at least two courses, of beginners two years earlier, percentage (%)	41	36	39	34	32	↘
SDG 5	Gender equality						
	Full-time monthly paid, municipality, percentage (%)	75	75	75	76	77	↗
	Parental benefit days taken out by men, percentage of days(%)	25,8	26,5	26,8	28,4	29,6	↗
	Womens median net income a porpoprtion of mens median net income, percentage (%)	82,0	82,4	82,8	83,0		↗
	Womens median net income a porpoprtion of mens median net income, municipal employees, percentage (%)	97,3	98,1	99,2	99,3	99,6	↗
SDG 6	Clean Water and Sanitation						
	Water resources with water protection area, percentage (%)				50,0	100,0	↗
	Lakes with good ecological status, percentage (%)	40,0	40,0	40,0			→
	Water streams with good ecological status, percentage (%)	9,5	9,5	9,5			→
	Groundwater bodies with good chemical and quantitative status, percentage (%)	100,0	100,0	100,0			→
SDG 7	Affordable and Clean Energy						
	Power outages, average downtime por customer, (longer than 3 min), minutes / customer			29,0	29,6		↘
	District heating production of renerwable energy sources at heat plants in the gographical area, percentage (%)						
	End-use of total energy in the geographical area, MWh/inh	35	32	33	30		↗
SDG 8	Decent work and Economic Growth						
	Gross regional product (BRP), kr/inh	557036	609407	640443			↗
	Long-term unemployment 25-64 years, porportion (%)of pop.	4,1	4,0	3,9	3,7	3,6	↗
	Residents 17-24 years who neither work nor study, share (%)	8,2	8,0	7,8	7,4		↗
SDG 9	Industry, Innovation and Infrastructure						
	Broadband access of at least 100Mbit/s, share (%)	78,2	89,5	92,1	94,0	95,1	↗
	Business climate according to Open Comparison (Insight) - Total, Satisfied Customers Index	67	68	69	69	67	↘
	Population in locationclose to public transport, percentage (%)	94,5	94,5	94,5	94,5		→
SDG 10	Reduced Inequality						
	GINI coeficcient, index	0,449	0,440	0,431	0,427		↗
	Resident 16-84 years with lack of trust in others, percentage (%)	30	29	29		30	→
	Left the establishment tasks and started working or studying (status after 90 days), percentage (%) (The establishment tasks includes newly arrived refugees of working age (20-67 years) and new arrivals aged 18-19 without permissions in Sweeden)		25	27	34	47	↗
	User assessment of daily activities within LSS (Act on support and service for some disabilities) The user may decide on things thath are important, percentage (%)			75	56	72	→
SDG 11	Sustainable Cities and Communities						
	Dependency ratio (is calculated as the sum of the numbers of persons 0-19 years and number of persons 65 years older dividedby the numberof persons 20-64 years. Desirable is a low value)	0,579	0,583	0,596	0,589	0,593	↘
	Overcoming in apartmentbuildings, according to norm 2, percentage (%)	18,5	18,8	19,2	19,7		↘
	Emisions to air of nitrogen oxides (NOX total Kg/inh)	11,9	12,0	10,9			↗
	Emisions to air of PM2.5 (particles>2.5 micrometers), kg / inhabitant	0,71	0,71	0,68			↗
SDG 12	Responsable Consumptionand Production						
	Total houshold waste collected, kg/person	387	385	379	369		↗
	Household waste collected for material recycling, incl. biological treatment, percentage (%)	36	36	36	36		→
	Organic food in the municipality's, percentage (%)	33	45	47	46	46	↗
SDG 13	Climate Action						
	Emissions to air of greenhouse gases total, tonnes CO2 eq/inh	4,20	4,11	4,41			↘
	Enviromental cars in the municipal organization, persentage (%)	79,3	79,4	78,9	78,9	74,9	↘
	Enviromental cars, percentage of total cars in the geographical area	25,7	28,3	24,9	21,3	19,2	↘
	Average mileage with passenger car, km/h	4700,5	4790,8	4872,4	4910,2	493,0	↘
SDG 14	Life Below Water						
	No indicator for local level						
SDG 15	Life on Land						
	Total protected nature, percentage (%)	12,2	12,2	12,9	12,9	12,9	↗
SDG 16	Peace and Justice Strong Institution						
	Election district with the lowest turnout in the last municipal election, percentage (%)	37,4	37,4	37,4	37,4	41,2	↗
	Residents 16-84 years who refrain from going out alone, percentage (%)	26		24		26	↘
	Reported violent crimes number / 100,000 inh.	1279	1306	1353	1261	1227	↗
	Profit for the year as a shore of tax & general goverment contribution to municipality (%)	1,5	3,0	3,2	7,0	5,7	↗
SDG17	Partnership to chieve the Goal						
	No Indicator Level.						

RKA suggested municipal indicators for monitoring SDGs. Example of Gothenburg. **Source**: Sandra C. Valencia, Localisation of the 2030 Agenda and its Sustainable Development Goals in Gothenburg, Sweden (Mistra Urban Futures, 2019).

International networks for local and regional governments

In addition to national associations, several international networks have undertaken significant efforts to support LRGs by providing data systems, indicators and methodologies to monitor progress and report achievements. Two experiences are presented in this section to illustrate the added value of this type of initiative.

Metropolis[31], the world association of major cities, developed a set of 38 indicators[32] with the London School of Economics and the Metropolitan Area of Barcelona with the objective of providing new empirical insights into metropolitan realities across the world that are comparable across jurisdictions. The indicators refer to six overarching themes: metropolitan governance, economic development, social cohesion, gender equality, sustainability and quality of life. The framework also adopts a gender perspective, disaggregating data whenever possible. Although there is no direct link with the 2030 Agenda, the system provides a relevant framework for comparing progress towards sustainable development between metropolises. Data sources range from IOs, national statistical offices and local and regional authorities to academic organizations and CSOs. The system provides over 2,700 data points that can be explored in a user-friendly manner through graphic visualization, charts and templates.

Finally, **CEMR**,[33], in cooperation with the French Ministry of Housing and Urban Development and Cerema (a public body supporting national and local authorities in the field of sustainable development), are the managing partners of the Reference Framework for Sustainable Cities (RFSC),[34] created to enable the implementation of the Leipzig Charter on Sustainable European Cities signed by European member States in 2007.

The RFSC offers different frameworks and a self-assessment tool to help cities become sustainable by applying a portfolio of 170 indicators to monitor sustainability at the local level. The 2030 Agenda is included as the global framework, and the tool also seeks to help LRGs integrate the SDGs in the design, implementation and monitoring of their sustainable development strategies.

Category 3:
National Governments

National Governments of sovereign States are key actors for the implementation of the 2030 Agenda. Apart from having the overall responsibility of overseeing, conducting and monitoring progress towards the SDGs, they also support and coordinate the involvement and contributions of different stakeholders across the country, including LRGs. The experiences of four national Governments are examined in this section.

According to the Third Local and Regional Governments' Report 'Towards the Localization of the SDGs',[35] 72 percent of 2019 VNRs mention LRGs as institutional actors and, in 2020, 55 percent of the 47 VNRs were developed by national Governments in consultation with LRGs.[36] However, the comparison of decentralized and unitary countries suggests that the establishment of multilevel coordination mechanisms that ensure cooperation for SDG achievement among different levels of government (municipal, regional, national) is a very complex undertaking. The lack of effective articulation is even more prevalent when it comes to coordinating SDG monitoring and reporting. Although many countries are making substantial efforts to strengthen their monitoring processes and collect localized data (e.g. Belgium, Benin, China, Colombia, Indonesia, Kenya, Finland, South Africa and Sweden, among others), several challenges persist in a more or less intense manner. In the first place, local realities, needs and aspirations are not well recognized, let alone integrated in national policies (i.e. national policies are not territorialized enough). Second, as a consequence of this, the indicators used in national policies are established at the national level, applied in the whole of the territory and based on national and international data rather than local data (whether produced by LRGs or by local stakeholders). As a result, the picture of the situation in a given country does not well reflect the specificities of the territories.

Many national Governments in federal and highly decentralized countries are strengthening their coordination mechanisms between central statistical institutes and bodies and those of LRGs. In **Spain**, for example, the Inter-territorial Statistics Committee (integrated by the central Government and the 17 Spanish regions) has created a specific working group on SDGs with a view to harmonizing the different regional methodologies and calculating the regional disaggregation of SDG indicators. The Spanish Government did not use regional or local data for its 2018 VNR, but its objective is to start using it for the 2021 VNR. In **Germany**, as earlier mentioned, the federal Government is involved in the multi-stakeholder initiative 'SDG-Portal'.

Other initiatives worth highlighting also take place in unitary countries. The **Chinese national Government** has led a pilot project in Deqing County in order to track progress towards the SDGs, assisted by a team of 30 researchers led by the National Geomatics Center of China together with several universities and high-tech enterprises.[38] The initiative adopted 102 indicators: 47 were adopted from the United Nations Inter-Agency and Expert Group on SDG Indicators (IAEG-SDG) framework, 6 were an extension, 42 were revised and 7 were new. They were adaptable to the local context and territorial specificities, comparable at the national and international levels and based on available data. Multiscale and multi-type geospatial and statistical data included topographic and land-cover maps, aerial and satellite images, disaggregated socio-economic information and environmental statistics, as well as data from social media. The involvement of a multidisciplinary team from national and local governments, as well as from other stakeholders, proved key for success, despite the initiative's rather top-down approach. However, the sophisticated methodology and the approach used to track SDG progress in Deqing require high technical capacities as well as technological and financial resources that are not always available in most local and regional contexts, which may hamper replicability.

In addition to China, several countries are currently seeking to foster coherence between national and local policies while taking advantage of, or improving, the existing national planning system.

