European Commission

EUROPEAN HANDBOOK FOR

SDG Voluntary Local Reviews

Joint Research Centre

EUR 30067 EN

This publication is a Science for Policy report by the Joint Research Centre (JRC), the European Commission's science and knowledge service. It aims to provide evidence-based scientific support to the European policymaking process. The scientific output expressed does not imply a policy position of the European Commission. Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use that might be made of this publication.For information on the methodology and quality underlying the data used in this publication for which the source is neither Eurostat nor other Commission services, users should contact the referenced source.The designations employed and the presentation of material on the maps do not imply the expression of any opinion whatsoever on the part of the European Union concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

Contact information
Carlo Lavalle
European Commission, Joint Research Centre
Carlo.Lavalle@ec.europa.eu
Tel.: +39 0332 785231

EU Science Hub
https://ec.europa.eu/jrc

This report is linked to an Interactive online platform:
https://urban.jrc.ec.europa.eu/sdgs

JRC 118682

EUR 30067 EN

PDF	ISBN 978-92-76-15403-7	ISSN 1831-9424	doi:10.2760/670387
Print	ISBN 978-92-76-15402-0	ISSN 1018-5593	doi:10.2760/257092

Luxembourg: Publications Office of the European Union, 2020

Graphic project: Raffaella Manfredi

How to cite this report: Siragusa A., Vizcaino P., Proietti P., Lavalle C., European Handbook for SDG Voluntary Local Reviews, EUR 30067 EN, Publications Office of the European Union, Luxembourg, 2020, ISBN 978-92-76-15403-7, doi:10.2760/670387, JRC 118682.

JRC SCIENCE FOR POLICY REPORT

EUROPEAN HANDBOOK FOR

SDG Voluntary Local Reviews

ALICE SIRAGUSA, PILAR VIZCAINO, PAOLA PROIETTI, CARLO LAVALLE

TABLE OF CONTENTS

2

3

ABSTRACT

The *European Handbook for SDG Voluntary Local Reviews* offers to policy makers, researchers and practitioners an inspirational framework to set up Voluntary Local Reviews (VLRs). VLRs are a fundamental instrument to monitor progresses and sustain the transformative and inclusive action of local actors towards the achievement of the Sustainable Development Goals (SDGs) in general, and competitive sustainability in particular.

The *Handbook* provides key examples of official and experimental indicators useful to set up an effective SDG local monitoring system specifically targeted for European cities. Per each Goal, the *Handbook* highlights examples of harmonised and locally collected indicators so that local actors can both benchmark themselves with other cities and monitor their own specific needs and challenges.

FOREWORD

The European Commission has put the delivery of the 2030 Agenda for Sustainable Development and its global goals (SDGs) on top of its political agenda for the years to come, shaping a sustainable Europe for future generations and striving for competitive sustainability.

There is an increasing recognition that international and national efforts towards SDGs crucially need to integrate the contribution of a number of actors: private sector, civil society, academia, as well as cities and regions.

Regions, cities and even communities are more-and-more called on to act at their local scale on the required transformative actions. In fact, they are essential partners for effectively achieving the global goals and for embedding local ownership of sustainability challenges and solutions.

Yet, despite such increasing targeted action taken at the local level, how cities and regions should contribute to the SDGs and how can we measure and assess their contribution, is still uncertain. The *European Handbook for SDG Voluntary Local Reviews* aims to fill this gap, building upon the knowledge developed by the European Commission's Directorates-General Joint Research Centre plus Regional and Urban Policy, in close co-operation too with the United Nations Programme for Human Settlements (UN-HABITAT). It also pools together a broader number of contributions from other stakeholder organisations and partners, including city networks and individual cities.

In particular, this *Handbook* can support European cities in preparing their SDG Voluntary Local Reviews (VLRs) with two objectives in mind: for the selected indicators to be, as far as possible, comparable among cities in Europe; and for the VLRs to be tailored to the local situations and address local issues.

To this end, the *Handbook* presents harmonised official indicators, as well as locally collected and experimental ones, that can serve as example and inspiration for cities willing to embrace the effort of self-assessment and reach the level of ambition required by a relevant and rigorous VLR.

I am firmly convinced that the collective intelligence of cities, research centres, academia, international institutions, cities networks and the civil society, is a powerful enabler for upscaling our joint effort to achieve the SDGs and to effectively leave no one and no place behind. I thus fully endorse this *Handbook* and invite all stakeholders to make full use of the knowledge and tools it provides.

Charlina Vitcheva, Director-General (Acting)
European Commission Joint Research Centre

ACKNOWLEDGEMENTS

This publication is part of the URBAN2030 project initiated by the Joint Research Centre and funded by the Directorate-General for Regional and Urban Policy (DG REGIO).

The authors would like to acknowledge for their support **Paolo Bolsi, Lewis Dijkstra, Nicolas Gharbi, Wallis Goelen, and Laura Liger** from the Directorate General for Regional and Urban Policies - European Commission.

The authors thank the following persons for their valuable comments and suggestions:

Angelova-Tosheva Valeriya, Gebhard Fritz, Moench Barbara, Schroer Hartmut, *EUROSTAT*

Daniel Moran, *Norwegian University of Science and Technology* (SDG 13)

Daria Denti, *Gran Sasso Science Institute* (SDG5)

Edgardo Blisky and **Andrea Ciambra**, *United Cities and Local Governments* (UCLG)

Giovanni Allegretti, *University of Coimbra* (SDG 16)

Giovanni Pica, *Università della Svizzera Italiana* (SDG 8)

Grazia Naletto, *LUNARIA* (SDG 5)

Guido Alfani, *Dondena Centre for Research on Social Dynamics* (SDG 10)

Jani Mollis, Marjo Kaasila, Ari Jaakola, Pirita Kuikka, Johanna af Hällström, *City of Helsinki*

Maria Sole Benigni, *Istituto di Geologia Ambientale e Geoingegneria del Consiglio Nazionale delle Ricerche* (SDG13)

Marta Hernández de la Cruz, *Oficina Española de Cambio Climático – OECC* (SDG13)

Stefano Marta, Paolo Veneri and **Marcos A. Díaz Ramírez**, *Organisation for Economic Co-operation and Development* (OECD)

Paola Monti, *Fondazione Rodolfo Debenedetti* (SDG1)

Paolo Spada, *University of Southampton* (SDG16)

Paulius Kulikauskas, Frederic Saliez, Annika Lenz, Cecilia Bertozzi, Dennis Mwaniki, Robert Dnugwa, Stefanie Holzwart, *UN-Habitat*

Sarah Bentz and **Pedro Bizzarro**, *Council of European Municipalities and Regions* (CEMR) & *PLATFORMA*

The authors thank all the experts who participated in the workshop organised in partnership with UN-HABITAT on the SDG 11.

The authors would also like to acknowledge JRC colleagues who provided support and suggestions in the preparation of this publication:

Patrizia Sulis, **Ine Vandecasteele**, and **Alessandro Rainoldi**, for the review and comments; **Davide Auteri**, **Carmelo Attardo** and **Ioris Bussolari** for the comments on the data platform integration.

Goal 2 **Sandra Calderia, Ana Sarasa Renedo, Nadia Vilahur Chiaraviglio, Ioanna Bakogianni, Francesco Giusti**

Goal 3 **Sandra Calderia, Ana Sarasa Renedo, Nadia Vilahur Chiaraviglio, Ioanna Bakogianni, Francesco Giusti**

Goal 4 **Ralph Hippe**

Goal 6 **Ad de Roo, Ine Vandecasteele**

Goal 7 **Jean-Philippe Aurambout, Claudia Baranzelli**

Goal 8 **Felipe Batista**

Goal 9 **Felipe Batista, Chris Jacobs-Crisioni**

Goal 10 **Fabrizio Natale**

Goal 11 **Ricardo Barranco, Valentina Alberti, Francesco Panella, Mert Kompil, Valentina Montalto, Sjoerdje Van Heerden**

Goal 12 **Serenella Sala, Ricardo Barranco, Felipe Batista**

Goal 13 **Christina Corban, Thomas Kemper, Filip Sabo, Ine Vandecasteele, Antigoni Maistrali**

Goal 15 **Carolina Perpiñá Castillo**

Goal 16 **Antigoni Maistrali**

Goal 17 **Andrius Kucas**

INTRODUCTION

The 2030 Agenda and the Sustainable Development Goals

In 2015, world leaders agreed on a new agenda for achieving global sustainable development by 2030. The outcome of two years of negotiations within the international community was the General Assembly's resolution: "*Transforming Our World: the 2030 Agenda for Sustainable Development*" *(United Nations 2015c)*. The Agenda sets 17 Sustainable Development Goals (SDGs) and identifies as first priority the eradication of poverty in all its forms and dimensions (see Annex 4 for the complete list of the SDGs and the related targets).

GOALS	17
TARGETS	169
INDICATORS	232[1]

Other approved agendas, such as the Sendai Framework for Disaster Risk Reduction *(UNISDR 2015)* and the Addis Ababa Action Agenda of the Third International Conference on Financing for Development *(United Nations 2015a)*[2], are taken into account, acknowledging their contribution without replicating objectives and targets already set in their specific fields of action[3].

Several reports, analyses and comments have been published on the contribution and approach of the EU on the SDGs *(inter alia European Commission 2019; European Union Agency for Fundamental Rights 2019)*, tackling the different aspects of the SDGs both internally and externally at the Union.

In 2016, one year after the approval of the 2030 Agenda, the importance of the urban context was highlighted in the policy debate. Indeed, in late 2016 the United Nations adopted a specific agenda for cities, the New Urban Agenda (NUA) *(United Nations 2016)*. In parallel to the process of negotiation for the NUA, EU Member States reached consensus on the adaptation of the NUA to the European context through the Pact of Amsterdam, establishing the "Urban Agenda for the EU" *(European Commission 2016b)*. This sets specific priorities and areas of action for European cities, in order to improve the consideration of the urban dimension in all policies, multi-level dialogues and partnerships *(European Commission 2019i)*.

The localisation of the 2030 Agenda

Thanks to advocacy work done by a number of different stakeholders, the SDGs include a specific urban goal. **SDG 11 calls for making cities and human settlements inclusive, safe, resilient and sustainable, recognising the key role of cities for sustainable development.**

Apart from the specific urban focus of SDG 11, it has been evaluated that SDG 11 is directly linked to targets and indicators in at least eleven other SDGs. Moreover, about one third of the 232 SDG

1 For the most updated information of the SDG indicators and target, including the Tier Classification: see https://unstats.un-.org/sdgs/iaeg-sdgs/tier-classification/ (20 November 2019)

2 The Addis Ababa Action Agenda of the Third International Conference on Financing for Development (Addis Ababa Action Agenda), adopted by the General Assembly on 27 July 2015 (resolution 69/313, annex).

3 "These include the Rio Declaration on Environment and Development, the World Summit on Sustainable Development, the World Summit for Social Development, the Programme of Action of the International Conference on Population and Development, the Beijing Platform for Action and the United Nations Conference on Sustainable Development. We also reaffirm the follow-up to these conferences, including the outcomes of the Fourth United Nations Conference on the Least Developed Countries, the third International Conference on Small Island Developing States, the second United Nations Conference on Landlocked Developing Countries and the Third United Nations World Conference on Disaster Risk Reduction." (United Nations 2015b)

indicators can be measured at the local level, making it an important unit for action and tracking of progress towards sustainable development *(UN-Habitat 2018a, 10–11)*.

Amongst urban advocates, consensus emerged that **the local dimension of the SDGs means that municipalities and cities are not merely implementing agencies, and that their challenges and opportunities in achieving the SDGs deserve special recognition**.

In fact, 65 percent of the SDG agenda may not be fully achieved without the involvement of urban and local actors *(Adelphi and Urban Catalyst 2015, 19)*.

The localisation of the SDGs is even more important in Europe, where cities are the places where most citizens live, where the largest share of GDP is generated, where a large part of EU policies and legislation is implemented and where a significant share of EU funds is spent. Building upon the experience of the Millennium Development Goals *(United Nations 2000a)*, the UN system recognised the multiplication of decentralised development cooperation initiatives and the use of city-to-city cooperation as a cost-effective mechanism for implementation *(UN Development Group 2014)*.

Cities are at the heart of today's economic, environmental and social challenges. More than 70% of EU citizens live in urban areas while about 85% of the EU's GDP is generated in cities. These urban areas are the engines of the European economy and act as catalysts for innovative sustainable solutions promoting the transition to a low-carbon and resilient society. However, they are also places where problems, such as unemployment, segregation, poverty and pollution are at their most severe.

(European Commission 2016a)

Cities are the places where the positive interlinkages amongst the SDGs **are boosted**.

Therefore, involving local authorities in the implementation of the 2030 Agenda is crucial.

A survey sent out in early 2018 to the *Council of European Municipalities and Regions (CEMR)* members and PLATFORMA partners highlighted how the technical tools and guidance for local governments have been lacking *(see Council of European Municipalities and Regions (CEMR) 2019)*. In particular, *"while the perception that the need to use data is important (91% of the responses), even amongst the most committed associations, there is no capacity to deliver" (Bardot et al. 2018, 20)*.

In order to address this issue, in 2016, DG REGIO and the JRC launched the Urban Data Platform (UDP)[4], hosted by the Knowledge Centre for Territorial Policies of the European Commission. The UDP collects and provides data and indicators on the status of urban areas in Europe and supports the analysis of the transition to sustainability in cities. This *Handbook* is based in part on the experience gained during the development of the UDP and it tries to address knowledge and capacity gaps.

Goal of the Handbook

The goal of this *Handbook* is to provide support to European cities willing to prepare their SDG Local Voluntary Reviews (VLRs). The *Handbook* is designed to be a guide for the selection of appropriate indicators to use in the assessment and to tailor the review to local situations and challenges.