Indonesia has in the recent years worked to improve coordination between the national and subnational tiers of government in order to facilitate SDG achievement. A presidential decree (No. 59, July 2017) formally required the integration of the SDGs and the national medium-term development plan into medium-term regional and local plans. It also called for the preparation of an SDG road map and several action plans, annual reports and biannual monitoring systems at the subnational level (National Planning Ministerial Regulation No. 7, 2018). To support the localization of the SDGs, the Government also developed technical guidelines and a set of metadata indicators as part of the provincial and local governments' vertical reporting process. Yet, according to the answers to a survey completed for the Third Local and Regional Governments' Report 'Towards the Localization of the SDGs' on the state of SDG localization, the requested indicators do not match the available data in many cases.[39]

The **Kenyan national Government**, together with the Council of Governors, supported all counties in the localization of the SDGs at the local level through the territories' County Integrated Development Plans. In this framework, the national Government helped to establish an SDG Unit within the Council of Governors that monitors SDGs at the local level, and they jointly elaborated guidelines for the development of a county integrated monitoring and evaluation system.[40] The counties are currently working in collaboration with the national Mon-

itoring and Evaluation Department to develop a county monitoring and evaluation framework incorporating the SDG indicators. Handbooks for monitoring have already been produced in four counties. Five counties (Busia, Kisumu, Kwale, Marsabit and Taita Taveta) have published their own VLRs, while Machakos County has disaggregated relevant indicators with the support of the Kenyan Statistics Unit and is able to track SDG achievement.[41] Some challenges, however, persist, such as inadequate linkages and coordination between the national and subnational levels of government, high political turnover and changes of administration, poor policy coherence, the need to strengthen infrastructure investment, inadequate monitoring and evaluation, difficulties in obtaining standardized and verifiable data, and the need for increased local stakeholder awareness and participation.[42]

Category 4:
International organizations

This section includes an analysis of various SDG monitoring systems for LRGs designed by international organizations (IOs). IOs draw "membership from at least three States, [have] activities in several States, and [their] members are held together by a formal agreement."[43] Hence, the organizations considered for the mapping range from worldwide organizations, such as United Nations agencies, and transcontinental IOs, such as the Organisation for Economic Co-operation and Development (OECD), to regional IOs, such as the EU, its institutions and agencies. In total, four initiatives are analysed in this section.

Several IOs are undertaking relevant efforts to support LRGs. These efforts have been analysed under three types of support: first, initiatives that provide tools, methodologies and indicators to support and strengthen the capacities of LRGs for selecting and developing relevant indicators; second, initiatives that provide expert support and assistance to cities for jointly developing their monitoring tools and relevant indicators; and third, initiatives to develop monitoring systems that are relevant for comparing the progress of cities and regions towards reaching the SDGs.

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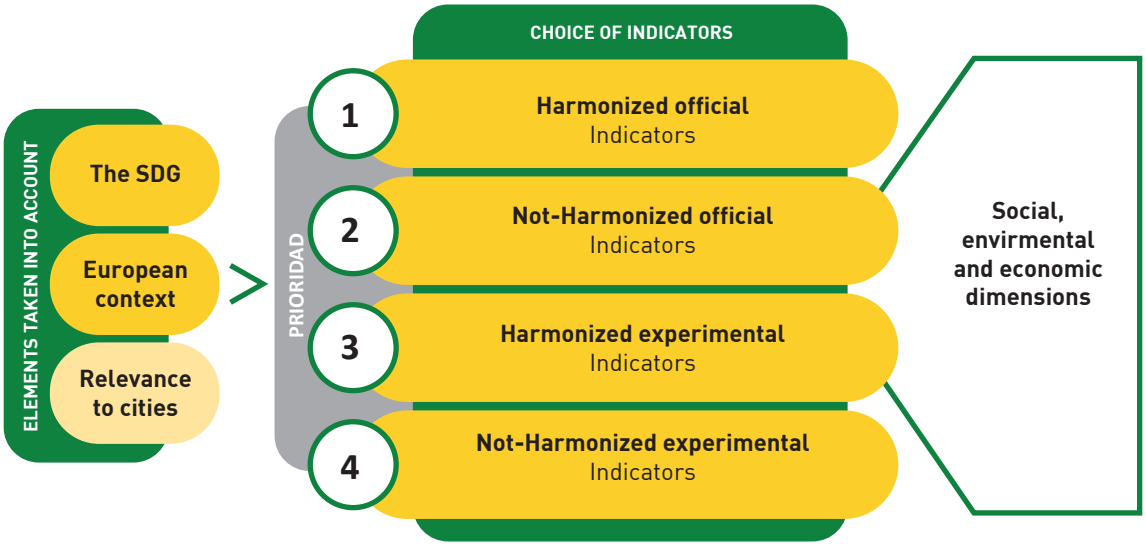
Tools, methodologies and indicators to support and strengthen the capacities of LRGs

The **'European Handbook for SDG Voluntary Local Reviews'**,[44] launched in February 2020 by the **EC Joint Research Council** (JRC), is a guide developed to facilitate the adoption of SDG indicators by European cities within the framework of the URBAN 2030 project. The Handbook provides 71 detailed examples and descriptions (including their advantages, limitations and data sources) of official (45) and experimental (26) indicators considered useful for European local governments (both harmonized and not

Figure 4 Urban indicators for SDGs - Rationale



Source: Alice Siragusa and Paola Proietti, "European Handbook for SDG Voluntary Local Reviews. A tool to support cities in the SDG monitoring", presentation given on 25 March 2020.

harmonized with the IAEG-SDGs, as shown in the figure below).

Among the indicators provided, 4 match the United Nations global indicator framework, 10 match the EU SDG Indicator Set 2019 and 6 match both the United Nations and the EU set. The main sources of indicators included in the system are the JRC (11), the Eurostat City Statistics Database (10), OECD (3), European Environment Agency (3) and the EC Directorate-General for Regional and Urban Policy (2), while some experimental indicators from selected cities, national Governments, CSOs and research institutions were also included as examples. According to the information provided by the JRC, some CSOs and experts were involved in the production and review of several indicator fact sheets included in the tool. For example, some experts from cities such as Helsinki took part in expert group meetings on SDG 11 indicators (organized with the Directorate-General for Regional and Urban Policy and UN-Habitat) on housing, public transport and land consumption. However, at the time of finalizing this study, the Handbook had not yet been tested with LRGs.

All data sources included in the Handbook are publicly available and accessible, and in principle only verified data are used; big and open data sources are included, but not citizen-generated information. There is a certain level of disaggregation of indicators (e.g. gender, unemployment, disability).

Initiatives that provide expert support and assistance to cities for jointly developing their monitoring tools and relevant indicators

On a global scale, the **UN-Habitat City Prosperity Initiative (CPI)**[45] aims to support local and national governments in establishing their own local monitoring and reporting mechanisms in line with SDG 11 and the New Urban Agenda

and based on six prosperity dimensions. Even though the CPI was created in 2012 before the adoption of the 2030 Agenda, it can be argued that this system covers one fourth of the SDG indicators, including all SDG 11 indicators. The CPI has a total of 72 indicators and three incremental scenarios that acknowledge the diversity and complexity of the local level: a basic one containing 32 indicators (in principle, available in any city and used for city comparisons and to measure overall performance), an extended one containing 60 indicators (which allows for the integration of indicators that are not commonly available in all cities but are of specific relevance) and a contextual one involving all 72 indicators (which includes additional indicators capturing the policies and actions implemented by the city).

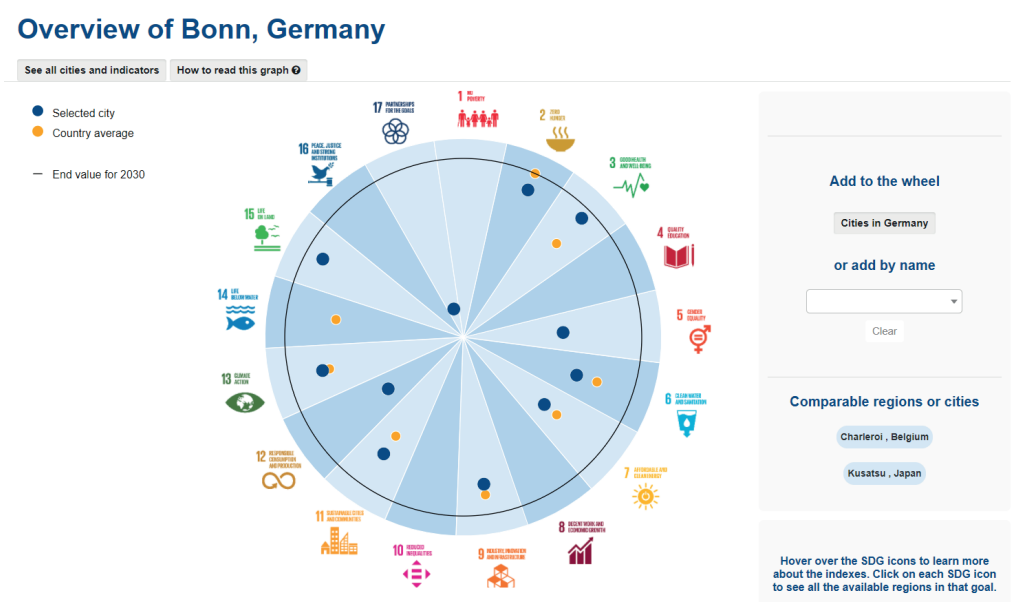
In terms of the direct support to LRGs and national Governments, the CPI methodology follows a multi-stakeholder approach. United Nations experts work with their counterparts (cities or national Governments) to identify the relevant CPI indicators and establish and implement their own monitoring system. This includes raising awareness and fostering ownership and collaboration among the different stakeholders involved, helping to create the necessary governance mechanisms, ensuring coherence and understanding of the results, and supervising implementation for accountability purposes. UN-Habitat is currently developing an integrated United Nations-wide urban monitoring framework based on the strengths and weaknesses of the CPI that allows for better SDG tracking.

The development of monitoring systems that are relevant for comparing the progress of cities and regions towards reaching the SDGs

The OECD territorial approach[46] and the European Spatial Planning Observation Network (ESPON) SDG localizing tool[47] allow for comparing LRGs in terms of SDG achievement. While the OECD territorial approach includes cities (functional urban areas) and regions of OECD member countries, Argentina and Colombia, the ESPON SDG localizing tool focuses exclusively on European regions.

The **OECD programme 'A territorial approach to the Sustainable Development Goals'** was launched in July 2018. It is a standardized and comparable localized SDG indicator framework to benchmark performances within countries and across regions and cities. It also allows cities and regions to analyse their strengths and weaknesses in relation to the SDGs and fosters policy dialogue to shape better local and regional policies. The approach was tested and compared in nine pilot regions and cities. A Community of Practice along with a Roundtable for SDGs were created, bringing together representatives of LRGs, national Governments, national and international networks of cities and regions, the EC, IOs and other stakeholders. OECD identified 135 indicators for measuring SDG progress in both cities—taking functional urban areas as the unit of measurement—and regions. Based on these indicators, composite indexes were developed for each of the 17 SDGs (containing 39 indicators for regions and 25 indicators for cities/functional urban areas) for communication purposes (see Figure V). These indexes include the indicators that best reflect core SDG targets with good data coverage across OECD regions and cities for each SDG but should only be seen as an entry point to further analyse the whole set of indicators.

Figure 5 Visualization for all the 17 SDGs, example of Bonn (DE)



Source: OECD, Measuring the distance to the SDGs in regions and cities database. Available at www.oecd-local-sdgs.org (accessed on 22 June 2021).

In the figure above, the selected city of **Bonn** (blue dots) is compared to the German average country performance (orange dots) and the other German cities that are part of the framework (grey dots) on the basis of OECD indexes defined for each SDG. Other cities can be added as well. By clicking on each of the SDGs, additional information on the progress can be obtained. For each SDG, the goal is described, as well as the different indicators that make up the composite index.

Second, the **ESPON** web application,[48] to be launched soon, aims to support LRGs in comparing their progress in the achievement of SDGs to other regions, identify inspirational peers and best practices that will help them to advance, and serve as information for national Governments to better target their support to regions on concrete SDGs and step up national progress. The platform will build on SDG reference indicator framework of Eurostat and validate its relevance for the regional level, which will include pilots in three European regions. Visually, every time an indicator is selected, an explanation of the indicator is provided. This is coupled with a link to goal-related initiatives in Europe from the tool's library, and it also offers values over different periods to track progress over time.

Category 5:
Other stakeholders

Apart from IOs, national Governments, LRGs or LRG associations, other stakeholders also contribute to SDG localization processes and monitoring. This section examines SDG monitoring systems developed by universities, think tanks and knowledge networks, as well as CSOs and multi-stakeholder platforms that integrate actors from the different categories of this study.

Universities

One of the universities engaging in SDG monitoring is the **Universidade Católica Portuguesa,** through its Centre for Studies and Opinion Surveys (CESOP). It has developed an index for measuring sustainable development at the municipal level[49]. This index allows 24 municipalities, representing all Portuguese regions and integrated in the CESOP Local Network, to obtain a diagnosis of their territories by applying 101 indicators measuring 64 targets.

In addition to the 24 municipalities, the CESOP Local Network comprises the Directorate General for Administration and Public Employment as the central government body, the Association of Municipal Assemblies and the Portuguese Association for Quality, which integrates professionals and collective entities representing all sectors of activity.

In general terms, the indicators follow those developed by the IAEG-SDG, with adaptations to match the Portuguese context. Indicators are only included if they are available for all Portuguese municipalities. Concretely, this means that some indicators are identical to those of the IAEG-SDG, others are proxies and some are adapted indicators. Data are based on Eurostat,

OECD and local sources (such as Statistics Portugal, the Portuguese Environment Agency and several directorates-general). In addition to this effort, in 2020, CESOP launched the third version of the Municipal Sustainability Index Portal, a dashboard for users to navigate online through these indicators.[50]

Think tanks and knowledge networks

The **Sustainable Development Solutions Network (SDSN)**, along with the Bertelsmann Foundation, is one of the most influential research-based platforms working for SDG achievement, as shown by the initiatives developed in Italy[51] and in the United States[52]. **REDS**, the Spanish partner of SDSN, has shown great dynamism in recent years, raising awareness on the relevance of the 2030 Agenda and promoting the engagement of different stakeholders such as universities, the private sector and LRGs. REDS published a study in 2018[53] that provided a first measurement of progress towards the SDGs in 100 Spanish cities following the SDSN methodology already developed by SDSN United States. It consisted of a set of 85 indicators in line with those defined by IAEG-SDG[54] and stemming from national and European data sources. However, no reference to local or regional data is made, which makes contextualization more difficult. Moreover, many of the indicators are calculated at the provincial (Nomenclature of Territorial Units for Statistics NUTS3 level) and not the municipal level (e.g. water supply or social housing). This poses a challenge for effectively measuring local progress.

Another SDSN initiative is the **Local Data Action Solutions Initiative**[55] programme, which aims to identify replicable methods for subnational SDG monitoring for local decision-making. This is supported through a repository of case studies and technical knowledge on how to monitor the SDGs at the city and regional levels. Experts assist cities worldwide in identifying relevant indicators and data sources together with city staff, technical partners and relevant stakeholders. This initiative offers concrete place-based support through the Initiative's micro-grant programme for locally generated data and lessons learned launched in 2018.

Another relevant initiative that falls under this category is **Mistra Urban Futures**, a 10-year knowledge and research programme (2010–2019) for sustainable urban development based in Gothenburg that brought together academics, professionals and other stakeholders[56]. This programme conducted a comparative study on how the cities of Cape Town (South Africa), Gothenburg (Sweden), Kisumu (Kenya), Malmö (Sweden), Sheffield (United Kingdom), Shimla (India) and Buenos Aires (Argentina) interpreted, implemented and engaged with the SDGs.[57] Two reports were published on the localization process of the 2030 Agenda in Gothenburg and in Cape Town. To measure progress in Gothenburg, Mistra Urban Futures used the indicators provided by the Swedish RKA through their 'Kolada' database. In the case of Cape Town, the report built on SDG 11 indicators for sustainable cities and communities, using available national and local data sources. This provided clear evidence on the gaps and difficulties involved in using most of the indicators defined to measure SDG 11 (11.3.1, 11.4.1, 11.5.2, 11.6.1, 11.a.1, 11.b1, 11.e.1) at the city level. For the elaboration of both reports, the centre worked hand in hand with city council officials.

The **International Institute for Sustainable Development (IISD),** a Canadian think tank, developed an open-source web-based Community Indicator System (CIS) called 'Tracking Progress'[58] to monitor the SDGs. 'Tracking-Progress' allows communities to customize, collect and visualize indicator data on key issues of community well-being using maps, graphs

and charts, as well as track progress against the SDGs.

The first CIS platform using the IISD open-source tool 'Peg'[59] was launched in Winnipeg in June 2018. It provides a set of over 60 indicators grouped into seven theme areas: built environment, basic needs, economy, education and learning, health, natural environment, and social vitality and governance. Although it uses a different language, the themes as well as the indicators provided are aligned with the SDGs. The platform pulls together data from many sources (Statistics Canada, Province of Manitoba, Manitoba Centre for Health Policy, City of Winnipeg, etc.). It uses graphs and maps to measure data and identify changing trends over time.

Civil society organizations

Under this last (and heterogeneous) category, one of the most relevant instruments is '**Know Your City**'60 a global campaign led by **Slum Dwellers International, UCLG of Africa** and **Cities Alliance** that offers slum dwellers city-wide data and information on informal settlements in order to foster better decision-making processes at the local and national levels. According to the organizations involved, this initiative creates alternative systems of knowledge that are owned by the communities and have become the basis of a unique social and political argument that supports an informed and united voice of the urban poor. This repository should also serve to measure progress on SDG achievements in cities with slums—which is the case for most African and Asian urban areas—with a particular focus on the principle of leaving no one behind..

Multi-stakeholder collaborations

The **WCCD**[61] is a multi-stakeholder platform integrated by a core group of 19 founding cities, United Nations agencies (the United Nations Environment Programme and the United Nations Office for Disaster Risk Reduction), city networks (ICLEI and CityNet), private companies (Siemens and Philips), national statistics organizations (China, Mexico and the Netherlands), regional governments (Ontario) and universities (Toronto). WCCD implements the ISO 37120 'Sustainable cities and communities: Indicators for city services and quality of life' and offers an open data portal to showcase city data and a registry of certified cities[62]. However, as can happen with other complex systems, the complexity of its methodology and the amount of indicators and data required to monitor progress makes its implementation more accessible to big cities with relevant resources and capabilities than to small- and middle-sized cities with fewer resources.

Cross-cutting comparative analysis

This section seeks to provide comparative insights on the selected LMSs by analysing cross-cutting dimensions of special relevance for understanding their respective advantages and challenges. Eight key dimensions have been considered: purpose of LMSs, SDG coverage, types of indicators, data sources, governance systems, data frequency and regularity, reporting mechanisms and monitoring costs.

1. Purpose of local monitoring systems

Most of the LMSs analysed in this study were designed to measure progress and report on the implementation of the 2030 Agenda at the local and regional levels. However, they might differ on their specific purpose. Some systems were part of broader efforts to inform and improve policymaking, other systems were conceived as tools to support LRG monitoring efforts and a final group of LMSs aimed to benchmark subnational contributions. Likewise, the analysis shows other systems that are not formally aligned with the 2030 Agenda—like the CPI of UN-Habitat or the Metropolis' indicators—but which focus on monitoring sustainable urban development on the basis of alternative reference frameworks.

The main purpose of the first set of LMSs considered is to **inform the policymaking process.** These systems, mainly developed by LRGs, are designed to provide information and evidence-based data that can serve to describe a certain reality, track progress towards SDGs and/or measure the effectiveness of strategies, policies and concrete solutions. As shown in the previous section, differences in terms of quality and effectiveness of systems might be partly due to unequal levels of capacities and resources.

According to the analysis conducted, the systems that better respond to this purpose are those which are: (a) designed to provide evidence-based data and information (including statistics and cartography); (b) integral and complex in nature; (c) based on comprehensive sets of reliable indicators and data sources; (d) managed in a collaborative framework (internal, multilevel and multi-stakeholder); and (e) key for making LRGs accountable and for reporting purposes.