4 urban.jrc.ec.europa.eu

“Localization 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**. This involves concrete mechanisms, tools, innovations, platforms and processes to effectively translate the development agenda into results at the local level. The concept should therefore be understood holistically, beyond the institutions of local governments, to include all local actors through a territorial approach that includes civil society, traditional leaders, religious organizations, academia, the private sector and others.”

(UN Development Group 2014, 6–7)

Moreover, thanks to the *Handbook* readers will be able to better understand the SDGs in the European context, the links amongst them, and the local actions supporting the global community in achieving the Goals.

The *Handbook* suggests using sound evidence in the review process in order to foster better decision-making and therefore the achievement of the SDGs at urban level.

Section '*1.5 Methodology for the selection of indicators*' illustrates the different types of indicators and the criteria used for their selection.

Finally, *Handbook* includes an overview of the VLRs produced so far useful references for existing experiences on the localisation of the SDGs led by international organisations and city networks, which offer valued support through peer-to-peer cooperation.

Structure of the Handbook

The first part of the *Handbook*:

- illustrates the issues linked to SDG monitoring at local scale;
- provides an overview of SDG monitoring systems;
- highlights the main challenges for local authorities in collecting data and analysing indicators;
- illustrates the main components of the VLRs;
- illustrates the methodology used for the selection of the indicators contained in this *Handbook*.

The second part of the *Handbook* presents a set of indicators that can be used for the VLRs according to a set of criteria. Each SDG is introduced by:

- the description of the goal;
- the European dimension of the goal;
- the local dimension of the goal.

The suggested indicators, both official and experimental, are identified according to the European context, the relevance at local level and the (potential) availability of data in local administrations.

The third part of the *Handbook*:

- presents and analyses the VLRs already published by local and regional governments around the world since 2017;
- provides considerations on and references to methods for the integration of SDG monitoring and city strategy plans;
- provides some considerations regarding a number of issues on local SDG monitoring, including: desired trends, distance to targets, baseline year and frequency of measurement, scale and boundaries for SDG monitoring, disaggregation by age classes, and upcoming data.

Finally, the **conclusions** provide elements to consider for future work and activities that will possibly support the cities in using the *Handbook*.

Part 1

MONITORING THE SDGs AT LOCAL SCALE

1

1.1
The Voluntary Local Reviews

What is a Voluntary Local Review?

A Voluntary Local Review is a tool that allows cities to assess their achievement of the SDGs and their contribution to the 2030 Agenda. It also enables cities to prioritise actions and raise awareness about sustainability in the administration and local community.

Deininger et al. (2019) define a Voluntary Local Review as *"a vehicle for state and local governments to report their progress on the SDGs"*, underlining how the process involves different stakeholders and actors.

One of the lessons learned in the transition from the Millennium Development Goals (MDGs)[5] to the SDGs is that the involvement of local governments and communities is fundamental in both the definition and achievement of the goals *(UN Development Group 2014)*. **More specifically, the need for statistical capacity building and mechanisms that strengthen disaggregated data collection efforts at the local level has been identified as one of the main issues** *(Oosterhof 2018)*.

In the years following the approval of the 2030 Agenda, several cities have started to work on how to assess their contribution to the SDGs. The first sub-national government to publish a VLR was the Basque Country (Spain) in 2017 *(Euskadi Basque Country 2017)*, with a second released in 2018 *(Euskadi Basque Country 2018)*.

For an in-depth analysis of the published VLRs, see 3.1 Examples of local governments measuring the SDGs

One of the first cities to cross the finish line was New York City, that publicly presented its first VLR at the High Level Political Forum (HLPF) in 2018 *(The City of New York 2018)* and a second in 2019 *(The City of New York 2019)*.

The complete database of VNRs is available at https://sustainabledevelopment.un.org/vnrs/

The VLR of New York City, as others that followed (i.e. Helsinki) largely took inspiration from the Voluntary National Reviews (VNRs), following the same structure and reporting only on the five SDGs under review at the HLPF that year. Even though the VNRs can act as a reference, the processes to be implemented by local governments involve different stakeholders and need to be adapted and built in accordance to the local governmental structure.

City networks and associations have taken action on the localisation of the 2030 Agenda both worldwide and regionally since 2015. While supporting their constituencies in advocacy activities, they have been producing publications, trainings and analyses in support of processes. Relevant examples are the Global Task Forces of UCLG and the CoR *(Global Taskforce of Local and Regional Governments 2016; Global Task Force of Local and Regional Governments 2018; European Committee of the Regions - Commission for European Policy 2019)*.

Why should a city spend time and resources producing a VLR?

The production of VLRs in European cities serve a double purpose: on the one hand, it can help the city to assess its own achievement of the SDGs; on the other hand, if done in a harmonised way at European scale, it can enable the assessment of European cities' contribution to the achievement of the 2030 Agenda at country or even continental level.

Apart from these direct outputs, a relevant number of VLRs could support the cause of multilevel governance and enable countries to integrate the assessments at local level into the national one (VNRs).

Countries with a high level of awareness of the importance of the local implementation of the SDGs and of cooperation among different level of government and stakeholders would benefit the most

5 As compared to the Millennium Development Declaration (United Nations 2000b) and its goals approved in 2000, the SDGs are designed to be universally applicable and cover more global challenges.

from this process, both in the implementation and monitoring, but also in reviewing and redefining policy actions.

For the city, the value is in the journey as much as in the product, since the processes used help local administrations to strengthen the links with a number of stakeholders and, internally, foster cooperation among different departments.

For instance, the preparation of VLRs require several steps and interactions with a number of local actors, from local communities, academia, private sectors, civil society and NGOs, amongst others.

This level of collaboration is necessary also within the administration: the analysis of a city's strategy and the mapping of strategic actions against the SDGs requires the participation of all municipal departments. A more efficient collaboration within multi-level governance settings is also required to establish of indicators that can support the SDG monitoring at the local level. As various departments generally collect different types of data (including administrative data), an effort is required to merge them into an integrated database.

For example, in the case of the City of Madrid, with whom the JRC has collaborated, the identification of indicators and the mapping of the city's strategic goals against the SDGs have stimulated internal cooperation across different departments within the municipality. Therefore, the VLR can be considered a product that integrates and summarises the best and most transformative actions put in place by the administration.

If the VLR provides an opportunity for local governments to illustrate the most transformative actions and gained achievements, it should also highlight the areas where most urgent actions are needed. The VLRs can be useful to identify priorities and better-define the possible action areas to make a city more sustainable economically, socially and environmentally.

The process of VLR can also serve as a tool to raise awareness in the administration about sustainability, and the multiplicity of effects of local actions on different SDGs. In several thematic meetings and open events organized by the JRC on these topics, many local governments highlighted the need for training of local civil servants on international agreements such as the 2030 Agenda, and more generally about the links between local actions and global challenges.

Benefits in producing the VLRs:

Internal benefits for the city (hidden connections, common framework, link between priority and data, sustainable networks, leave no one behind)

External benefits at local scale (transparent accountability, new cross-sectoral partnerships, building leadership)

External benefits at global scale (engagement in the global community, city leaders on the world stage, elevate city priorities to the global conversation).

Source: (Deininger et al. 2019)

The work done by city networks and associations of local governments has prepared the ground for the localisation of the SDGs. For European cities' and regions' associations, the CMER represent a reference point for collecting information and sharing best practices on this topic. Among those, an interesting experience among municipalities is the work done by the *Association of Netherlands Municipalities (VNG)* both in terms of raising awareness and identifying indicators for the local monitoring of the SDGs.

Exclusionary cities are a major barrier to the achievement of the **2030 Agenda**.

(McGranahan, Schensul, and Singh 2016, 14)

1.2
Navigating the SDG monitoring systems

Well-informed policies are critical for successful actions. Every year the United Nations publish the Sustainable Development Goals Report, an assessment of the SDGs at global scale *(United Nations 2016b, 2017, 2018, 2019b)*. The Report is a summarised analysis of the statistics collected from UN Member States according to the Global indicator framework for the SDGs *(United Nations 2019a)*[6]. One key element of the evaluation is the importance of reliable and relevant data to assess the 2030 Agenda.

This reporting system is designed to involve national governments in the 2030 Agenda and make them accountable for their actions. Within this process, the local dimension of the SDGs is not directly taken into account and it is still under review how the UN System and countries could integrate reporting frameworks from other institutions (local authorities, but also corporations, NGOs and civil society). In particular, the special one-day event "Local Action for Global Commitments" was organised to discuss this topic during the HLPF 2019 *(United Nations 2019)*.

The VLRs have been applied as a translation at the local scale of the Voluntary National Reviews (VNRs). Indeed, UN Member States willing to prepare a VNR follow the guidelines provided by the UN *(United Nations Development Group 2016; UNDSD and UNDESA 2018; United Nations Department of Economic and Social Affairs 2018)*, and they are encouraged to use the UN SDG official indicators.

Cities, however, can only rely on the few existing experiences and try to navigate the multitude of reporting systems designed for use at the national level which cannot easily be adapted to the city scale. The *Table 1* summarises the existing monitoring frameworks for the SDGs, excluding single national experiences.

> "Use the **SDGs check** for your goal tree and action plans. A qualitative, comprehensive policy for sustainable development with an intersectoral approach is key in this respect."
>
> *(Van Herck, Vanoeteren, and Janssen 2019)*

What clearly emerged in the debate about the localisation of the SDGs is that **a call for local action has been launched, and that cities are responding**. While methods to integrate the VLRs in VNRs are still under discussion, cities are starting to report about the SDGs. However, an agreed framework is still missing on how to do this and on how to make these efforts comparable. This is even more important because national averages can hide inequalities amongst cities and regions within countries, and because this effort can improve the capacity of local governments to self-assess their path towards sustainability[7].

Interested in free online training on SDGs and official statistics? *Explore the portal on the United Nations Institute for Training and Research, where many free online courses are available: https://www.unitar.org/*

6 The purpose of the complex framework, that includes 232 indicators for 169 targets, is to measure the improvements of Member States in achieving the Goals. Along with this global effort coordinated by the UN Statistical Office, every year UN member states have the possibility to present their VNRs at the High-level Political Forum (HLPF) organised under the auspices of ECOSOC. In 2019, 47 countries published their VNRs, 7 for the second time.

7 The World Bank recently published a work that specifically focuses on the importance of local governments self-assessing. (Farvacque-Vitkovic and Kopanyi 2019)

NAME	GEOGRAPHICAL LEVEL	COVERAGE	PERIODICITY	SOURCES	NUMBER OF INDICATORS	REFERENCES
Global Indicator Framework for the SDGs (UN)	Country	193 UN Member States (with data gap)	Yearly publication of aggregated results	NSOs	232 indicators for 17 Goals	(United Nations 2019b)
EU SDG INDICATOR SET 2019	Country	EU28 + Norway, Switzerland, Iceland, Serbia and Turkey	Reviewed every year	NSOs	100 indicators for 17 goals	(EUROSTAT 2019a)
CITY PROSPERITY INITIATIVE (CPI)	City	400 cities across the world		Administrative data		UN-HABITAT
OECD	Metropolitan areas or Functional Urban Areas of more than 250K people	600+ FUAs of 33 OECD countries and Colombia		OECD Regional and Large Metropolitan Areas databases	100+ indicators	upcoming
SDSN SDG INDEX (composite index)	Country	193 UN Member States (with data gap)	Yearly	NSOs	75 indicators for 17 goals	(Sachs et al. 2019)
	SDG Index for European Cities	45 European Cities capital cities and large metropolitan areas	2019 (prototype)	Eurostat, ERA, JRC , Eurobaromete, OECD, European Social Survey	56 indicators for 15 Goals [Nuts 2 and Nuts 3 data are most often used]	(Lafortune and Zoeteman 2019)
	Italy - City level	101 cities (among the "Capoluogo di provincia")	2018	Eurostat and local statistics	39 indicators for 16 Goals	(Cavalli and Farnia 2018)
	Spain - City level	100 Spanish Cities	2018	Several sources	85 indicators for 17 goals [Nuts 2 and Nuts 3 data are most often used]	(Sánchez de Madariaga, García López, and Sisto 2018)
	USA -Metropolitan Statistical Area (MSA)	105 US cities	2018	Several sources	57 indicators for 15 Goals	(Alainna Lynch 2019)

Table 1 Overview of the existing frameworks for the SDG monitoring

1.3
Data challenges for local authorities

Local authorities face several difficulties in collecting and using data to measure their progress in achieving the SDGs. Several issues and questions emerged from feedback received during the preparation of this publication:

- There is a lack of capacity or trained staff in municipalities to collect and disseminate data, as well as insufficient financial resources to produce data with a wide geographical and temporal extension[8];
- The role of municipalities in achieving SDG targets is defined by the multi-level governance framework in which they are embedded *(European Commission 2019g)*;
- The availability and harmonisation of data across local entities are essential to the direct comparability of data. These aspects are challenging but also fundamental for cities to position themselves and engage in peer-learning activities *(EUROCITIES 2019)*;
- There is an ongoing debate in relation to the two options that cities approaching SDGs would face: prioritising measurable targets or investing to obtain new data to measure targets that are relevant to achieving SDGs?
- Available indicators might be more or less relevant across different cities, given the local context, or show no or little variation over time.
- Data is usually derived from different branches or departments of local administrations and is often not readily available, both in terms of format and in terms of rights of dissemination.