Beyond those implemented by LRGs themselves, other systems provide comprehensive information and highly relevant data for improving LRG policymaking processes in different areas. An example worth mentioning is the 'Tracking-Progress' system, the open-source web-based CIS developed by IISD in Canada. Through a comprehensive set of indicators, the CIS allows cities to assess how much progress has been made and what remains to be done before 2030 in different domains. Collecting and communicating data at the local level can help communities identify strengths and areas where improvement is needed to achieve the SDGs locally.

The second set of LMSs includes systems **aimed at supporting LRGs in their efforts to track SDGs and report on progress.** National associations, international city networks, IOs, universities and research centres have developed tools and methodologies that support cities and regions worldwide in measuring their contributions to the 2030 Agenda and preparing their VLRs.

Some organizations have developed **tools** to offer guidance to LRGs. These tools include methodologies and roadmaps for preparing VLRs, best practices, indicators and data sources. Some of the tools are available and contextualized at the local or regional level (e.g. the set of indicators prepared by the Flemish association VVSG), at the national level (e.g. in Germany, the guidelines provided for LRGs to prepare VLR and the project to develop indicators for municipalities were led by the national government,), and in Kenya, it counted on the support of the local government association, academia and a foundation) and at the international level (e.g. the European Handbook of the JRC or the RFSC).

Following a more tailored approach, several IOs, national Governments and research centres are accompanying LRGs in the production of their reports. These experiences include the CPI of UN-Habitat and the reports produced in many cities to measure prosperity (not specifically aligned with the 2030 Agenda); the pilot project implemented by the Chinese Government in Deqing; Mistra Urban Futures, with the reports of Gothenburg and Cape Town; and the Institute for Global Environmental Strategies[63] that has accompanied the Japanese cities of Shimokawa, Kitakyushu and Toyama[64].

Some of the tools and methodologies used to support the reporting process have been designed in close collaboration with LRGs. This is the case for the set of indicators developed by the Deutscher Städtetag association and VVSG, or the reports prepared by Mistra Urban Futures for Gothenburg and Cape Town that have been prepared under the supervision of city council officials. Involving LRG staff ensures better contextualization of the measurement process as well as more receptiveness to local voices and views.

On the other hand, the Deqing pilot report followed a top-down approach, whereby a team of national experts defined the reporting path to be followed by the county. In the same way, with less resources and technology, the Government of Kenya guided LRGs in their reporting efforts, defining methodology, processes and indicators. However, it is important to note that top-down approaches can lead to technocratic and expert-based configurations of reality that may sometimes affect the effectiveness of monitoring processes.

Finally, a third set of LMSs includes systems whose main purpose is to **benchmark LRG** performances towards achieving the SDGs and to compare them to their peers at the national or international level. Numerous systems can be included in this group, such as WCCD, the territorial approach of OECD and the Metropolis' indicators providing an international comparison. Others, such as the reports prepared by CESOP (Portugal) and REDS (Spain), provide a national overview of how cities are performing.

OECD, WCCD, ESPON and Metropolis use highly professional tools, dashboards, graphs and maps to present data comparisons. The use of the information available is intuitive and useful for enriching presentations and reports. The information provided by some of these systems, especially by WCCD and OECD, is also relevant for informing the policymaking process at the local and national levels.

2.Sustainable Development Goal coverage

The systems analysed address the 2030 Agenda and its SDGs to different extents and in different ways. Some LMSs define mechanisms to track the 17 SDGs, while others focus on specific SDGs and even on some of their associated targets. There are also systems that use alternative frameworks, such as the five pillars of sustainable development or other thematic structures.

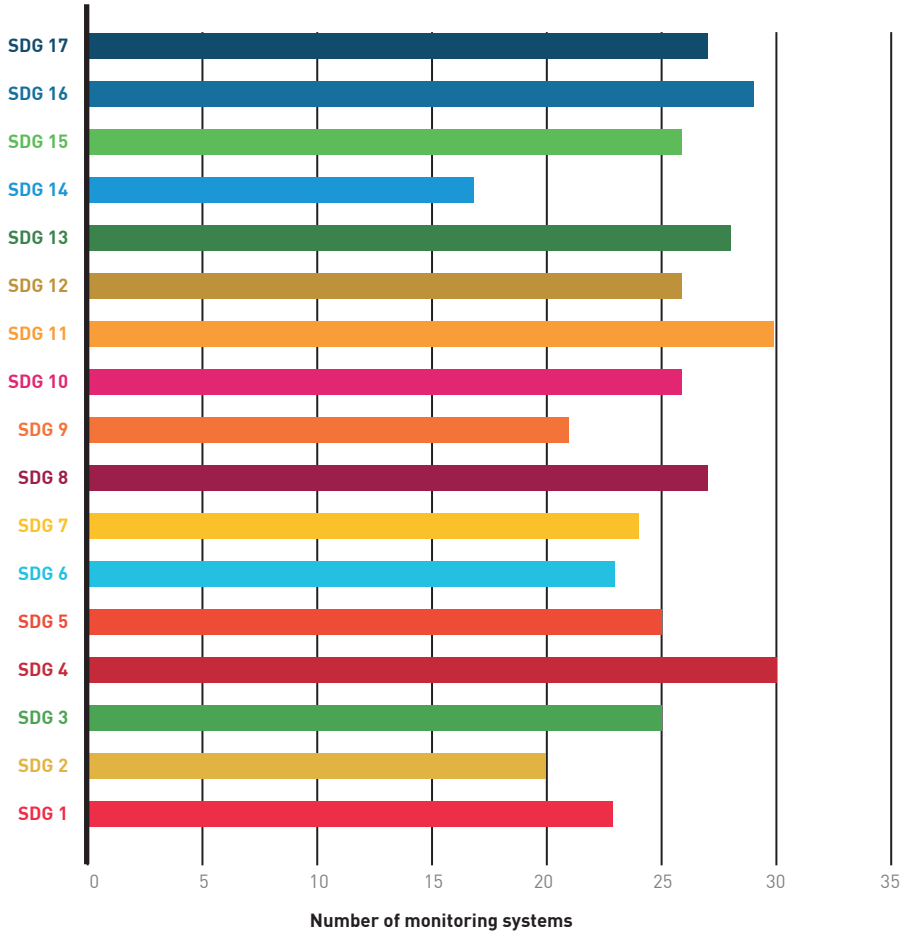
Forty-seven percent of the systems analysed[65] define or use indicators to track the 17 SDGs. This is the case for most of the systems proposed by LRG associations (e.g. Deutscher Städtetag and VVSG), international networks (WCCD and the RFSC), IOs (JRC and OECD) and research institutions and CSOs (IISD, CESOP and REDS). On the other hand, individual LRGs tend either to pursue the 2030 Agenda as a whole (e.g. Andalusia, Barcelona, Oaxaca, São Paulo[66]) or focus on specific SDGs (e.g. New York, which provides information on SDGs 6, 7, 11, 12 and 15; Helsinki, which focuses on SDGs 4, 8, 10, 13 and 16; and

New Taipei[67], which addresses SDGs 4, 6, 7, 8, 10, 11, 12, 13, 15, 16 and 17).

The following figure shows the level of coverage provided by 35 of the systems analysed and the most prioritized goals for monitoring. It provides evidence on the cross-cutting alignment between SDGs and the competences and responsibilities of LRGs.

SDG 4 (education) and SDG 11 (sustainable cities) are the goals that receive more attention for monitoring purposes (83 percent of the systems approach them) followed by SDG 16 (peace, justice and strong institutions, 80 percent), SDG 13 (climate action, 77 percent), and SDG 17 (partnerships, 75 percent). On the lower side, SDG 14 (life below water) is only covered by 47 percent of the systems, fol-

Figure 6 SDG coverage by monitoring system



SDG coverage by monitoring system. Colours according the 5 Ps of sustainable development (People in red, Prosperity in blue, Planet in green, Peace in purple, and Partnerships in orange) **Source:** Author. r.

lowed by SDG 2 (hunger) by 55 percent, SDG 9 (industry, innovation and infrastructure) by 58 percent and SDG 1 (poverty) by 63 percent.

Some of the systems go beyond the Goals and track progress focusing on specific targets. In doing so, these systems provide a more precise picture of the achievements (through more precise indicators) and allow for greater contextualization of their monitoring efforts. This is the case, for example, for the city of Buenos Aires , which focuses on the following targets:

Table 1 SDG targets for the city of Buenos Aires

SDG	TARGETS INCLUDED	NOT INCLUDED
4 QUALITY EDUCATION	4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.a	4.b, 4.c
5 GENDER EQUALITY	5.2, 5.4, 5.5, 5.6, 5.c	5.1, 5.3, 5.za, 5.b
8 DECENT WORK AND ECONOMIC GROWTH	8.2, 8.3, 8.5, 8.6, 8.9	8.1, 8.4, 8.7, 8.8, 8.10, 8.a, 8.b
10 REDUCED INEQUALITIES	10.2, 10.3	10.1, 10.4, 10.5, 10.6, 10.7, 10.a, 10.b, 10.c
13 CLIMATE ACTION	13.2, 13.3	13.1, 13.a, 13.b
16 PEACE, JUSTICE AND STRONG INSTITUTIONS	16.3, 16.5, 16.6, 16.7, 16.10	16.1, 16.2, 16.4, 16.8, 16.9, 16.a, 16.b

Source: Author

A small minority of LMSs use alternative frameworks to measure sustainable development. The 205 indicators proposed by the Flemish association VVSG are structured around the five pillars of sustainable development (people, prosperity, planet, peace and partnership). Likewise, IISD has integrated the SDGs into its indicator framework (structured around seven themes: built environment, basic needs, economy, education and learning, health, natural environment, and social vitality and governance), and the 'Mandala' developed by the Brazilian CNM builds upon four dimensions: institutional (SDG 17), economic (SDGs 8, 9, 10, 12), social (SDGs 1, 2, 3, 4, 5, 7, 11 and 16) and environmental (SDGs 6, 13, 14, 15) sustainability.