8 This information comes from an online survey on "The key contribution of regions and cities to sustainable development". Carried out by the European Committee of the Regions (CoR) in cooperation with the Organisation for Economic Cooperation and Development (OECD) from 13 December 2018 to 1 March 2019

1.4
Main components of the VLRs

The challenges mentioned in the previous paragraph are just a few of those that cities face when starting the VLR process. Since an official and agreed framework for local reporting is not yet available, most cities have followed the front-runner examples.

Four main initial steps can be identified in most of the experiences of SDG localization (Sustainable Development Solutions Network 2016):

- Initiation of an inclusive and participatory process;
- Setting the local SDG Agenda;
- Planning the SDG implementation;
- Monitoring and evaluation of the SDG targets.

A review of published VLRs is given in the section *3.1 Examples of local governments measuring the SDGs*. Since a standard local SDG indicator framework does not exist, cities and local authorities that have published the VLRs have used their own framework, referring to SDG indicators only in few cases. This evidently means that there is a lack of comparability across cities.

> "Local statistical capacities to collect data, monitor, evaluate, and engage in national SDG-related data efforts are critical elements of the successful **implementation of the SDGs**."
>
> *(Oosterhof 2018, 11)*

Ideally, a VLR should be: accountable, replicable and affordable; be comparable over time (at least every three years); based on robust data analysis; and be comparable with other cities in the country and in Europe.

Some considerations should be taken into account when starting the VLR process:

- The VLR is voluntary, therefore a clear commitment on transparency and accountability should be made, usually by the Mayor;
- The VLR can be of three types, including: (1) a review of all SDGs, (2) a selection of SDGs of particular relevance for the city, or (3) only SDGs under review at the HLPF in the year of publication.
- The VLR process has to be well planned in all its phases since it can last for about a year.
- Different management processes can be used: centralising the VLR's effort within the mayor's office – *the hub-and-spoke model – (Deininger et al. 2019, 14)*, creating a specific internal task force or working group, or tasking external experts.
- For a city with a statistical and Geographical Information System (GIS) office, their data collection and assessment may result in a faster overall process.

Some recurring building blocks have been identified in the VLRs published in the last couple of years *(Deininger et al. 2019)*. They usually follow a similar structure:

> Opening statement > commitment of the Mayor, administration
> Executive summary > highlights
> Introduction
> Organizational alignment and institutional process
> Structural issues and challenges
> Methodology: Metrics and Data
> Policy & enabling environment
> Review of the Goals (all goals, goals under review at the current HLPF, or the top priorities)
> Conclusions

1.5 Methodology for the selection of the indicators

As mentioned above, the main challenge for local governments lies in the identification of the indicators and data to use. This *Handbook* provides a wide range of examples of urban indicators that can be used by European cities for the VLR. This paragraph illustrates the criteria used for the selection, as well as the types of indicators presented and their data sources.

Criteria

The criteria used to select the urban indicators for the SDGs in Europe provided in the *Handbook* are:

- **Alignment with the UN's Global Indicator Framework** for Member States.
- **Relevance to the European context.** Coherence amongst several indicators and the EU SDGs Indicator Set, used at the national level by Eurostat, allows a more extended use of data and the emergence of territorial patterns that might not be visible at lower levels of disaggregation. This also makes the comparison of indicators possible with higher levels (regions and countries), enabling a better comprehension of trends within the country. An increasingly wide range of comparable indicators at urban scale are available on the Urban Data Platform designed by the JRC (*https://urban.jrc.ec.europa.eu/#/en*).
- **Relevance at local scale.** Some SDG indicators from the UN's Global Indicator Framework for the SDGs and the EU SDG Indicator Set 2019 are specifically defined for the national scale, while the goal of this Handbook is to propose locally-relevant indicators (i.e. Share of fe-

males elected in Local Councils as opposed to the share elected in National Parliaments).

- **Covering areas of competence of local governments.** The VLR and its indicators should be able to catch the contribution of the city towards the Goals: it is therefore important to take into account the possible areas of competence of local authorities, also within the variety of governmental and institutional frameworks of the EU countries.
- **Number of cities and availability in different countries.** The fact that an indicator is available for a large number of cities, allows for its comparability. For a detailed description of the geographical units used in the *Handbook*, see Annex 3.
- **Timeliness, time coverage and comparability over time.** A wide time coverage allows a study of trends over time, and the evaluation of progress made. The timeliness refers to the time gap between the collection of data and its publication of the indicator, which ideally should be as short as possible.
- **Affordability of data collection and production over time.** While ad-hoc indicators, obtained from surveys and specific research or experimental activities can be useful, the selection should favour those for which the production is continuous and scheduled over time.
- **Balanced.** Indicators selected cover the environmental, social, and economic pillars of sustainable development – in a balanced way.

Types of indicators proposed in the *Handbook*

1. **Official indicators, harmonised at the European Level,** usually produced by European or other international institutions, which are already available for use (i.e. SDG 3 Infant mortality).
2. **Experimental indicators, harmonised and available for a significant number of European cities:** these are usually produced by reliable scientific entities with European coverage and are easily available (i.e. SDG 13 - JRC - Urban Flood Risk Index).
3. **Official indicators, not harmonised, collected by countries or local entities:** these indicators are elaborated and disseminated according to the Fundamental Principles for Official Statistics from local statistical offices or administrations for few cities, regions or countries according to their specific situations (i.e. SDG 12 - Urban waste per capita).
4. **Experimental local indicators:** indicators produced by individual cities or organisations/institutions through innovative and experimental methods. These indicators are proposed in this *Handbook* as an example and inspiration for local authorities. They can help in describing specific local situations in the most appropriate way, assessing particular local challenges, and issues related to the specificity of each city (i.e. SDG 1 - Homeless).

Data sources

The indicators presented in this *Handbook* are gathered from:

- European institutions collecting official statistics[9].
- National Statistical System (NSS).
- Intergovernmental organisations, universities and research centres or institutions.
- Local administrations.
- NGOs, independent organisations, and foundations.

9 For the European Union, the legal framework is based on the European regulation (EC) No 223/2009 and the set of principles are called the European Statistics Code of Practice (Source: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Beginners:Statistical_concept_-_What_are_official_statistics%3F).

Part 2

URBAN INDICATORS FOR THE SDGs IN EUROPE

2

2.1
Reader's guide

This section of the *Handbook* is a ready-for-use tool for city officials, researchers and professionals for preparing the data backbone of the VLRs. This section proposes several options to generate strong evidences for the follow-up and review processes and for contributing to better decision-making to accelerate the achievement of the SDGs at urban level.

The complete list of all indicators suggested in this *Handbook* is available in Annex 1.

The proposed **71 indicators** include:

TYPE

45 official indicators

26 experimental indicators

ALIGNMENT

4 indicators
match the UN's Global Indicator Framework

10 indicators
match the EU SDG Indicator Set 2019

6 indicators
match both the EU set and the UN Global set

SOURCES

10 indicators
from Eurostat, City Statistics database

11 indicators from the JRC

2 indicators from DG REGIO

3 indicators from OECD

3 indicators from EEA

Every **goal** is introduced by the following three components:

- **Description of the goal**
- **European Dimension**
- **Local Dimension**

Some special **Boxes** in *Part 2* provide insights on specific topics, issues, or indicators.

After the Goal's description, a fiche per selected indicator is provided.

The indicator fiche is composed by graphic elements and textual sections.

For each graphic element, a brief explanation is provided. The textual sections provide several information. An overview of the topics is listed in the next page. Topics might slightly change according to the indicators.

Every **indicator fiche** is compose by **3 main parts**:

A

Side bookmark

B

Main information on the indicator and potential use and interpretation

C

Key Metadata

OVERVIEW

Comments / Limitations

- More realistic estimates of urban inequalities should be developed by establishing the risk of poverty threshold with the median equivalised disposable income calculated at city level. This would take more into account the (possibly) different costs of living with respect to the national average.
- Data should include both rates and absolute values. Furthermore, it is necessary to look at trends, to better understand how figures change over time.
- It would be informative to look at the number of people at risk of poverty before and after social transfers to understand the impact of social transfers in alleviating poverty.
- The income poverty indicator is a measure of income inequality in comparison to other residents of the territory, as it measures the share of people with an equivalised disposable income below the risk-of-poverty threshold which is set at 60% of the national median equivalised disposable income. Therefore, it does not necessarily imply a low standard of living.

Meta data

Source: Eurostat, City Statistics database (data collected from national statistics), table urb_clivcon, variable EC3065V.

Availability and geographical coverage: more than 100 European cities and greater cities in 2016.

Unit of measurement: Share (% of total population).

Level of aggregation: Cities and greater cities.

Time coverage and frequency: 2008-2018. Data is collected every year.

B

C

1 NO POVERTY

TYPE

Links to other SDGs

2 ZERO HUNGER

3 GOOD HEALTH AND WELL-BEING

5 GENDER EQUALITY

ALIGNMENT

UN list ☐

EU list ☑

COVERAGE

EU 28

AGGREGATION

CITIES AND GREATER CITIES

AVAILABILITY

100 CITIES AND GREATER CITIES >

SOURCE Eurostat, City statistics database

GOAL 1

PEOPLE AT RISK OF INCOME POVERTY AFTER SOCIAL TRANSFERS

Description of the indicator

This indicator is defined as the share of people with an equivalised disposable income below the risk-of-poverty threshold which is set at 60% of the national median equivalised disposable income (after social transfer). The total disposable household income is calculated by adding together the personal income received by all of the household members, the income received at household level diminished by regular taxes on wealth, regular inter-household cash transfer paid and the tax on income and social insurance contributions. To take into account the impact of differences in household size and composition, the total disposable household income must be 'equivalised'. The equivalised income attributed to each member of the household is calculated by dividing the total disposable income of the household by the equivalisation factor. Equivalisation factors can be determined in various ways. More details are available in *(Eurostat 2017a)*. This indicator measures one of the dimensions of the AROPE, which is the headline composite indicator to measure poverty within the Europe 2020 Strategy together with indicators concerning low work intensity and material deprivation (more details *Box 1*).
This indicator addresses aspects of Targets 1.2 (reduce poverty) and 1.3 (social protection) of UN SDGs. This indicator matches the indicator proposed in the EU SDGs indicator set.

European context

Income poverty is the most prevalent form of poverty in the EU and it has been increasing in the last years, with 84 million people at risk of poverty after social transfer in EU-28 in 2011 and 85 in 2018. However, not all countries registered an increase in this figure. For example, the number of people at risk of poverty after social transfers has been decreasing in Greece, Croatia, Serbia over the same period (source: Eurostat data code: sdg_01_20). Disaggregating the evidence across and within countries is helpful to target the areas that are lagging behind in the fight against income poverty.

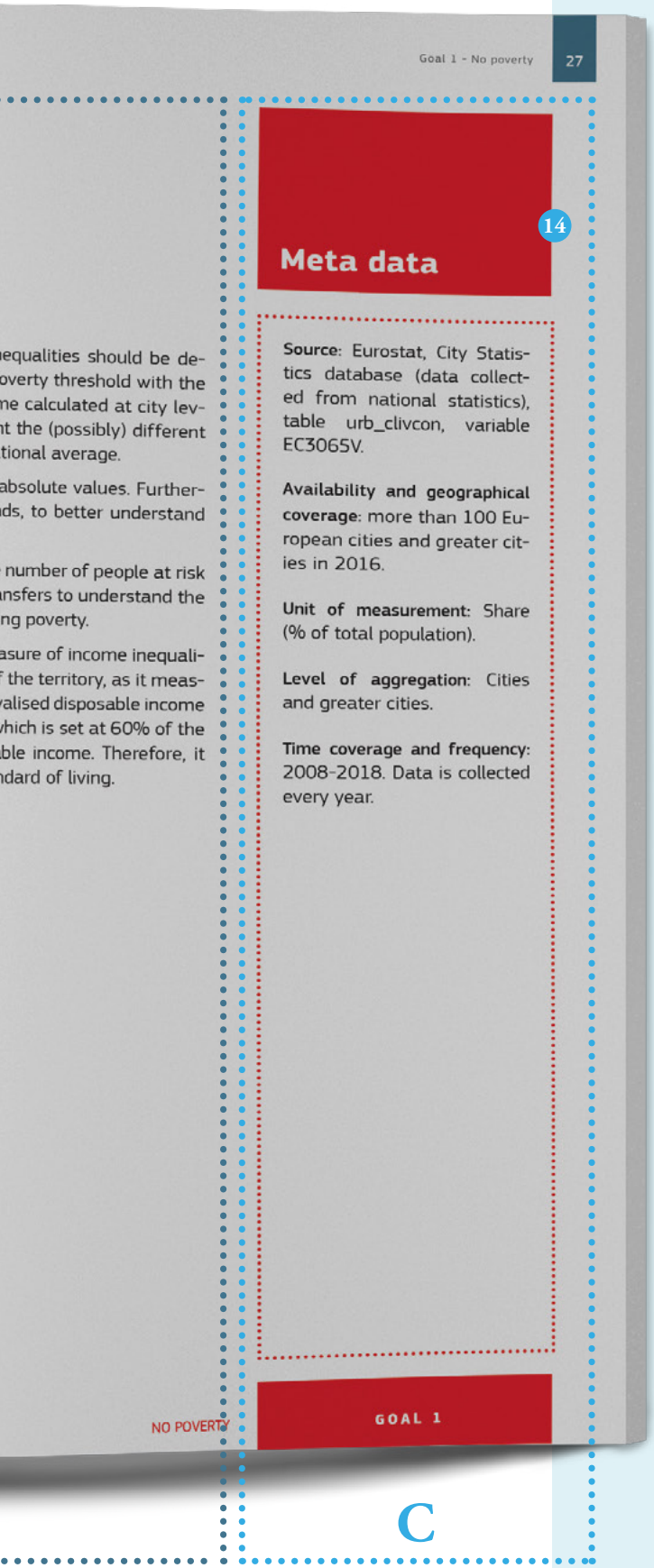
Comments / Limitations

- More realistic estimates of urban in
veloped by establishing the risk of p
median equivalised disposable incor
el. This would take more into accoun
costs of living with respect to the na
- Data should include both rates and
more, it is necessary to look at tren
how figures change over time.
- It would be informative to look at the
of poverty before and after social tra
impact of social transfers in alleviati
- The income poverty indicator is a mea
ty in comparison to other residents o
ures the share of people with an equiv
below the risk-of-poverty threshold w
national median equivalised disposa
does not necessarily imply a low star

A

B

LEGEND



1. **SDG icon**

2. **Type** 

3. This box includes the **interlinkages** of the indicators with other Goals.

4. **Alignment** with the UN's Global Indicator Framework
5. **Alignment** with the EU SDG Indicator Set 2019

6. **Geographical coverage**

7. Suggested level of **aggregation** for the VLRs

8. Number of units for which the indicator is **available** (entry points). For some indicators, the number of entry points varies over time.

9. **Data sources** (e.g. national statistical offices, research centres, international institutions, etc.)

10. **Indicator name**

11. **Definition of the indicator;** the main concepts used; input data and method of calculation; relevance; relation to SDG targets; correspondence with official SDG indicators.

12. **Specificity of the EU context;** time trends; best performers; EU policies and actions.

13. **Key elements of the data collection;** possible limitations due to formulation and interpretation; potential improvement or integration of the indicator; use and development of the indicator; relation with other factors, as identified in literature; key references; similar/related indicators.

14. This section includes the essential **metadata**: source (table, variable code, etc.); availability and geographical coverage; unit of measurement; level of aggregation; time coverage and frequency.

GOAL 1

END POVERTY IN ALL ITS FORMS EVERYWHERE

Description of the Goal

Eradicating poverty in all its forms and dimensions is recognised as the greatest challenge and an indispensable requirement for sustainable development. For instance, poverty limits people's opportunities to achieve their full potential, with consequences both in terms of social cohesion and sustainable growth. Poverty is a multidimensional concept and relates to economic, social, environmental, cultural and political aspects.

Targets of this goal focus on: eradicating extreme poverty, eventually counteracting the existence of poverty traps *(Kraay and McKenzie 2014; Duflo and Banerjee 2011)*; halving poverty in all its forms; ensuring all people enjoy a basic standard of living and social protection benefits; and building the resilience of the poor, also in the face of natural disasters *(Hallenatte et al. 2017)*.

European Dimension

Although extreme poverty is less relevant in the EU context than in other world regions, one of the five headline targets of the Europe 2020 Strategy is to reduce poverty by lifting at least 20 million people out of the risk of poverty and social exclusion by 2020 (compared with the 2008). This includes people affected by at least one of the following forms of poverty: income poverty, low work intensity and material deprivation.

The 2020 target remains an important challenge although, after the 2012 peak in poverty, there has been a continuous downward trend. For instance, in 2018 about 22% of the EU population was still at risk of poverty or social exclusion.

To tackle these challenges the Urban Agenda for the EU Partnership on Urban Poverty *(EC 2018)* has established four priorities of action: child poverty, deprived neighbourhoods and urban regeneration, homelessness, and vulnerability of Roma people *(Urban Poverty Partnership (UPP) 2018)*, whereas the European pillar of social rights focuses, among other priorities, on the prevention of the misuse of precarious employment relationships.

Local dimension

Local authorities are the most appropriate actors to identify vulnerable groups, especially for what concerns hard-to-measure populations like homeless *(James D. Wright 1992)*. For this reason, the municipal level could also be the most informed to alleviate the condition of poverty experienced by individuals, with the coordination and support of higher governance levels.

In particular, local authorities can counteract poverty acting on two typologies of constraints to the development of individuals: external constraints like institutional or governmental failures *(Bardhan 1997),* and internal constraints, such as behavioural and aspirational biases *(Dalton, Ghosal, & Mani, 2016; Walto, 2004)*.

Municipalities can target both these determinants of poverty avoiding that people remain poor for much or all of their lives in which case their children also become more likely to experience poverty.

Links to other SDGs

ALIGNMENT

UN list ☐

EU list ☑

COVERAGE

EU-28

AGGREGATION

CITIES AND GREATER CITIES

AVAILABILITY

100

CITIES AND GREATER CITIES

SOURCE **Eurostat, City statistics database**

PEOPLE AT RISK OF INCOME POVERTY AFTER SOCIAL TRANSFERS

Description of the indicator

This indicator is defined (according to the "Manual on city Statistics", *Eurostat 2018*) as the share of people with an equivalised disposable income below the risk-of-poverty threshold which is set at 60% of the national median equivalised disposable income (after social transfer).

The total disposable household income is calculated by adding together the personal income received by all of the household members, the income received at household level diminished by regular taxes on wealth, regular inter-household cash transfer paid and the tax on income and social insurance contributions.

To take into account the impact of differences in household size and composition, the total disposable household income is divided by an 'equalisation factor' to give the equivalised income attributed to each member of the household. Equivalisation factors can be determined in various ways. More details are available in *(Eurostat 2017a)*.

This indicator measures one of the dimensions of the AROPE, which is the headline composite indicator to measure poverty within the Europe 2020 Strategy together with indicators concerning low work intensity and material deprivation (more details *Box 1*).

This indicator addresses aspects of Targets 1.2 (reduce poverty) and 1.3 (social protection) of UN SDGs. This indicator matches one indicator proposed in the EU SDGs indicator set.

European context

Income poverty is the most prevalent form of poverty in the EU and it has been increasing in the last years, with 84 million people at risk of poverty after social transfer in EU-28 in 2011 and 85 in 2018. However, not all countries registered an increase in this figure.

It has been decreasing in Greece, Croatia, Serbia over the same period (source: Eurostat data code: sdg_01_20).

Disaggregating the evidence across and within countries is helpful to target the areas that are lagging behind in the fight against income poverty.

Comments / Limitations

- More realistic estimates of urban inequalities should be developed by establishing the risk of poverty threshold with the median equivalised disposable income calculated at city level. This would take into account to a greater extent the (possibly) different costs of living with respect to the national average.
- Data should include both rates and absolute values. Furthermore, it is necessary to look at trends, to better understand how figures change over time.
- It would be informative to look at the number of people at risk of poverty before and after social transfers to understand the impact of social transfers in alleviating poverty.
- The income poverty indicator is a relative measure of income inequality in comparison to other residents of the territory, as it measures the share of people with an equivalised disposable income below the risk-of-poverty threshold which is set at 60% of the national median equivalised disposable income. Therefore, it does not necessarily imply a low standard of living.
- The number of missing values changes from year to year.

Metadata

Source: Eurostat, City Statistics database (data collected from national statistics), table urb_clivcon, variable EC3065V.

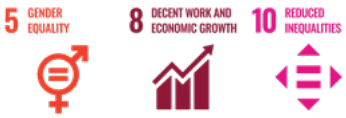
Availability and geographical coverage: more than 100 European cities and greater cities in 2016.

Unit of measurement: Share (% of total population).

Level of aggregation: Cities and greater cities.

Time coverage and frequency: 2008-2018. Data is collected every year.

Links to other SDGs



ALIGNMENT

UN list ☐

EU list ☑

COVERAGE

EU-28

AGGREGATION

CITIES AND GREATER CITIES

AVAILABILITY

100

CITIES AND GREATER CITIES

SOURCE **Eurostat, City statistics database**

PEOPLE LIVING IN HOUSEHOLDS WITH VERY LOW WORK INTENSITY

Description of the indicator

This indicator is defined (according to the "Manual on City Statistics", *Eurostat 2018*) as the share of individuals living in households where working-age members work for less than 20% of their total potential working time during the income reference year. A working-age person is a person aged 18-59 years, with the exclusion of students in the age group between 18 and 24 years.

The work intensity of a household is calculated as the ratio of the total number of months that all working-age (18-59 years) household members have worked during the income reference year and the total number of months the same household members could have theoretically worked in the same period.

Households composed only of children, of students aged less then 25 and/or people aged 60 or more are completely excluded from the indicator calculation. This indicator measures one of the dimensions of the AROPE, which is the headline composite indicator to measure poverty within the Europe 2020 Strategy together with indicators concerning income poverty and material deprivation (more details in *Box 1*).

This indicator addresses aspects of Target 1.2 (reduce poverty) and 1.4 (rights to economic resources) of the UN SDGs. This indicator matches to one of the indicators proposed in the EU SDGs indicator set.

European context

Very low work intensity is the second most frequent form of poverty. In 2018, the countries with the highest number of people living in household with low work intensity in the EU-28 were Serbia, Greece, Belgium, Italy and Croatia (Source: Eurostat data code: sdg_01_40).

Comments / Limitations

- The definition of working age in the calculation of the indicator should be in line with that used for the Europe 2020 employment target, which means increasing the upper age limit from 59 to 64.
- The indicator does not provide information concerning the reasons for the low work intensity. These might be related to the presence of people not in education, employment or training (NEET), to the need to provide care to other member of the household but also to involuntary part-time employment or to the presence of informal working activities. Therefore, it would be useful to complement this indicator with others able to explain the reasons for low work intensity.
- The number of missing values changes from year to year.

Metadata

Source: Eurostat, City Statistics database (data collected from national statistics), table urb_clivcon, variable EC3064V.

Availability and geographical coverage: more than 100 European cities and greater cities in 2016.

Unit of measurement: Share (% of total population).

Level of aggregation: Cities and greater cities.

Time coverage and frequency: 2008-2018. Data is collected every year.

1 NO POVERTY

TYPE

LONE PARENT PRIVATE HOUSEHOLDS

Links to other SDGs

5 GENDER EQUALITY

10 REDUCED INEQUALITIES

ALIGNMENT

UN list ☐

EU list ☐

COVERAGE

EU-28

AGGREGATION

CITIES AND GREATER CITIES

AVAILABILITY

450

CITIES AND GREATER CITIES

SOURCE **Eurostat, City statistics database**

Description of the indicator

This indicator describes (according to the "Manual on City Statistics", *Eurostat 2018*) the number of households with only one adult and at least one child under 18 years old.

A one-person household is a person that lives alone in a separate housing unit or who occupies, as a lodger, a separate room of a housing unit but does not join with any other occupants of the housing unit to form part of a multi-person household.

A multi-person household is a group of two or more individuals that join to occupy the whole or part of a housing unit and to provide themselves with food and possibly other essentials for living. Members of the group may pool their incomes to a greater or lesser extent.

This concept does not assume that the number of private households is necessarily equal to the number of housing units. The adult is not necessarily a biological parent but an adult of the family nucleus. This indicator addresses aspects of Targets 1.2 (reduce poverty) and 1.3 (social protection) of the UN SDGs.

European context

The incidence of different household types differs greatly among countries. However, the same household types are at the highest risk of poverty in most of the countries.

Amongst the household types more at risk, there is the group of lone parents *(Eurostat 2013)*. According to *(EUROSTAT 2018a)* almost half of this population were at the risk of poverty or social exclusion in 2016.

Looking at the incidence of this population in the 2008-2016 period, the share of single adults with children increased from 4.0 % to 4.4 % *(Source: Eurostat - online data code: lfst_hhnhtych available at https://ec.europa.eu/eurostat/statistics-explained/index.php/Household_composition_statistics#Household_size)*.

Comments / Limitations

- This indicator informs about the risk of social and economic poverty and the need for care facilities.
- The number of missing values changes from year to year.

Metadata

Source: Eurostat, City Statistics database (data collected from national statistics), table urb_clivcon, variable DE3005V.

Availability and geographical coverage: more than 450 European cities and greater cities in 2016.

Unit of measurement: Absolute number. Calculating the variation over time and the share over the total number of households is recommended.

Level of aggregation: Cities and greater cities.

Time coverage and frequency: 1990-2018. Data is collected every year.

1 NO POVERTY

TYPE

HOUSEHOLDS IN SOCIAL HOUSING

Links to other SDGs

ALIGNMENT

UN list ☐

EU list ☐

COVERAGE

EU-28

AGGREGATION

CITIES AND GREATER CITIES

AVAILABILITY

100

CITIES AND GREATER CITIES

SOURCE **Eurostat, City statistics database**

Description of the indicator

This indicator measures the number of households living in social housing. Generally, each country defines social housing differently. However, the main criterion is that social housing is organised to "fulfil a housing need for those who cannot compete in the market, afford to be homeowners or rent decent housing in the private market" *(United Nations 2015b)*.

Social housing is supplied at prices that are lower than the general housing market as it is supported by the State *(United Nations 2015b)* and assigned through administrative processes *(UNECE 2006)*. This indicator addresses aspects of Target 1.3 (social protection) of the UN SDGs.

The EU SDGs Indicator set includes indicators measuring overcrowding and the number of individuals living in dwellings with a leaking roof, damp walls, floors or foundation or rot in window frames or floor. On the contrary, it does not include an indicator measuring the number of inhabitants in social housing.

European context

In the last years, the most in-demand European cities have seen an increase in the ratio between house price and income. This is due to many phenomena: among others, the increase in investments from foreign and corporate investors in cities, an increase of population, and the use of popular platforms allowing homeowners to engage in short term rentals, especially to tourists *(Vandecasteele et al. 2019)*.

To mitigate the decrease in housing affordability in big cities and the outflow of some groups of residents, a strategy may be the creation of more social and public housing, as there is a persistent shortage of affordable dwellings and long waiting lists.

Despite the fact that affordable housing is a determinant of social cohesion and regional development and hence it is clearly linked to the EU Cohesion policy, housing remains under the sole authority of Member States and their local governments, with the EU having no direct mandate on it *(Housing Europe 2019)*.