3. Types of indicators

According to UN-Habitat, about one third of the 231 SDG indicators can be measured at the local level, making it an important player for monitoring progress towards sustainable development.[68] Whether through the United Nations indicators or alternative ones, this cross-cutting analysis shows a wide range of approaches and methodologies for the definition and use of indicators to track progress in the implementation of the 2030 Agenda at the local and regional levels.

Some of the systems analysed have been **created ad hoc to track progress towards the implementation of the 2030 Agenda**. They build on existing indicators (collected from different sources) coupled with a new and specific set issued to monitor SDGs. This category includes systems developed by LRGs (Barcelona City Council, Metropolitan Strategic Plan of Barcelona (PEMB) [Pla Estratègic Metropolità de Barcelona] , the government of the Basque Country), those created to support or guide LRGs in their monitoring and reporting process (JRC, Deutscher Städtetag, VVSG, Kenya) or to benchmark their performance (OECD, WCCD, CESOP, REDS, CNM).

Other actors use **already existing sets of indicators and data sources** established to monitor different strategies or public policies at the local and regional levels. These efforts follow a 'cherry-picking' approach for selecting appropriate indicators and providing evidence on the achievements or the gaps to be highlighted in a report. This is the case for most VLRs and sustainable development reports produced by LRGs themselves (New York, Helsinki, Mannheim , Bristol , Buenos Aires, La Paz, Suwon) or with the support of research institutions (Gothenburg, Cape Town, Kitakyushu).

Other systems show the difficulties involved in translating United Nations indicators into local and regional realities. A significant part of the 231 indicators respond to national contexts and are defined to measure national development policies rather than local policies or contexts. According to an analysis led by **PEMB** that focused on the reality of the Barcelona metropolitan area, 100 of the 238 United Nations indicators identified were considered 'suitable' or 'adaptable' to local realities, 38 required revising, and the remaining 100 were rejected. The following table shows three examples related to SDG 11 on sustainable cities and communities.[74]

Table 2 IAEG-SDG and PEMB comparison

IAEG-SDG indicator	PEMB analysis
11.1.1 Proportion of urban population living in slums, informal settlements or inadequate housing	Required revising: the original indicator was rejected because it 'lacked concretion' but other similar indicators were adopted, such as the percentage of overcrowded dwellings or the number of citizens at risk of 'residential exclusion'.
11.2.1 Proportion of population that has convenient access to public transport, by sex, age and persons with disabilities	Suitable, with local data available
11.5.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population	Rejected[a]

Source: Author.

a. No further information is given as to why indicator 11.5.1 has been rejected.

WCCD has made a similar effort based on ISO 37120 certified city data. At the country level, the WCCD framework uses all its 132 indicators (of the official 232) to measure the distance to the targets. On the contrary, the localized indicator framework, based on proxy indicators, focuses on a subset of 64 indicators to produce indexes that measure the distance of regions and cities to the SDGs.[75] The reason for adopting this approach is that data availability tends to be lower at the subnational level. The following table shows some examples of the alignment proposed.

Table 3 IAEG-SDG and WCCD comparison

IAEG-SDG indicator	WCCD indicator
4.6.1 Proportion of population in a given age group achieving at least a fixed level of proficiency in functional (a) literacy and (b) numeracy skills, by sex	Percentage of students completing primary education: survival rate
4.7.1 Extent to which (i) global citizenship education and (ii) education for sustainable development, including gender equality and human rights, are mainstreamed at all levels in (a) national education policies; (b) curricula; (c) teacher education; and (d) student assessment	Not included
11.2.1 Proportion of population that has convenient access to public transport, by sex, age and persons with disabilities	Percentage of commuters using a travel mode other than a personal vehicle Annual number of public transport trips per capita Km of high capacity public transport system per 100,000 population Km of light passenger public transport system per 100,000 population
11.4.1 Total expenditure (public and private) per capita spent on the preservation, protection and conservation of all cultural and natural heritage, by type of heritage (cultural, natural, mixed and World Heritage Centre designation), level of government (national, regional and local/municipal), type of expenditure (operating expenditure/investment) and type of private funding (donations in kind, private non-profit sector and sponsorship)	Not included
13.1.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population **13.1.2** Number of countries that adopt and implement national disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015–2030 **13.1.3** Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with national disaster risk reduction strategies	Number of disaster related deaths per 100,000 population
13.a.1 Mobilized amount of United States dollars per year between 2020 and 2025 accountable towards the $100 billion commitment	Not included

Source: Author.

Some systems, such as the set of indicators provided by the Flemish association VVSG, include **cross-thematic indicators** (28 in the case of VVSG) that are relevant for various targets: tax income below critical threshold (SDG targets 1.2 and 10.1), affordability of housing (SDG targets 1.4 and 11.1) and greenhouse gas emissions (SDG targets 3.9, 9.4 and 13.3). Some others have indicators that are specific for only one SDG.

In terms of the **origin and harmonization** of data, most indicators used by the different systems stem from official sources (local and regional sets, national statistical and data systems, Eurostat, World Bank, etc.) or experimental, but highly reliable, sources (academic databases, research, philanthropies, experimental indicators proposed by public institutions, etc.).

The JRC set presents harmonized official indicators, as well as locally collected and experimental ones, that can inspire cities willing to carry out self-assessments. The following is an example of the indicators proposed for SDG 13 on climate action.

Figure 7 JRC proposed indicators for SDG 13

SDG	Indicator	Type	Source	Coverage	Availability
13 CLIMATE ACTION	People affeted by disasters	official	Emergency Events Database (EM-DAT)	global	Municipalities affected by disasters
	Greenhose gas emissions	official	Gloval covenant of Mayors	global	Signatory municipalities
	Urban flood risk	experimental	Join Research Centre	UE-28	800 cities
	Heat vulnerability	experimental	Econten - Stadt Wien	Wien	Wien

Source: Alice Siragusa and others, European Handbook for SDG Voluntary Local Reviews (Luxembourg, Publications Office of the European Union, 2020).

According to the SDSN methodology, sustainable development indicators should be "simple (one single variable) and outcome-oriented". However, choosing between input and outcome measures should be done in a pragmatic manner, and input metrics can sometimes be key in driving and tracking the changes needed for sustainable development.[76] The systems analysed in this study present a wide range of typologies. Both simple and complex or composite indicators are used, as well as input, output and outcome indicators. The following table shows some examples:

Table 4 Examples of types of indicators

Type	Indicator	Source
Simple	**SDG 13** Greenhouse gas emissions measured in tonnes per capita	WCCD (2019)
Composite	**SDG 11** Cultural Creative Cities Index	JRC. European Handbook for SDG VLR
Input	**SDG 7** Reduce the city's greenhouse gas emissions by 80 percent by 2050 relative to 2005 levels	NYC VLR
Outcome	**SDG 9** Highly skilled workers	SDGs Indicators for Municipalities
Quantitative	**SDG 4** Primary education student/teacher ratio	WCCD (2019)
Qualitative	**SDG 11** Condition of the residence	VVSG

Source: Author.

Despite the heterogeneity of existing methodologies, many indicators might be considered mainstream and common to different LMSs. The following table illustrates some of them:

The wide variety of indicators shown in this analysis reveals the complexity of a highly relevant but challenging need for LRGs: establishing robust monitoring systems to track SDGs on the basis of reliable indicator sets.

Table 5 Comparison of SDG indicators across monitoring systems

SDG	SDG Indicator	PEMB	VVSG	WCCD	JRC	REDS
5	**5.5.1** Proportion of seats held by women in (a) national parliaments and (b) local governments	Share of women with political representation in the city council	Share of women in managerial positions in the municipality	Women as a percentage of total elected to city-level office	Seats held by women in municipal governments	Share of elected women in municipal elections
SDG	**SDG Indicator**	**Bristol**	**Deutscher Städtetag**	**WCCD**	**OECD**	**CESOP**
7	**7.2.1** Renewable energy share in the total final energy consumption	Installed capacity of renewable energy	Share of renewables energies in energy consumption	Percentage of total energy derived from renewable sources, as a share of the city's total energy consumption	Percentage of total electricity production that comes from renewable sources	Share of renewable energies in total energy consumption (percentage)
SDG	**SDG Indicator**	**Málaga**	**RFSC**	**JRC**	**OECD**	**REDS**
10	**10.4.2** Redistributive impact of fiscal policy	Gini Index	Gini Index	Gini Index	Gini Index	Gini Index
ODS	**Indicador ODS**	**TAIPÉI**	**RFSC**	**WCCD**	**CCI**	**REDSo**
11	**11.7.1** Average share of the built-up area of cities that is open space for public use for all, by sex, age and persons with disabilities	Green space (hectares) per 100,000 population	Green zones and recreational areas proximity	Green area (hectares) per 100,000 population	Population without green urban areas in their neighbourhood	Green urban areas and sports and leisure facilities

Source: Author.

4. Data sources

As stressed above, the availability of data is crucial for implementing efficient monitoring systems based on reliable indicators. According to SDSN, indicators should draw on well-established sources of both public (local, regional, national, international) and private data and be consistent to enable accurate measurement over time. Local and regional data can be gathered at the local or regional level or be the result of the disaggregation of national, regional or international data. As such, across the systems analysed, indicators can be found that use data produced by LRGs, national authorities, IOs, knowledge-based institutions, civil society, philanthropies and private companies. The following table provides some examples:

Table 6 Origin of data used by indicators

Data source by type of stakeholder	SDG indicator system	Name of stakeholder	SDG	Indicator
LRG	Sistema Indicadores de Género BA [Buenos Aires Gender Indicators System]	Buenos Aires	**SDG 5**	Percentage of women legislators in the city of Buenos Aires
LRG network	WCCD (data provided by member cities)	WCCD	**SDG 11**	Annual numbers of public transport trips per capita
National authority	Statistics Finland, Labour Force Survey	Helsinki VLR	**SDG 13**	Employment rate
Regional authority	Eurostat City Statistics Database	JRC	**SDG 5**	Gender employment gap
International organization	Food and Agriculture Organization of the United Nations Statistical Database land data	RFSC	**SDG 15**	Proportion of agricultural area under productive and sustainable agriculture
Academia	Fedea[77]	REDS	**SDG 10**	High income concentration
CSO	Ecologistas en Acción [Ecologists in Action]	PEMB	**SDG 3**	Air quality
Philanthropy	Bertelsmann Fundation	DS	**SDG 1**	Poverty (child, youth and elderly poverty)
Private sector	Komosie[78]	VVSG	**SDG 12**	Reuse of goods through a recycling shop

Source : Author.