Comments / Limitations

- The interpretation of this indicator is twofold. On the one hand, if the number of households living in social housing increases, there is an increase in the number of people in need of low cost housing, as they cannot afford to rent or buy a house on the private market. On the other hand, it also means that there is a higher number of dwellings provided by associations and local councils at low prices as a measure of social protection.

Metadata

Source: Eurostat, City Statistics database (data collected from national statistics), table urb_clivcon, variable SA1012V.

Availability and geographical coverage: more than 100 European cities and greater cities in 2016.

Unit of measurement: Absolute number. Calculating the variation of this indicator over time and the share over the total number of households is recommended.

Level of aggregation: Cities and greater cities.

Time coverage and frequency: 1991-2018. Data is collected every year.

1 NO POVERTY

TYPE

HOMELESS PEOPLE

Links to other SDGs

ALIGNMENT

UN list

EU list

COVERAGE

DENMARK

AGGREGATION

FUAs

AVAILABILITY

5

FUAs

SOURCE **VIVE – The Danish Center for Social Science Research**

Description of the indicator

This indicator provides information on the number of people who experience homelessness. The reference period for the data collection is one week. The operational definition according to which the census has been realised includes individuals: sleeping on the street, in stairwells, or similar places; spending the night in emergency accommodation; spending the night in temporary accommodation as nursing home; staying at hotel, hostel or similar places due to homelessness; living temporarily and without contract with family, friends or acquaintances; living in temporary lockout housing without permanent contract; currently in prison, due to be released within 1 month and lack a housing solution; currently in hospital, due to be realised within 1 month and lack a housing solution; spending the night in vehicles, caravans and the like or with an uninformed homelessness situation (e.g. entities that participate in the survey know that a citizen is in a homelessness situation, but they do not know in which of the eight situations the citizen is in).

This indicator addresses aspects of Target 1.1, 1.2, 1.3 and 1.4 of the UN SDGs.

European context

Homelessness is one of the most severe and persistent manifestations of marginalisation in Europe, as it arises out of a complex interaction among individual, societal and systemic factors that vary across time and places.

According with the Second Overview of Housing Exclusion in Europe (Maria-José Aldanas et al. 2017), presented in the European Parliament in 2017, homelessness is swiftly increasing in all countries. Despite this, recent initiatives aiming at collecting data on homelessness have mainly been local.

Across local collections, data is not harmonised because collected using different definitions of homelessness, methodologies and reference periods (more details on methods and reference periods in *Busch-Geertsema et al., 2014; James D. Wright, 1992).*

Comments / Limitations

- The Danish definition of homelessness, which has been used to gather data in the survey, is very similar to the light definition proposed in the European Typology of Homelessness and housing exclusion (ETHOS light). More information on the ETHOS and ETHOS light definitions are included in *Box 2*. However, some adjustments have been made in relation to the Danish conditions. For instance, while definitions of homelessness can vary within individual countries, the use of a standardised definition of homelessness (ETHOS or ETHOS light) is encouraged when the EU Member States conduct their censuses.
- In an attempt to understand homelessness, an important role has to be played by cities since no other administrative unit can better identify this hard-to-reach population *(Seymour Sudman, Monroe G. Sirken 1988; Kish 1991),* understand its needs, and produce targeted policies.
- Obtaining a better understanding of homelessness could contribute towards the implementation of the services dedicated to this population (inter alia the scaling up of housing first programmes).
- The use of data concerning homelessness should be cautious and the into consideration sensitive conditions *(Mitchell 1961)* and *(Petty 2016)*.

Metadata

Source: Hjemløshed i Danmark 2017. National kortlægning [Homelessness in Denmark 2017. National mapping] *https://www.vive.dk/media/pure/14218/3352843*.

Copenhagen: VIVE (Benjaminsen 2017; 2018).

Availability and geographical coverage: five FUAs in Denmark (København, Frederiksberg, Aarhus, Odense, Aalborg)

Unit of measurement: Absolute number, also disaggregated by homeless situation (e.g. living on the street), demographics (e.g. age cohort). Calculating the variation over time and the share of homeless over the number of residents is recommended.

Level of aggregation: FUAs and national totals.

Time coverage and frequency: 2009-2017. Data collected every other year.

Box 1

PEOPLE AT RISK OF POVERTY AND SOCIAL EXCLUSION (AROPE)

The AROPE indicator (At Risk Of Poverty or social Exclusion) has been developed within the framework of the EU statistics on income and living conditions (EU-SILC).

AROPE is a composite indicator that corresponds to the share of people who are either at risk of poverty, or severely materially deprived, or living in a household with a very low work intensity. Individuals at risk are only counted once, even if they are present in several sub-indicators.

The main limitation of the AROPE indicator is that it is derived from surveys on people living in private households; therefore, it does not take into account some key groups at very high risk such as people living in shelters, homeless people and other hard-to-reach groups like asylum seekers.

While the AROPE indicator allows for a broad comparison between densely-populated, intermediate, and thinly-populated municipalities (classified using the method of the Degree of Urbanization), it does not allow to distinguish across single LAUs' values. In order to overcome this limitation, Eurostat, together with Sogeti Luxemburg S.A., developed a test to apply small area estimation methods to disentangle information related to the AROPE indicator for several individual cities and FUAs for the year 2013. The methodology is described in *(Sogeti and Eurostat 2017)*.

In the framework of the local monitoring of the SDGs, if available, it is highly relevant to include information concerning the number of people at risk of poverty and social exclusion by municipalities.

Box 2

ETHOS AND ETHOS LIGHT DEFINITIONS

In 2005, FEANTSA launched the European Typology of Homelessness and Housing Exclusion (ETHOS). ETHOS has been developed as a means of improving the understanding and measurement of homelessness in Europe, and to provide a 'common language' for transnational exchanges.

The framework elaborated by FEANTSA includes two definitions: ETHOS and ETHOS Light.

ETHOS definitions includes:

- People living rough
- People in emergency accommodation
- People living in accommodation for the homeless
- People in omen's shelters
- People in accommodation for immigrants
- People due to be released from institutions
- People receiving long-term support (due to homelessness)
- People living in insecure accommodation
- People living under threat of eviction
- People living under threat of violence
- People living in temporary/non-conventional structures
- People living in unfit housing
- People living in extreme over-crowding

ETHOS Light is intended as a harmonised definition of homelessness for statistical purposes, and includes the following categories:

- People living rough
- People in emergency accommodation
- People living in accommodation for the homeless
- People living in institutions
- People living in non-conventional dwellings due to lack of housing
- Homeless people living temporarily in conventional housing with family and friends (due to lack of housing)

(Source: FEANTSA *https://www.feantsa.org/en/toolkit/2005/04/01/ethos-typology-on-homelessness-and-housing-exclusion*)

GOAL 2

END HUNGER, ACHIEVE FOOD SECURITY AND IMPROVED NUTRITION AND PROMOTE SUSTAINABLE AGRICULTURE

Description of the Goal

The aim of this goal is to move beyond under nutrition and also address the challenges related to sustainable food production and consumption.

European Dimension

Malnutrition, in all its forms, includes "under nutrition (wasting, stunting, and underweight), inadequate vitamins or minerals, overweight, obesity, and resulting diet-related non-communicable diseases" (World Health Organization).

Malnutrition can cause long lasting individual and societal impacts. On the contrary, a well-balanced diet, in combination with physical activity, low-risk consumption of alcohol, and avoidance of tobacco use, are good premises for a healthy life.

Furthermore, a healthy and active life also fosters productivity and competitiveness. This is especially true in Europe, where the main problem is not hunger – as in other parts of the world – but rather overweight, obesity and their consequences on health.

Policies concerning healthy nutrition are mainly targeted towards children and adolescents, as the benefits of such actions should be seen over a longer time span and therefore have a stronger impact on society as a whole.

The encouragement of sustainable agricultural practices is also essential, both to tackle malnutrition, and to ensure food security, despite the challenges posed by climate change and population growth. Sustainable agricultural systems also contribute to produce healthy food, diminish food waste, preserve the land and valorise the producers.

Local dimension

Goal 2 targets issues that are relevant for local governments and cities - in particular: tackling malnutrition, approaching sustainable food-production systems and managing verified and well-functioning food chains.

Cities can contribute towards this goal through: the provision of services, including meals for those who cannot afford it; the promotion of healthy diets and healthy food environments, and the creation of procurement processes that consider the need for supporting the consumption of healthy and safe food with a low environmental impact.

In urban areas, local governments can actively reduce food waste and improve food security. Cities can also promote sustainable urban agriculture practices both at the individual level and through community projects.

2 ZERO HUNGER

TYPE

ADULTS OVERWEIGHT (INCLUDING OBESE)

Links to other SDGs

1 NO POVERTY

3 GOOD HEALTH AND WELL-BEING

ALIGNMENT

UN list ☐

EU list ☑

COVERAGE

UNITED KINGDOM

AGGREGATION

MUNICIPALITIES

AVAILABILITY

ALL

BRITISH MUNICIPALITIES

SOURCE **Public Health England**

Description of the indicator

This indicator shows the percentage of adults (aged 18+) classified as overweight (including obese) ever the total population *(EUROSTAT, n.d.)*, using the Body Mass Index (BMI).

BMI is calculated by dividing an individual's body weight (in kilograms) by their height in metres squared. The resulting BMI can be categorised into four classes:

- Underweight if it is less than 18.5 kg/m2.
- Normal weight if it is between 18.5 (included) and 25 kg/m2 (excluded).
- Overweight if it is equal to or higher than 25 kg/m2.
- Obese if it is equal to or higher than 30 kg/m2.

Since data is not available at the local level across countries, the case of the UK is presented as an example.

This indicator addresses aspects of Targets 2.2 of the UN SDGs and with the EU SDGs indicator "Obesity Rate".

European context

Overweight and obesity in the EU Member States are issues of concern *(Caldeira et al, 2013)*, with an estimated 51.6% of the EU adult population (aged 18+) being overweight in 2014 *(EUROSTAT, 2015)*.

Unhealthy diet and overweight are associated with serious health problems, such as cardiovascular disease, type-2 diabetes, hypertension, and certain types of cancer, which have substantial direct and indirect associated healthcare costs. Consequently, healthy nutrition is a priority in the elaboration of health objectives.

The incidence of overweight and obesity differs across and within countries, but also amongst individuals depending on their sex, level of education and income *(EUROSTAT 2017c)*.

Comments / Limitations

- In middle and high-income countries, the rate of obesity is relatively higher among people of lower socioeconomic status (SES) compared to those with higher SES. Among the several factors likely contributing to this relationship, a possible explanation is that calorie-dense food (such as fried or processed food) tends to cost less on a per-calorie basis when compared to fresh fruit and vegetables *(Søren & Jo, 2010; World Health Organization; & UN-Habitat, 2010)*.

Metadata

Source: Public Health England, an executive agency sponsored by the Department of Health and Social Care of the UK Government *(Public Health England, n.d.)*

Availability and geographical coverage: All LAUs in the UK

Unit of Measurement: Share (% over total population). Calculating the variation of this indicator over time is recommended.

Level of aggregation: LAU level.

Time coverage and frequency: 2015/2016, 2016/2017 and 2017/2018.

2 ZERO HUNGER

TYPE

ORGANIC FOOD PURCHASED FOR SCHOOLS

Links to other SDGs

4 QUALITY EDUCATION
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
15 LIFE ON LAND

ALIGNMENT
UN list
EU list

COVERAGE
SWEDEN

AGGREGATION
MUNICIPALITIES

AVAILABILITY
232
SWEDISH MUNICIPALITIES

SOURCE **Swedish Food Agency**

Description of the indicator

This indicator measures the rate of organic food over total grocery purchases for schools by municipality. Data related to the amount of organic food purchased for schools is not available across countries at the local level. Therefore, the case of Sweden is proposed as a best practice in this domain.

This data is obtained through a survey involving Swedish municipalities (LAUs).

This indicator addresses aspects of Target 2.4 (sustainable food production) of the UN SDGs and it relates to the indicator "Area under organic farming" proposed in the EU SDGs indicator set.

European context

The promotion of healthy food and diets among children and adolescents has several benefits both on health and also on school performance. Agriculture is one of the most polluting activities, in terms of ammonia and green gas emissions, soil erosion and potential biodiversity loss, especially in intensive agriculture production systems *(Bonsmann, et al., 2017)*.

On the contrary, organic food production can help in preserving farmland ecosystems and diverse landscapes. Public procurement is a policy tool that can promote healthier choices both for nutrition and for preserving the environment.

In Europe, organic agriculture is on the rise, with Austria, Sweden, Estonia, Czech Republic and Latvia having the highest shares of agricultural area farmed organically.

Comments / Limitations

- While this database only covers the year 2017, calculating the variation of this indicator over time is recommended.
- Public procurement of food and related services does not only happen in schools but also in other places like worksite canteens, hospitals, universities. As a consequence, the promotion of organic or more generally healthy and sustainable food can be promoted further *(Storcksdieck, Caldeira, Gauci, Calleja, & Furtado, 2017)*.

Metadata

Data source: Swedish Food Agency. *(National Food Agency, n.d.)*. The Swedish Food administration is Sweden's expert and central control authority in the food sector.

Availability and geographical coverage: 232 Swedish LAUs.

Measurement: Share (% organic food in schools over total grocery purchases for schools by municipality).

Level of aggregation: Municipal level (LAU).