The analysis of **data sources** used to build the different systems mapped in the study allows certain trends to be identified. LRGs tend to use local and/or regional data to fit their systems and to report progress, whereas other stakeholders (associations, international networks, national Governments, IOs, research institutions, CSOs, etc.) use sources in a more balanced way, despite tending towards national and international data sources and sometimes producing their own data.

The VLR produced by the city of Helsinki provides interesting insights; 67 percent of the indicators used to monitor SDGs are based on local sources while 33 percent are obtained from national and international data providers. The VLR reveals a cross-cutting effort to provide data that involve different units of the City Council, such as the City Executive Office, the urban and education divisions, the police department and other municipal bodies, such as the environmental operator HSY.

In comparison, international sources dominate the set of indicators proposed by the JRC Handbook (61 percent). However, the system also resorts to other sources, i.e. national (21

percent), local (10 percent) and from other stakeholders (8 percent, including researchers, CSOs and private companies). In this case, indicators based on these sources are used as examples and require further adaptation to the context of LRGs.

Although most of the systems tend to use official data, sometimes there are data gaps or their quality is contested; hence, non-governmental sources prove useful. For example, the Slum Dwellers International 'Know Your City' portal is an extremely valuable source on slum populations and living conditions. According to the organization, the "verification and validation of official data by non-official sources like these is instrumental in holding policymakers to account".[79]

Most of the systems analysed contain **quantitative data and qualitative information, statistics and cartography**. Quantitative information is collected through different types of public registers, such as cadastres, surveys and specific research. Qualitative information is provided through surveys, opinion polls and interviews, as well as specific research. New sources such as **big data** or **citizen-generated data** are being used by highly resourced LRGs, although they are still exceptional and limited to certain pilot initiatives (i.e. Barcelona City Council[80]).

Standardizing and harmonizing local and regional data sources is a complex challenge and remains an unrealistic task for some territories. There are, however, relevant efforts that must be taken into account, as they might show certain paths to follow (CPI, WCCD). For this, keeping data updated on a regular basis and the channels for cities and regions to deliver information will be key.

5. Governance systems

The most effective systems designed to monitor public policies are based on **joint and coordinated efforts** between different levels of government and the involvement of stakeholders such as CSOs, the private sector and knowledge-based organizations. However, when it comes to monitoring the 2030 Agenda there is still a long way to go. The systems mapped and analysed in this study offer useful insights that are worth considering for developing effective collaborative monitoring mechanisms.

The following table shows different systems defined in collaboration between various partners, whether in a multilevel or multi-stakeholder framework.

As stated in the report of the Global Taskforce of Local and Regional Governments to the 2020 High-Level Political Forum,[81] the involvement of subnational levels of government in national mechanisms for implementing the 2030 Agenda remains limited. This is particularly the case when it comes to coordinating SDG monitoring efforts. Two trends can be highlighted.

A **first group** of countries (including Kenya, Indonesia and the Philippines[82]) has fostered the coherence of national and local sustainable development strategies through national planning systems. This has led to a series of processes whereby central Governments have provided LRGs with guiding tools to monitor SDGs and report progress. However, efforts made by LRGs have been hindered by their limited capacities and resources and the difficulty of accessing available and reliable local data.

Table 7 Types of monitoring partnerships

SDG Indicator system: Stakeholders involved				
LRG + LRG association + national Government				
Busia County Voluntary Reporting on SDGs	Busia County (Kenya)	Council of Governors	Kenyan national Government	
Asociación de gobiernos locales y regionales + gobierno nacional + centro de investigación + filantropía				
SDG Indicators for Municipalities	German Federal Institute for Research on Building	German County Association, Association of German Cities	German Institute of Urban Affairs	Bertelsmann Foundation
LRG association + national Government				
Reference Framework for Sustainable Cities	CEMR		28 EU member States, represented by France	
LRG + research institution				
Gothenburg 2030 Report	City of Gothenburg (Sweden)		Mistra Urban Futures (Sweden)	
Kitakyushu SDG Report	City of Kitakyushu (Japan)		Institute for Global Environment Strategies (Japan)	
Municipal Sustainability Index	20 Portuguese municipalities		CESOP (Portuguese Catholic University)	
Research institution + CSO				
Peg Winnipeg (Canada)	IISD (Canada)		United Way Winnipeg (Canada)	

Source : Author.

Applying a more horizontal approach, the RFSC is currently led and managed by a cross-cutting alliance between the French Government (representing EU member States) and CEMR (representing LRG associations and networks) with the support of the EC.

A **second group** of countries (including Germany, Italy, South Africa and Sweden) has established multilevel and multi-stakeholder mechanisms for designing monitoring and reporting mechanisms adapted to both necessities and interests, as well as the capacities and available resources of LRGs. This is the case for the Swedish RKA, a collaborative effort between the national Government and SALAR; the Municipal Barometer[83], a web-based portal developed by the South African Local Government Association in close collaboration with Statistics South Africa; and the multi-stakeholder SDG Indicators for Municipalities in Germany.

The multi-stakeholder, public-private dimension of the German case offers valuable insights. It fosters coherence between national and subnational strategies, strengthening collaborative frameworks through a whole-of-government and whole-of-society approach. The Italian SDG Portal developed by the Eni Enrico Mattei Foundation and the Italian association of CEMR, with the support of the Bertelsmann Foundation, has followed a similar strategy.

Following this collaborative approach, the alliances built between research institutions and LRGs to monitor SDGs and deliver reports contribute to improving the quality of accountability efforts led by LRGs, while reinforcing research by making local realities and data available. This is the case for the collaboration between Mistra Urban Futures and the City of Gothenburg (Sweden), the African Centre of

Cities and the city of Cape Town (South Africa), the city of Kitakyushu (Japan) and the Institute for Global Environment Strategies, and the Municipal Sustainable Index elaborated in a common effort between CESOP and 24 Portuguese cities.

Finally, the CIS developed in Canada by IISD based in Winnipeg is worth highlighting. It was developed in close collaboration with United Way Winnipeg, a community fund of local agency partners, all levels of government, special partnerships, caring workplaces and thousands of donors and volunteers.

6. Data frequency and regularity

Ensuring that data are available constitutes an essential element for guaranteeing better measurement of SDG achievement and improved decision-making as a result. Keeping data updated in a frequent and regular manner is equally important. This involves collecting, processing and introducing data into the LMS. The more frequent the data collection, the higher the quality of results.

The German 'SDG-Portal' indicators, for example, are updated at least every three years, depending on the difficulty and resources needed for each indicator:[84] to monitor progress on SDG 1 on poverty, data is collected and displayed yearly; the percentage of women in city and district councils is updated every two years; and data on the improvement of water quality are updated every three years. The Andalusian LMS collects and disseminates the data on a yearly basis[85].

7. Reporting, providing open data and benchmarking

As noted throughout this study, a growing number of LRGs worldwide have developed their own sustainable development reporting systems, whether through their own mechanisms and resources; by following methodologies proposed by other institutions; or under the guidance of national Governments, IOs or research institutions. Since 2017, at least 50 **VLRs** have been collected and, according to UCLG, many other LRGs are currently in the process of producing VLRs.[86]

The approach of these reports differs considerably, ranging from descriptive exercises, the main added value of which is to show commitment to the 2030 Agenda and support efforts to mobilize local stakeholders, to results-oriented documents, prepared through participatory and collaborative procedures and based on reliable sets of indicators, information systems and data sources.

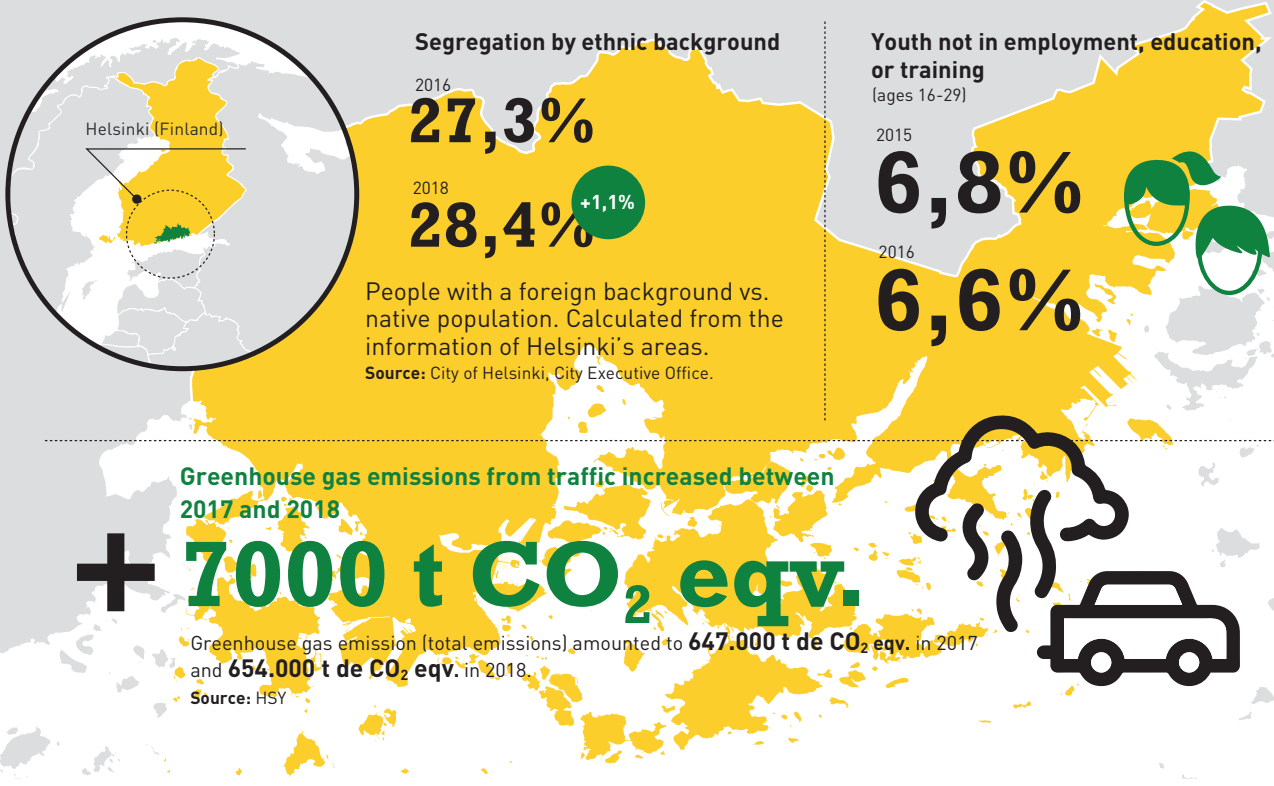
For example, Helsinki has channelled the implementation of its LMS into a VLR. The city has used a wide range of data sources, both local and national. In order to report on employment rates, Helsinki has used data from Statistics Finland, the Ministry of Economic Affairs and Employment and the Finnish National Agency for Education. Data on geographical segregation has been collected by the city of Helsinki, and greenhouse gas emissions data have been collected by the municipal body HSY, among others.

Figure 8 Reporting, providing open data and benchmarking

* Provincial and state-level governments. **Source:** UCLG and UN-Habitat, Guidelines for Voluntary Local Reviews, vol. 1, A Comparative Analysis of Existing VLRs (Barcelona, 2020).

Beyond reports, some LRGs have developed **open data portals** where stakeholders and citizens have access to data, statistics, cartography and other types of information. In Spain, regional statistical institutions like the Andalusian Institute of Statistics and Cartography might be a good example. Likewise, certain national associations and international networks are also offering open data with robust resources to elaborate comparisons. The WCCD platform is one of the most advanced and comprehensive local data-based systems developed to date. These tools are often very useful for **benchmarking** purposes, as stated above, for Governments (OECD constituency) to report progress at the national level and for LRGs to compare themselves with other cities and regions. This is the case for the tool developed by OECD, analysed above. The picture below compares Amsterdam, Barcelona, Boston, Cape Town and Melbourne.

Figure 9 Data reported by Helsinki in the course of its VLR in 2019



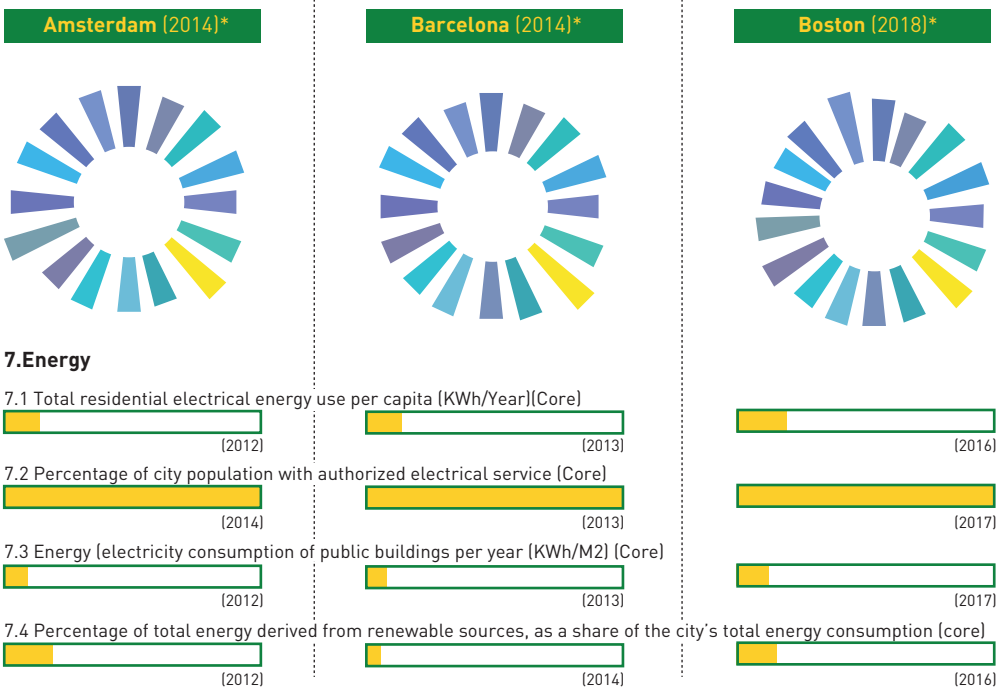
Source: Author.

8. Costs of monitoring the Sustainable Development Goals

It is estimated that implementing the SDGs will cost between US$50 trillion and $70 trillion over the next 10 years (2020–2030).[87] Developing sound monitoring systems that will contribute to achieving the 2030 Agenda and improving the policymaking process also requires human, technical and financial resources that are usually not easily accessible.

Among the systems analysed in this study, some of them have been developed by the LRGs with their own financial resources, such as Barcelona or Andalusia (with an annual budget of 12 million euros). In Bristol, it was an informal coalition of citizens, stakeholders and institutions, organized as the Bristol SDG Alliance, that managed

Figure 10 Comparison of SDG 7 targets across cities.



Source: World Council on City Data.

to obtain funding and support from local academic institutions before the City Council joined the development of a VLR and collected data that finally took the form of a VLR. National Governments have also played an important role, as in the case of Kenyan counties, which also counted on the financial support of the United Nations Development Programme. The cities that worked within the framework of the Mistra Urban Futures received necessary financial support from the independent research foundation Mistra and the Swedish International Development Cooperation Agency, as programme funders.

In other cases, the funding required to take part in some of the initiatives is much more considerable. For example, resorting to the technical assistance of OECD experts through the programme 'A territorial approach to the Sustainable Development Goals' entails a budget that cannot necessarily be taken for granted by LRGs worldwide. Likewise, applying the City Prosperity Index might require mobilizing funding from more resourced stakeholders, such as the national Government (as was the case in Mexico or Tunisia). Using international standardization indexes, such as ISO norms, might also require mobilizing a group of recognized and validated consultants, the cost of which needs to be considered.

Conclusions

LRGs worldwide are showing a growing commitment to move forward in the establishment of systems to track progress towards accomplishing the SDGs, encouraged by the efforts made by a wide range of public and private actors to raise awareness among LRGs on the relevance of monitoring.

However, although UN-Habitat and other international operators stress that a relevant part of the 231 SDG indicators can be measured at the local level, this research shows the difficulties and limitations faced by LRGs and other actors. Most indicators proposed by the United Nations respond to national contexts and are defined to measure national development policies. Besides, not all indicators are conceptually clear or have an internationally established methodology or available standards. Additionally, respective data may not be produced regularly (see tier 2 and 3 indicators). This poses challenges for national Governments, but even more so for LRGs. LRGs need to adapt those indicators or explore alternative solutions, often with limited means to tackle these challenges. Despite these limitations, LRGs, networks, IOs and academic and private institutions are developing local level monitoring systems and sets of indicators more or less aligned with those defined by the United Nations, using proxies, adaptations or alternative indicators.

The aim of these systems varies. Some are oriented towards tracking progress on the SDGs (i.e. the CPI of UN-Habitat, the German indicators), and others go beyond that and focus on informing policymaking processes and making LRG interventions more effective and results oriented (i.e. the CIS 'Tracking Progress' of IISD). Still others aim to provide information to benchmark their performance in the implementation of the 2030 Agenda (i.e. some VLRs at the individual level and the systems developed by OECD, WCCD, ESPON and Metropolis allowing for comparison between governments' achievements). Some systems consider all 17 SDGs through the indicators (i.e. RFSC, REDS, Oaxaca). Others select specific SDGs and targets according to their policy priorities and capacities (i.e. cities like Buenos Aires or New Taipei, in their VLR), arrange their systems around other dimensions (i.e. CNM 'Mandala') or include cross-thematic indicators (i.e. VVSG).

While a minority of actors, including highly resourced cities and regions, have created systems to measure SDGs (i.e. Basque Country), most LRGs use existing domestic sets of indicators linked to data and information that are easily available to them (i.e. Suwon).

Most systems set up by IOs, networks and private and academic actors stem from official international and national data sources. However, the production of, and access to, local reliable data and information is still complex and not feasible everywhere, usually as a direct consequence of the lack of resources and capacities. Sets are composed of different types of indicators (official, experimental, outcome, output, simple, complex, etc.), with diverse scopes and linked to different data sources. Data sources vary greatly. LRGs tend to use local and/or regional data to fit their systems and to

report progress, whereas other stakeholders (associations, international networks, national Governments, IOs, universities, research institutions, CSOs, etc.) use sources in a more balanced way, despite tending towards national and international data sources and sometimes producing their own data. In line with this, multilevel and multi-stakeholder collaboration for the monitoring of SDG achievement at the local level has proven positive in initiatives in all continents.

Data are collected and updated with different regularities according to the nature of the indicators themselves, while sustained support can be difficult over time. On another note, the way these data and information are used and visualized varies from being included in reporting documents (i.e. VLRs), to being gathered through open data portals (i.e. WCCD) and visualized for benchmarking purposes (i.e. OECD and ESPON). Finally, tracking progress on the associated costs of SDGs in terms of human, technical and financial resources may vary greatly.