Time coverage and frequency: 2017

2 ZERO HUNGER

TYPE

SOUP KITCHENS FOR PEOPLE WHO CANNOT AFFORD FOOD

Links to other SDGs

1 NO POVERTY
3 GOOD HEALTH AND WELL-BEING
10 REDUCED INEQUALITIES

ALIGNMENT

UN list
EU list

COVERAGE

POLAND, SPAIN AND ITALY

AGGREGATION

CITIES

AVAILABILITY

10
CITIES IN POLAND, SPAIN AND ITALY

SOURCE **Sant'Egidio**

Description of the indicator

This indicator assesses the existence of soup kitchens in cities for people who cannot afford food. Beneficiaries of soup kitchens are people experiencing poverty, homelessness and other categories at risk of exclusion. This dataset, compiled by the Comunità di Sant'Egidio, collects information about the presence of soup kitchens in 10 cities in Poland, Spain and Italy.

This indicator addresses aspects of Targets 2.1 (end hunger) and 2.2 (end malnutrition) of the UN SDGs.

European context

Data shows that in Europe the situation has improved in the last years. Nevertheless, there is still a number of individuals that cannot afford the food they need to have a healthy diet.

The "European Union Statistics on Income and Living Conditions" (EU-SILC) is a source of comparable cross-sectional and longitudinal data on several issues concerning income, poverty, social exclusion and living conditions.

According to the EU-SILC, in 2016 approximately 8% of the population in Europe was unable to afford a meal with meat, fish (or a vegetarian equivalent) every second day, compared to 11% in 2012.

Since there is no harmonised EU-wide data on the provision of support for healthy nutrition as a whole in cities, data related to the support to healthy nutrition for the most vulnerable is proposed as an example.

Comments / Limitations

- The Comunità di Sant'Egidio not only monitors the availability of soup kitchens in cities but it also uses the gathered information to produce publications including several other services that might be useful for vulnerable groups (e.g. Soup kitchens and food delivery on the street; night shelters; clothes distribution centres; public showers; job agencies; health facilities and public libraries). In these publications information concerning the exact locations of services is also included, as well as information about how to reach these places through public transport.
- If possible, it would be useful to monitor the number of beneficiaries of soup kitchens against both the number of places available and the number of people living in severe material deprivation or experiencing homelessness. The first information is useful to measure the capacity to respond to manifested needs, the second to assess the accessibility to services for vulnerable groups.

Metadata

Source: Comunità di Sant'Egidio *(Sant'Egidio, n.d.)*

Availability and geographical coverage: 10 cities in Poland, Spain and Italy: Rome, Naples, Milan, Treviso, Venice, Genoa, Padua, Warsaw, Barcelona, and Madrid.

Unit of Measurement: Number of soup kitchens.

Level of aggregation: Municipal (LAU) level.

Time coverage and frequency: Time coverage and frequency change from city to city.

GOAL 3

ENSURE HEALTHY LIVES AND PROMOTE WELL-BEING FOR ALL AT ALL AGES

Description of the Goal

"Health is one of the most effective markers of any city's successful sustainable development" *(World Health Organization 2016)*.

Compared to the Millennium Development Goals that mentioned the need to reduce child mortality, improve maternal health and fight HIV/AIDS, malaria and other diseases, the SDGs encompass all health-related issues under one goal, SDG3, that includes mental, sexual and reproductive health care services, health issues related to communicable and non-communicable diseases, pollution, contamination and road traffic accidents.

Therefore, Goal 3 encompasses all dimensions of health from individual characteristics and behaviours, socio-economic factors as well as health services and research to prevent or treat and cure diseases.

European Dimension

The EU has made significant progresses in most of the spheres related to health *(Eurostat, 2018)*. On the one hand, life expectancy has improved and EU citizens enjoy one of the highest life expectancy in the world, due to a good access to health care, reduced child mortality and an improved living standard and advances in health (*Eurostat 2018*).

On the other hand, there is a well-known gap of roughly 20 years between the average life expectancy and the average healthy life expectancy in the EU.

This difference can be due to injuries or temporary disease, but most importantly to long term illnesses like cardiovascular disease, cancer or diabetes. For example, more than half of the population above the age of 18 was overweight in 2016; the number of people affected by communicable diseases is increasing; and air pollution hotspots remain.

In this framework, the EU supports, coordinates and integrates Member States in their health policies, but the main responsibility for health care policies and management is at national level.

Local dimension

Evidence suggests that differences exist in health status in relation to the place of residence, whether it is urban, rural or remote. Locational disadvantage, or where people live, can affect individuals' ability to improve their living conditions by denying them easy access to social support and healthcare. Even commuting small distances can make the access to care difficult for people without adequate and secure transport means.

Cities can have an important role to play in addressing health challenges. For instance, local interventions such as urban, environmental and transport planning and design, can strongly influence risk exposures *(Giles-Corti et al. 2016)*.

Moreover, the built quality, level of overcrowding and related cost of the housing might have a direct impact on health. Poor quality housing is associated with increased prevalence of allergic and inflammatory lung diseases, such as asthma. The incidence of infectious diseases and the number of accidental deaths are also positively associated with high levels of overcrowding *(Lloyd, Newell, and Dietrich 2004)*.

For example, poor health is concentrated in certain neighborhoods: it appears that the worst health outcomes are also those that are the poorest in economic terms. It is indeed necessary to look at health indicators disaggregated by income, neighborhood and social conditions so that health challenges of the disadvantaged do not go overlooked *(World Health Organization; and UN-Habitat 2010)*.

"To unmask the full extent of urban health inequities, it is important to disaggregate health and health determinants data within cities." (World Health Organization; and UN-Habitat 2010)

3 GOOD HEALTH AND WELL-BEING

TYPE

INFANT MORTALITY

Links to other SDGs

1 NO POVERTY

10 REDUCED INEQUALITIES

ALIGNMENT

UN list ☐

EU list ☐

COVERAGE

EU-28

AGGREGATION

CITIES AND GREATER CITIES

AVAILABILITY

300

CITIES AND GREATER CITIES

SOURCE Eurostat, City statistics database

Description of the indicator

This indicator measures (according to the "Manual on City Statistics", *Eurostat 2018*) the number of deaths of children born alive aged less than 1 year, during the reference year (per 1,000 live births). This indicator addresses aspects of Target 3.2 (end preventable deaths of new-borns) of the UN SDGs. It also relates to the "Life expectancy at birth" indicator included in the EU SDGs indicator set.

European context

The decrease in infant mortality rates is one of the most significant changes that has led to an increased life expectancy at birth.

During the period 1997-2017, the infant mortality rate in the EU-28 fell from 6.8 deaths per 1,000 live births to 3.6 deaths per 1,000 live births. Differences still exist among and within countries.

In 2017, the highest infant mortality rates in the EU-28 were registered in Malta and Romania (6.7 deaths per 1,000 live births), Bulgaria (6.4 deaths per 1,000 live births), whereas the lowest rates were recorded in Cyprus (1.3 deaths per 1,000 live births) and Finland (2.0 deaths per 1,000 live births).

Comments / Limitations

- Infant mortality is usually considered as an indicator of living conditions and of coverage and quality of health care. This figure may hide inequalities that exist across different groups of the population.

Metadata

Source: Eurostat, city statistics database (data collected from national statistics), table urb_cfermor, variable SA2004I

Availability and geographical coverage: more than 300 European cities and greater cities in 2018.

Unit of measurement: Number of deaths of children born alive aged less than 1 year per 1,000 live births. Calculating the variation over time is recommended.

Level of aggregation: Cities and greater cities

Time coverage and frequency: 1991-2018. Data is collected every year.

3 GOOD HEALTH AND WELL-BEING

TYPE

ADOLESCENT BIRTHS

Links to other SDGs

1 NO POVERTY
4 QUALITY EDUCATION
5 GENDER EQUALITY
10 REDUCED INEQUALITIES

ALIGNMENT

UN list ☑

EU list ☐

COVERAGE

EU-28

AGGREGATION

CITIES AND GREATER CITIES

AVAILABILITY

300

CITIES AND GREATER CITIES

SOURCE **Eurostat, City statistics database**

Description of the indicator

The adolescent birth rate is the number of live births per women aged 10-19.

This indicator addresses aspects of Target 3.7 of the UN SDGs (family planning).

European context

In the EU-28 the fertility rate by mother's age group, for the under 20 age group, has been continuously decreasing in the 2001-2017 period, contrarily to the fertility rate in the 30-34, 35-39 and over 40 cohort groups, that have been increasing over the same period (*EUROSTAT, Fertility statistics*).

Reducing adolescent pregnancies and adolescent birth rates is an important priority for many governments *(UNDESA 2013; United Nations 1995)* because adolescent childbearing is associated with a wide range of risks for young mothers and their newborns.

Apart from health risks, adolescent pregnancy might obstacle the socio-economic development of girls, because of the interruption of their education path, at least temporarily, a more difficult inclusion in the labour market, and possible social and political exclusion *(UNDESA 2013)*.

Comments / Limitations

- Adolescent birth rates can decline for several reasons: a reduction in the number of sexually active adolescents, an increase in the use of contraception, or an increase in abortions (voluntary or not). This suggests that relying solely on tracking adolescent birth rates is not sufficient for a complete assessment of the issue.
- The disaggregation of adolescent birth rates by neighbourhood might be useful for targeted policy making.

Metadata

Data source: Eurostat, City Statistics Database (data collected from national statistics), table urb_cfermor, variable, SA2010V

Availability and geographical coverage: more than 300 European cities and greater cities in 2017.

Unit of measurement: Number of adolescent births. Calculating the variation over time is recommended.

Level of aggregation: Cities and greater cities

Time coverage and frequency: 2011-2018. Data is collected every year.

3 GOOD HEALTH AND WELL-BEING

TYPE

DEATHS IN ROAD ACCIDENTS

Links to other SDGs

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

11 SUSTAINABLE CITIES AND COMMUNITIES

ALIGNMENT

UN list ☑

EU list ☑

COVERAGE

EU-28

AGGREGATION

CITIES AND GREATER CITIES

AVAILABILITY

400

CITIES AND GREATER CITIES

>

SOURCE **Eurostat, City statistics database**

Description of the indicator

This indicator describes (according to the "Manual on City Statistics", *Eurostat 2018*) the number of people who were killed outright or who died within 30 days as the result of road accidents, and excluding suicides involving the use of road vehicles.

If the death happens in the new reference year but within the 30 days from the accident, this number has to be counted in the previous year.

This indicator addresses aspects of Target 3.6 (road accidents) of the UN SDGs and matches to the indicator "People killed in road accidents" of the EU SDG indicator set.

European context

The number of fatalities counted in road traffic accidents has considerably fallen over the last 20 years: in the EU, it fell by 41% between 2007 and 2017 *(EUROSTAT 2019h)*. Differences between Member States are considerable: deaths in road accidents are generally lower in the North-Western EU Member States than in their Southern and Eastern-European counterparts.

Measures taken in the EU in the last decades to improve road safety appear to be paying off: the highest drop in the number of fatalities in the EU-28 was among buses and coaches, followed by car drivers and their passengers, and occupants of goods vehicles.

Instead, the fall in the number of fatalities among cyclists (-26.6 %) and pedestrians (-37.1%) was smaller *(EUROSTAT 2019h)*. Therefore, this is an area where the actions of the local administration can be largely effective in reducing the fatalities (such as improving sidewalks, bicycle paths, the street lighting, etc.).

Comments / Limitations

- Data are collected by Eurostat from Member States. All Member States should follow the international standard of 30 days established by the ECMT (European Conference of Ministers of Transport, an OECD body). Please note that, in order to ensure the geographical comparability, the preferred data source is the police data integrated by the hospital data (*EUROSTAT 2017a*).
- In the same database, the variable TT1060I measure the number of people killed in road accidents per 10,000 people.
- The community road accidents database (CARE) provides data at the national level disaggregated by user, gender, transport mode, age and month. A technical note on the CARE database in available in *(DG MOVE 2018)*.
- This indicator can also be disaggregated by cause: road, vehicle or person related accident. This level of disaggregation is relevant in order to intervene on the most recurrent causes of deaths accidents. Data can also be disaggregated per type of vehicle (inter alia car, bus, motorcycle, bicycle, pedestrian).

Metadata

Source: Eurostat, city statistics database, (data collected from national statistics), table urb_ctran, variable TT1060V

Availability and geographical coverage: more than 400 European cities and greater cities in 2018.

Unit of measurement: Absolute number. Calculating the indicator per 10,000 residents and its variation over time is recommended.

Level of aggregation: Cities and greater cities

Time coverage and frequency: 1992-2018. Data is collected every year.

3 GOOD HEALTH AND WELL-BEING

TYPE

Links to other SDGs

DAILY SMOKERS IN 1ST AND 2ND YEAR OF UPPER SECONDARY SCHOOL

ALIGNMENT

UN list ☐

EU list ☐

COVERAGE

FINLAND

AGGREGATION

MUNICIPALITIES

AVAILABILITY

ALL

FINNISH MUNICIPALITIES

SOURCE **National Institute for Health and Welfare - Finland**

Description of the indicator

This indicator describes the incidence of smoking among students. It is expressed as the share of students in the 1st and 2nd year of upper secondary school who are reporting to smoke one cigarette or more daily over the total number of 1st and 2nd year upper secondary school students (*National Institute for Health and Welfare – Finland 2019*). Since no harmonised data is available across Europe at the local level, the case of Finland is illustrated as an example.

This indicator addresses aspects of Target 3.a.1 of the UN SDGs (tobacco use among persons aged 15 years and older). This indicator relates to the indicator "Smoking Prevalence" proposed in the EU SDGs indicator set.

European context

The European Commission's Directorate-General for Health and Food Safety describes tobacco consumption as "the single largest avoidable health risk in the European Union", that is responsible for nearly 700,000 premature deaths every year.

Many forms of cancer, cardiovascular and respiratory diseases are linked to tobacco use. Furthermore, around half of smokers die prematurely *(EUROSTAT 2014b)*. In the EU policy, control measures related to tobacco consumption include: the regulation of tobacco products (not only in terms of packaging, but also advertising restrictions), the creation of smoke-free environments and tax measures.

These policies aim at protecting citizens from the hazardous effects of smoking and other forms of tobacco consumption, including against second-hand smoke.

Crucially, they aim to help smokers to quit or not to start in the first place. "Particular attention is paid to youth smoking given that 93% of smokers take up smoking before they turn 26" *(DG SANTE n.d.)*.

Despite the considerable progresses made, also through targeted initiatives to prevent young people to smoke, the age of young people experimenting tobacco is decreasing and number of young smokers in the EU is still high: 16% for those aged 15-24 (*EUROSTAT 2014b*).

Comments / Limitations

- Despite the considerable progresses made, also through targeted initiatives to prevent young people to smoke, the age of young people experimenting tobacco is decreasing and number of young smokers in the EU is still high: 16% for those aged 15-24 (*EUROSTAT 2014b*).
- This indicator might be calculated also disaggregated by gender.
- The analysis of this indicator at local level can be enhanced with the national statistics, collected by European School Survey Project on Alcohol and Other Drugs (ESPAD), in collaboration with the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) *(ESPAD 2015)*.

Metadata

Source: *(National Institute for Health and Welfare – Finland 2019)*

Availability and geographical coverage: Finnish cities

Unit of measurement: Share. Calculating the variation over time is recommended.

Level of aggregation: Cities

Time coverage and frequency: 2000-2013 and 2017, 2019

Box 3

CONTAMINATED SITES

The term 'contaminated site' refers to a well-defined area where the presence of contamination has been confirmed and presents a potential risk, so that risk management measures may be needed to reduce risks to an acceptable level *(Liedekerke et al. 2014)*.

The Joint Research Centre estimates that there are 2.5 million potentially soil contaminated sites in Europe, of which about 14% (340,000 sites) are highly likely to be in need of remediation measures *(Liedekerke et al. 2014)*.

While the creation of new contaminated sites is constrained by regulation, a large number of historically contaminated sites existand may present risks for local communities. Up to now, legal requirements for the general protection of soil have not been agreed at the EU level and only exist in some Member States *(inter alia EC 2008b; 2008a; EU 2010)*. However, the Integrated Pollution and Prevention Control Directive (IPPC 2008/1/ EC) requires that operations do not induce new soil contamination, and the Waste Framework Directive (2008/98/EC) and Landfill Directive (99/31/EC) provide indirect controls on soil contamination and requirements for its management *(Liedekerke et al. 2014)*.

In the framework of the local monitoring of the SDGs, it would be relevant to measure the effects of contaminants from different sources (e.g. petrochemical, waste treatment, power generation) on health.

The identification of single factors potentially impacting on health is challenging, since contamination can differ in forms and effects and can be spread over different geographical areas. However, in some cases the link between specific contaminations and citizens' health has been measured, and can serve as inspiration for cities with similar challenges and wishing to introduce a remediation strategy.

The SENTIERI Project is an extensive investigation on mortality in 44 sites of national interest for environmental remediation in Italy (National Priority Contaminated Sites—NPCSs). The analysis considers 63 single or grouped causes of death *(Pirastu et al. 2014)*.

GOAL 4

ENSURE INCLUSIVE AND EQUITABLE QUALITY EDUCATION AND PROMOTE LIFELONG LEARNING OPPORTUNITIES FOR ALL

Description of the Goal

Goal 4 aims to ensure that all people have access to quality education and the opportunity for lifelong learning. The Goal goes beyond data about school enrolment and also looks at both the availability of trained teachers and adequate school facilities, and at disparities in education outcomes *(United Nations 2017, E/2017/66:5)*. The custodian agency of this indicator is UNESCO *(UNESCO Institute of Statistics 2019)*.

European Dimension

SDG 4 can be monitored in an EU context by looking at the progress made in promoting and improving basic, tertiary and adult education. Upper secondary education is the minimum desired educational attainment level in the EU, as the skills and competences gained at that level are considered essential to enter the labour market.

Education and training is one of the eleven priorities for the *Cohesion Policy in 2014-2020* ("thematic objective 10"). The *European Social Fund* (ESF) and the *European Regional Development Fund* (ERDF) support activities that help to: modernise education and training systems, including investments in educational infrastructure; reduce early school leaving; promote better access to good quality education for all, from primary to tertiary level; enhance access to lifelong learning, and strengthen vocational education and training systems *(European Commission 2019f)*.

In addition to this, the EU developed the "Education and Training 2020" framework for cooperation in this specific field *(European Commission 2019e)*.

Education outcomes, as measured by pupils' performance in the PISA study for reading, maths and science, are still far from the respective EU target. The benchmark of 15% of adults participating in learning by 2020 will also likely be missed. Specific attention should be dedicated to young people with disabilities or from a migrant background, who show significantly lower educational attainment *(EUROSTAT 2019b)*.

The new Commission has identified the following priorities for 2019-2024: enable learners to move more easily between education systems in different countries, creating a European Education Area, and improving digital skills for both young people and adults (*Von Der Leyen 2019*).

Local dimension

In many countries, primary and secondary education fall under the direct responsibility of local governments, as they are the best equipped to identify specific local needs.

A good and efficient education system at the local level provides the best grounds for the integration of citizens from vulnerable groups, in particular those with disabilities, migrants and minorities.

Schools encourage integration and mutual knowledge, and through education and training, citizens can improve their employment and economic condition.

Furthermore, cities and local authorities have a great potential to implement innovative actions to ensure inclusive education for all, and can offer lifelong learning opportunities tailored to meet the needs of local production systems.

4 QUALITY EDUCATION

TYPE

CHILDREN 0-4 IN DAY CARE OR SCHOOL

Links to other SDGs

5 GENDER EQUALITY

8 DECENT WORK AND ECONOMIC GROWTH

ALIGNMENT

UN list ☐

EU list ☑

COVERAGE

EU-28

AGGREGATION

CITIES AND GREATER CITIES

AVAILABILITY

400

CITIES AND GREATER CITIES

SOURCE **Eurostat, City statistics database**

Description of the indicator

The indicator measures the number of children aged 0-4 who participate in early childhood education (day care or school). Early Childhood Education and Care (ECEC) is usually the first step in a child's educational pathway. Quality ECEC provides an essential foundation for future educational achievement and effective adult learning, leading to higher well-being, employability and social integration, especially for children from disadvantaged backgrounds.

The 'childcare gap' is the amount of time a child is not covered, neither by childcare leave nor a guaranteed place in ECEC. *"This is the period when families with young children have to make difficult decisions about whether to stay at home, whether to try to get a place in a high-demand public ECEC facility, or whether and how to pay for an expensive, private ECEC setting. In families with several young children, a long childcare gap with under-developed public ECEC services may lead to one parent (usually the mother) being obliged to drop out of the labour market to take care of the child(ren) without adequate compensation" (European Commission/EACEA/Eurydice/Cedefop 2014).*

This indicator addresses aspects of Target 4.2 (childhood education) of the UN SDGs and relates to the indicator "Participation in early childhood education" proposed in the EU SDGs indicator set.

European context

Early childhood education and care (ECEC) – the phase before primary education – is increasingly acknowledged as providing the foundation for lifelong learning and development. This indicator is also relevant for SDG 5 (Gender equality) and SDG 8 (Decent work and economic growth). Greater investment in quality and affordable childcare is linked to greater opportunities for women's economic advancement and empowerment. Adequate childcare is also a critical element of the decent work agenda.

Most children living in Europe start primary education around age 6 – this means that 31 million children are potential users of ECEC. However, not all of them have access to it: on average, 34%, or approximately 5 million children under age 3, attend ECEC. Unfortunately, good quality ECEC is not yet available for all children under age 3 in many European countries. Clear educational content for all children, delivered by highly qualified staff and supported by consistent policies is mostly found in the Nordic, Baltic and Balkan regions *(European Commission/EACEA/Eurydice 2019)*.

Comments / Limitations

- Data does not reveal if children aged 0-4 and who are not enrolled in day care or school are excluded because of an insufficient provision of places or for reasons linked with the preferences (or financial possibilities) of their families.
- According to EUROSTAT, early childcare education can be either part or full time during the day but the program must account for at least the equivalence of 2 hours per day and 1000 days a year in order to be classified as day care.

Metadata

Source: Eurostat, City Statistics database (data collected from national statistics), table: urb_ceduc, variableTE1001V *(https://ec.europa.eu/eurostat/web/cities/data/database)*

Availability and geographical coverage: 400 European cities and greater cities in 2016

Unit of Measurement: Absolute number. Calculating the variation over time is recommended

Level of aggregation: Cities and greater cities

Time coverage and frequency: 1990-2018. Data is collected every year

4 QUALITY EDUCATION

TYPE

ADULTS WITH LESS THAN PRIMARY, PRIMARY AND LOWER SECONDARY EDUCATION

Links to other SDGs

1 NO POVERTY
8 DECENT WORK AND ECONOMIC GROWTH
16 PEACE, JUSTICE AND STRONG INSTITUTIONS

ALIGNMENT

UN list ☐
EU list ☐

COVERAGE

EU-28

AGGREGATION

CITIES AND GREATER CITIES

AVAILABILITY

250
CITIES AND GREATER CITIES

SOURCE Eurostat, City statistics database

Description of the indicator

This indicator gives the number of individuals (aged 25-64) with an International Standard Classification of Education (ISCED) of level 0 ('Early childhood education'), 1 ('Primary education'), or 2 ('Lower secondary education') as their highest level of education.

The indicator addresses aspects of Target 4.6 (literacy and numeracy) of the UN SDGs.

European context

The educational attainment levels in the EU-28 have significantly improved over time: in 2018, 78.1% of people aged 25–64 attained at least an upper secondary level of education, compared to only 68.1% in 2004 (source of data *(EUROSTAT 2019c)*). On average, younger people attain higher levels of education than older ones.

The educational attainment of an individual is a crucial determinant of their quality of life and job opportunities. As an example, in 2018 the employment rate in the EU-28 was 55.5% for individuals with less than primary, primary and lower secondary education; 73.4% for those with upper secondary and post-secondary non-tertiary education (ISCED 3-4) and 84.5% for people with tertiary education (ISCED 5-8) (source of data *(EUROSTAT 2019c)*).

Comments / Limitations

- Adults with less than primary, primary and lower secondary education are also those least involved in formal and non-formal adult education *(Eurostat 2019a)*. Local authorities should invest in upskilling pathways, so creating new opportunities for adult residents having lower educational attainment levels *(European Union 2016)*.

Metadata

Source: Eurostat, City Statistics database (data collected from national statistics), table urb_ceduc, variableTE2025V *(https://ec.europa.eu/eurostat/web/cities/data/database)*

Availability and geographical coverage: more than 250 European cities and greater cities in 2016.

Unit of Measurement: Absolute number. Calculating the share and variation over time is recommended

Level of aggregation: Cities and greater cities

Time coverage and frequency: 1996-2018. Data is collected every year

4 QUALITY EDUCATION

TYPE

STUDENTS IN HIGHER EDUCATION BY GENDER

Links to other SDGs

8 DECENT WORK AND ECONOMIC GROWTH

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

ALIGNMENT

UN list ☐

EU list ☑

COVERAGE

EU-28

AGGREGATION

CITIES AND GREATER CITIES

AVAILABILITY

600

CITIES AND GREATER CITIES

SOURCE **Eurostat, City statistics database**

Description of the indicator

The indicator gives the number of students in higher education by gender.

Students in higher education are those attending levels 5-8 of the International Standard Classification of Education (ISCED) classification, including short-cycle tertiary education (5), Bachelor (6), Master (7) or doctoral studies (8).

The indicator addresses aspects of Target 4.3 (tertiary and vocational education) of the UN SDGs, and relates to the indicator "Tertiary education attainment" proposed in the EU SDGs indicator set.

European context

This indicator can be very relevant in assessing the availability and distribution of education services, and the relation to the number of female students.

The majority of tertiary students in the EU are women. However, they are over represented in some subject areas (e.g. social science, health, arts and humanities) and still under represented in others (e.g. science, technology, engineering and math - STEM see *Blasko, Pokropek, and Sikora 2018*).

Comments / Limitations

- The number of missing values changes from year to year.
- Having a higher education does not always mean having a higher salary or employment rate. Reducing under performance in the job market is one of the issues on which there is more ground for improvement *(Niven, Faggian, and Ruwanpura 2013)*.
- For each reference year (e.g. 2016), data refers to the school/academic year starting the year before in September (e.g. 2015/2016). As some universities have more than one campus, these might be situated in two or more different cities. In this case, students should be counted in the location/premises where they study (and not to the legal address of the university). If the exact information is not available, the best choice would be to divide the total number of students in the university by the number of cities where the campuses/departments are located. Online students are included only if they fulfil certain requirements *(see Eurostat 2017a)*.

Metadata

Source: Eurostat, City Statistics database (data collected from national statistics), table urb_ceduc, variable TE1026V (total), TE1027V (male), TE1028V (female) *(https://ec.europa.eu/eurostat/web/cities/data/database)*

Availability and geographical coverage: more than 600 European cities and greater cities in 2016

Unit of measurement: Absolute number. Calculating the share and the variation over time is recommended

Level of aggregation: Cities and greater cities

Time coverage and frequency: 1991-2018. Data is collected every year

4 QUALITY EDUCATION

TYPE

NON-NATIVE-SPEAKING STUDENTS GRADUATING FROM UPPER SECONDARY SCHOOLS

Links to other SDGs

8 DECENT WORK AND ECONOMIC GROWTH

10 REDUCED INEQUALITIES

ALIGNMENT

UN list ☐

EU list ☐

COVERAGE

HELSINKI

AGGREGATION

MUNICIPALITIES

AVAILABILITY

1

SOURCE **Helsinki Region Infoshare**

Description of the indicator

This indicator gives the share of non-native-speaking students who graduate from upper secondary school over the total number of graduates. Since no consistent data is available Europe-wide at the local level, the case of Helsinki is illustrated here as an example.