The different systems analysed throughout this study show how pioneering LRGs, whether alone or with the support of other institutions, have invested in monitoring the achievement of the 2030 Agenda through more or less reliable, accessible and localized indicators and systems, applying very different approaches according to their specific needs and capacities. Nevertheless, several challenges still need to be addressed. First, there is the need to raise and expand awareness among LRGs about the importance of monitoring and reporting, as well as to allocate adequate human, technical and financial resources and capacities to LRGs so they can continue improving their monitoring mechanisms and maintaining them throughout the years. The second challenge involves ensuring that such monitoring efforts, which include a necessary boost in data collection, disaggregation mechanisms, indicator setting and horizontal integration, contribute to developing better and more inclusive policies at the local and regional levels. Following this, it will be crucial to assess to what extent the results obtained from applying the indicators do inform such policies. In line with the latest recommendations of the Praia city group for national statistical offices,[88] LRGs (and their regional statistical institutes, if existing) should aim to establish 'knowledge factories', combining official statistics with other data sources and drawing out clear narratives from these multiple datasets in order to provide the information that decision makers need. Lastly, there is the need to ensure that all these local efforts (developing indicators and monitoring systems, reporting results, informing better local policies) result in more territorialized national policies, which identify and recognize the specificities of the peoples and territories and approach them accordingly in order to leave no one and no place behind. These challenges will not be faced efficiently without the improvement of multilevel and multi-stakeholder governance mechanisms.

Recommendations

On the basis of the main findings of this study a set of recommendations for supporting the monitoring and measurement of SDGs and, subsequently, improving policymaking at the local and regional levels can be drawn. These recommendations mainly target the public sector, from LRGs and their associations and networks to national authorities and IOs. However, they might also be useful for universities, research centres, CSOs and private organizations.

Raising awareness on the importance of tracking SDG achievements to enhance transparency and accountability and improve the policymaking process at the local and regional levels

There are many purposes to developing an SDG monitoring system at the local level, and it is crucial to raise awareness on all of them, both on an individual and on a collective basis. Keeping track and visualizing development advances in a given territory allows local or regional authorities to showcase their own achievements and render political dividends. These may be channelled through specific reporting mechanisms such as VLRs, open data portals and tools to benchmark results. Local and regional governments should also be called to conceive these tools as a mechanism that ensures transparency and accountability as a duty towards the citizenship and other local, national and international stakeholders.

Likewise, it will be crucial to raise more awareness on the positive link between the monitoring of SDG implementation and the development impact in territories, by informing more efficient, evidence-based and bottom-up policymaking processes.

Strengthening LRG capacities and resources to measure progress in the achievement of SDGs

In addition to raising awareness on the importance of tracking SDG achievements, IOs, CSOs, academia and national Governments should continue to implement initiatives (with a specific budget allocation) aimed to strengthen LRG capacities and resources in this regard. In line with the efforts led by UCLG and the United Regions Organization under the Global Partnership for Effective Development Cooperation 'Action Area 2.6: Development effectiveness at subnational level', development partners should make harmonized and aligned efforts to support LRGs in setting up and operating inclusive local SDG monitoring mechanisms.[89] These initiatives should offer guiding knowledge, experiences, training and learning tools to reinforce skills and capacities in terms of indicator setting, data generation, governance of data systems and reporting mechanisms, among others, as well as technology to make tracking efforts more efficient according to the context and capabilities of each government involved. It is essential to develop a long-term

strategy for the monitoring system and understand the regularity needed to put the system in place and make it work, as well as the implementation costs. Efforts should be well coordinated in order to avoid fragmented and isolated approaches. City-to-city and decentralized cooperation will help maximize the potential of monitoring as an instrument that can serve to hold governments accountable and make public policies more efficient and results driven.

Establishing a consensual, harmonized set of indicators to measure progress on SDGs at the local and regional levels

Building upon some of the more advanced and robust systems analysed in this study, a multi-stakeholder effort, including frontrunner actors capable of mobilizing the necessary capacities and resources in a sustained manner over time (main LRGs networks, national Governments, IOs and knowledge-based institutions), could develop a harmonized set of indicators fed with data generated at the local level and adapted to the different capacities of LRGs (basic indicators for those with limited capacities and more advanced indicators for the stronger ones).

The aim of elaborating a set of homogenized indicators would be to acknowledge the specific realities of the different territories and inform national policymaking accordingly. For this exercise, it should be ensured that the data sources are consistent and indicators are thus comparable and aggregated and that they are adaptable to the different features and circumstances. The data and information collected and managed could also be used to develop a VNR. Also, only when relevant, a comparison between the different territories could also be developed. This effort could be also developed taking into consideration any relatively homogeneous area. The institutions in charge of this set of indicators should ensure LRGs are provided with the necessary tools, knowledge, resources and support to ensure that the exercise of implementing the indicators can be maintained overtime.

Given the complexity of some systems for monitoring, benchmarking and comparing results in terms of SDG achievement, another approach would be to develop a system of indicators divided into categories. This system should propose different sets of indicators to be chosen and used by LRGs according to their capacities, from rural towns and small cities with scarce resources and capacities for monitoring to middle-sized cities and, in a more ambitious manner, big cities, metropoles and regions with higher resources and capacities. The launching of this set of indicators should be accompanied by a toolkit of resources aimed at supporting LRGs in their monitoring and reporting efforts, i.e. a dashboard to track progress and compare, a guide on how to use the indicators, training programme, assessment programme, etc.

Finally, a debate should be opened about the feasibility of creating a compliance mechanism that assesses the level of implementation of the 2030 Agenda in a given territory. To move forward with such a mechanism, it would be critical to define who would have the legitimacy, and the resources, to deliver compliance certifications.

Ensuring the production of local and regional data and information

The need for data disaggregation at the regional, local and even neighbourhood levels has been one of the major challenges of SDG achievement. In this regard, in addition to the tradi-

tional indicators managed and fed by national Governments, new data sources produced closer to the populations and territories will contribute to bridging data gaps at the local level. As mentioned above, LRGs should mobilize resources and capacities, whether internal or external, to develop their own indicators and generate their own data.

Also, the use of non-governmental data alongside more traditional, nationally generated data should be encouraged as a means to incorporate new views, overcome data gaps and verify and validate official data sources. Beyond official data, this would involve experimental data such as big data, qualitative data and citizen-driven data, as well as data generated by academic institutions, the private sector and academia. Geospatially disaggregated data (indicators regarding public space, agglomeration economies, etc.) would offer relevant information on the allocation of resources and the achievement of equitable outcomes across and within cities and human settlements.

Indicators to track SDG progress should cover the environmental, social and economic pillars of sustainable development in a balanced manner and allow for understanding interrelations between the different dimensions analysed, conceiving proxy and cross-thematic indicators as a possibility. The indicators should be designed to provide evidence-based data and information (including statistics and cartography) and deliver concrete results. SDG indexes can be conceived for visualization purposes and should be complemented by, and serve as an entry point for, a more detailed (and likewise accessible) set of indicators that cover the whole 2030 Agenda in a more integrated and specific manner. Baseline data should be established along with reasonable local commitments to be contrasted regularly with the data produced and collected. Complementing quantitative data with qualitative information is desirable in as much as it allows for a fuller view of the situation.

Promoting collaborative efforts for improving monitoring efforts at the local and regional levels

As is widely accepted by scientific and policy-oriented literature, multilevel and multi-stakeholder governance is crucial for ensuring more efficient and results-oriented monitoring systems that are integrated in wider governance mechanisms and, consequently, improve the policymaking process at the local and regional levels. Even the most advanced and highly resourced LRG cannot build and manage alone comprehensive systems that provide a precise and contextualized picture of what is happening in their territories and the impact of the public policies they are promoting.

Reinforcing horizontal coordination and collaboration among the different levels of government based on leadership and commitment is key for strengthening capacities and promoting more informed public policies at various levels. Involving CSOs, the private sector and academia allows them to mobilize alternative resources, technologies and information, as well as their capacity to innovate and gain legitimacy. Reinforcing multilevel and multi-stakeholder governance is still challenging, especially when it comes to promoting coordination mechanisms that allow LRGs to inform national policies, involving local stakeholders in policymaking and monitoring processes, mobilizing innovation and knowledge and reinforcing accountability. The different actions showcased in this report—led by LRGs, LRG associations, networks, national Governments, IOs, CSOs, academia and even the private sector—for the establishment of localized monitoring systems provide interesting insights and possible paths to follow.

Notes

1. Localizing refers to "the process of defining, implementing and monitoring strategies at the local level for achieving global, national and subnational sustainable development goals and targets". (United Nations Development Group, Localizing the Post–2015 Development Agenda: Dialogues on Implementation, (2014)).

2. The United Nations tasked the Inter-Agency and Expert Group on Sustainable Development Goal Indicators to develop indicators to monitor the implementation of the 2030 Agenda and the 17 SDGs. The system includes 231 statistical indicators.

3. Alice Siragusa and others, European Handbook for SDG Voluntary Local Reviews (Luxembourg, Publications Office of the European Union, 2020).

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5. While the regional level refers to the first administrative and political subdivision of a sovereign State, the local level refers to the administrative and political levels below the regional level.

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13. See Category 5 for more information.

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26. See www.urbanet.info/germany-sdg-indicators-municipalities/.

27. Organisation for Economic Co-operation and Development (OECD), A Territorial Approach to the Sustainable Development Goals: Synthesis report, OECD Urban Policy Reviews (Paris, OECD Publishing, 2020).

28. RKA is a non-profit organization formed in 2006 in collaboration between the national Government and SAKAR.

29. See www.kolada.se.

30. Sandra C. Valencia, Localisation of the 2030 Agenda and its Sustainable Development Goals in Gothenburg, Sweden (Mistra Urban Futures, 2019).

31. See www.metropolis.org/.
32. See https://indicators.metropolis.org/.
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34. See http://rfsc.eu/.
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36. UCLG, Local and Regional Governments' Report to the 2020 HLPF, 4th Report: Towards the Localization of the SDGs – How to accelerate transformative actions in the aftermath of the COVID-19 outbreak (Barcelona, 2020).
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48. ibid.; Paresa Markianidou and others, Interim Report: SDG Localising Tool – Localising and Measuring Sustainable Development Goals in Cities and Regions (ESPON, 2020).
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Comparative study on SDG monitoring systems at local and regional levels

Agencia Andaluza de Cooperación Internacional para el Desarrollo

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UCLG United Cities and Local Governments

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