This indicator is highly relevant for the city, where the Education Division approved the Development Plan for Immigrant Education 2018-2021.

Education is one of the main tools to promote integration and support disadvantaged groups in improving their economic situation: ad-hoc programs to improve it should be a key element of city strategies.

This indicator addresses aspects of Target 4.5 (access to education) of the UN SDGs.

European context

Young people with a migrant background - those born either outside the country or with foreign-born parents - face more difficulties in schooling than native students, as demonstrated by the Early Leavers from Education and Training Statistics (ELET).

In 2018, the share of early school leavers at EU level was twice as high for people born outside the EU than for people studying in their country of birth. Foreign-born men are the most at risk, with an ELET rate of 22.8% in 2018.

Young people from a migrant background also have a higher risk of underperforming at school.

In almost all EU Member States, the difference in the share of low achievers between first-generation immigrant students and their non-immigrant counterparts was substantial in 2015 - amounting to as much as 25 to 33 percentage points in some countries *(EUROSTAT 2019)*.

Comments / Limitations

- There are constraints regarding of comparability with other cities and the limited availability of data over time. It is recommended to collect time series of at least 10 years and compare data according to the increment of non-native-speaking students enrolled in the school system.

Metadata

Source: Helsinki Region Infoshare, local data *https://hri.fi/data/en_GB/dataset/helsinki-koulutus*

Availability and geographical coverage: city of Helsinki

Unit of Measurement: Share (% of total graduates)

Level of aggregation: Municipal

Time series and frequency: Available for 2017 and 2018

GOAL 5

ACHIEVE GENDER EQUALITY AND EMPOWER ALL WOMEN AND GIRLS

Description of the Goal

Achieving gender equality and empowering all women is now acknowledged as necessary to foster sustainable development (*EUROSTAT 2019*). Goal 5 refers to several initiatives necessary to achieve gender equality, among which, the implementation of actions to eliminate all forms of violence against women in public and private spheres. Other important actions to obtain gender equality consist in the implementation of non-discriminatory behaviour, in the repartition of care work, property rights, access to information, education, labour market and power positions. Finally, the longitudinal aspect is particularly relevant in order to investigate gender-related issues due to the prominent role of persistent cultural biases in determining gender discrimination.

European Dimension

Gender equality is a core value in Europe as stated in foundational documents of the EU such as the Treaty on the Functioning of the European Union, which states: "*In all its activities, the Union shall aim to eliminate inequalities and to promote equality, between men and women*" *(European Union 2012)*.

In this context, the EC considers the gender-based analysis as a useful tool to gather data on the causes and consequences of gender inequality and to inform policies.

From (*EUROSTAT 2019a*), it is clear that progress has been made on gender equality in the last years. For instance in the 2012-2017 period the increase in employment rates has been greater for women, and the gender pay gap has decreased (16% in 2017) in EU-28 countries.

Moreover, the share of women representatives in national parliaments has increased. Conversely, the representation of female in the boards of the largest listed companies is still very low: progresses towards gender equality in this respect is slow.

Local dimension

In 2019, JRC published a report on gender equality at the regional level *(Norlén, Papadimitriou, and Dijkstra 2019)*.

This analysis demonstrates that differences within member stated are significant. In particular, it emerged that women in capital regions achieve more in terms of educational attainments and employment conditions, but feel less safe than in other regions.

It would be useful to understand if these findings hold at the municipal scale to be able to intervene in territories focusing on the most pressing issues, without dispersing resources.

5 GENDER EQUALITY

TYPE

GENDER EMPLOYMENT GAP

Links to other SDGs

8 DECENT WORK AND ECONOMIC GROWTH

10 REDUCED INEQUALITIES

ALIGNMENT

UN list ☐

EU list ☑

COVERAGE

EU-28

AGGREGATION

CITIES AND GREATER CITIES

AVAILABILITY

600

CITIES AND GREATER CITIES

SOURCE **Eurostat, City statistics database**

Description of the indicator

The gender employment gap (according to the *Eurostat 2018*) is defined as the difference between the employment rates of men and women. The employment rate is calculated by dividing the number of employed people aged 20-64 by the total population of the same age group.

A person can be considered to be employed if, during the reference week period of the data collection, they performed work for pay or profit for at least an hour, or was not working but had jobs from which they were temporarily absent (for example due to illness, holidays, industrial dispute, or education and training).

This indicator addresses aspects of Target of 5.1 (end gender discrimination) of the UN SDGs. This indicator matches to the indicator "Gender employment gap" proposed in the EU SDGs indicator set.

European context

As for time trends, the gender employment gap in the EU-28 has been continuously decreasing in the 2002-2017 period *(EUROSTAT 2018)*.

On average, the employment rate of men is higher than that of women (73% for men compared with 62% for women in 2017). However, it is interesting to note that the employment rates of both women and men increase with the number of children and then, after a certain threshold, decrease.

In the EU in 2017, the employment rate for women without children was 66%, while it was 74% for men.

For women with two children, the rate increases to 72%, for women and up to 90% for men. For those with three or more children, the employment rate then decreases to 57% for women and to 85% for men *(EUROSTAT 2018)*.

Comments / Limitations

- The number of missing values changes from year to year.
- The gender employment gap is smaller in cities than in rural areas. However, reducing the gender gap further would increase the resilience of families to shocks (e.g. during economic crisis) (*EUROSTAT, Statistical on rural areas in the EU*).
- The gender employment gap does not include information about part-time and full-time jobs.
- The literature emphasises that poor women are the most vulnerable to violence. Therefore promoting policies and initiatives to increase the participation of women in the labour market as well as reducing gender wage gaps *(Aizer 2010)*, might also be favourable to reduce the episodes of violence.

Metadata

Source: Eurostat, City Statistics database (data collected from national statistics), table urb_clma, variable EC1178V (Persons employed, 20-64, male) and EC1179V (Persons employed, 20-64, female). For population data by age and gender, refer to variables from DE1049V to DE1027V).

Availability and geographical coverage: more than 600 European cities and greater cities in 2016.

Unit of measurement: Difference between the employment rates of men and women.

Level of aggregation: Cities and Greater Cities.

Time coverage and frequency: 2008-2018. Data is collected every year.

5 GENDER EQUALITY

TYPE

Links to other SDGs

3 GOOD HEALTH AND WELL-BEING

4 QUALITY EDUCATION

10 REDUCED INEQUALITIES

ALIGNMENT

UN list ☐

EU list ☐

COVERAGE

UNITED KINGDOM

AGGREGATION

NUTS3

AVAILABILITY

ALL

BRITISH NUTS 3

SOURCE Health and Social Care Information Centre

AVERAGE SATISFACTION WITH LIFE BY SEXUAL IDENTITY FOR 15-YEAR-OLD CHILDREN

Description of the indicator

This indicator considers the average satisfaction with life by sexual identity for 15-year-old. Since no harmonized data is available across Europe for this indicator, the case of UK is illustrated here as an example.

The 2014 'What About YOUth?' (WAY) survey asked respondents to categorise their sexual identity among the following options (heterosexual, gay, lesbian, bisexual, other and prefer not to say). The survey also asked questions related to how the respondents felt about aspects of their life on a scale from 1 to 10, with a score of 0 to 4 being described as 'bad', 5 to 6 as 'medium', 7 to 8 as 'good' and 9 to 10 as 'very good'.

Questions about how respondents feel about their lives use validated questions from the Annual Population Survey (APS) *(Public Health England 2017)*.

This indicator addresses aspects of Targets 5.1 (end gender discrimination) of the UN SDGs.

European context

In 2010, the Recommendation from the Committee of Ministers to Member States asked to improve the measurement of discrimination on grounds of sexual orientation in order to induce more appropriate measures to address the issue *(Committee of Ministers 2010)*.

In 2018, the first comprehensive synthesis of how education sectors respond to 'Sexual Orientation, Gender Identity and Expression, and Sex Characteristics' (SOGIESC) based violence in MS was published by the Council of Europe *(Council of Europe 2018)*.

The report identifies the key trends in Europe concerning actual SOGIESC violence, explores how Member States try to prevent and address this violence and also gives some recommendation. Besides this first assessment, there is not comparable data at the local level on the satisfaction with life by sexual identity.

Comments / Limitations

- The literature finds that students who are identified by others as lesbian, gay, bisexual, transgender, and questioning (LGBTQ) experience a higher risk of school victimisation *(Kopels, S., & Paceley 2012; Robinson and Espelage 2012; Toomey et al. 2010; Paceley and Flynn 2012)*. Victimisation has a negative impact on the mental and physical health of those involved and may result in higher levels of discomfort, lower educational achievements as well as long-term effects: lower work qualifications; difficulties to form meaningful relationships; and a greater likelihood of engaging in anti-social or deviant behaviours *(Council of Europe 2018)*.
- Average satisfaction is a subjective measure influenced by a multiplicity of factors. Hence, caution is recommended in the interpretation of results and in comparative analysis.
- Municipalities are the main actors involved in education; therefore, they might be interested in realising comparative analyse in order to inform policies against discrimination and bullying in schools based on sexual identity *(Daria Denti 2019b)*.

Metadata

Source: Health and Social Care Information Centre, UK (*National Health Service 2015*)

Availability and geographical coverage: British counties

Unit of measurement: Rating (0-10). Survey data.

Level of aggregation: Counties

Time coverage and frequency: 2014

5 GENDER EQUALITY

TYPE

Links to other SDGs

3 GOOD HEALTH AND WELL-BEING

10 REDUCED INEQUALITIES

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

ALIGNMENT

UN list ☐

EU list ☐

COVERAGE

SPAIN

AGGREGATION

PARTIDO JUDICIAL

AVAILABILITY

ALL

ALL PARTIDOS JUDICIALES

SOURCE **Delegación del Gobierno para la Violencia de Género - Spain**

FORMAL COMPLAINTS FOR EPISODES OF VIOLENCE AGAINST WOMEN

Description of the indicator

The indicator represents the number of cases of violence against women reported to the police or to a judicial court. Since no data is available across Europe at the local level, the case of Spain is illustrated here as an example.

The European Union defines 'violence against women' as "any act of gender-based violence that results in, or is likely to result in, physical, sexual or psychological harm or suffering to women, including threats of such acts, coercion or arbitrary deprivation of liberty, whether occurring in public or in private life" (Eurobarometer, 2010).

This indicator addresses aspects of Target 5.2 (end gender violence) of the UN SDGs and relates to the indicator "Physical and sexual violence to women experience within 12 months prior to the interview" of the EU SDG indicator set.

European context

The Istanbul Convention, which the Council of Europe adopted in 2011, is the first legally binding regional instrument in Europe that comprehensively addresses different forms of violence against women, such as psychological violence, stalking, physical violence, sexual violence and sexual harassment.

According to the Fundamental Right Agency (FRA) survey realised in 2013, according to 13 million women in the EU had experienced physical violence in the course of the 12 months before the survey interviews. This corresponds to 7% of women aged 18–74 years in the EU.

Unfortunately, there is no comparable data at the local level, despite the relevance of the phenomenon and the involved costs in terms of the personal (physical and emotional) impact on the victims, provision of services (including health, legal, social and specialised) and also lost economic output (*European Institute for Gender Equality 2014*). Spain scores higher than average in Europe in the Gender equality Index proposed by European Institute for Gender Equality (EIGE), and its performance has been improving in the period 2005-2015.

Comments / Limitations

- According to an investigation of the *Ministerio de Sanidad Servicios Sociales e Igualdad* only the 26.8% of women who have experienced physical or sexual violence throughout their lives, or have been afraid of it, reported the facts to the police and 1.7% reported it directly to court. Therefore, this indicator offers an underestimation of the gender-based violence phenomenon.
- Improving services dedicated to women who have experienced any form of violence might encourage them to denounce *(Daria Denti 2019a)*.
- Women's public outcry to express the sexual harassment and assault they experienced at the international, national and local level might have increased the incidence of formal complaints for episodes of violence against women in certain periods, while the rise of hate speeches and ethnic discriminations might have fostered gendered discrimination *(Daria Denti 2019a)*.
- To measure effectively victims' charges to the police, data should not be affected by inaccuracies in recording. Whenever this is the case, these statistics cannot convey a reliable measure (*Basu, Jaising, and Collective 2005*).

Metadata

Source: *Delegación del Gobierno para la Violencia de Género* (Delegation of the Government for the Gender Violence) *http://estadisticasviolenciagenero.igualdad.mpr.gob.es/*. Additionally, data on population is available from the Instituto Nacional de Estadistica (*https://ine.es/dyngs/INEbase/en/categoria.htm?c=Estadistica_P&cid=1254734710990*).

Availability and geographical coverage: Spanish "Partidos Judiciales"

Unit of measurement: Absolute number. It is recommended to look at number of complaints in a territorial unit over the number of women in that unit.

Level of aggregation: Partido Judicial (this is a territorial unit for the administration of justice, composed of one or more municipalities bordering and within the same province), Provincia (NUTS3), Comunidad autonoma (NUTS 2).

Time coverage and frequency: 2010-2019. Data is collected every year.

5 GENDER EQUALITY

TYPE

FEMALE HOSPITALISATION FOR ASSAULT

Links to other SDGs

3 GOOD HEALTH AND WELL-BEING

10 REDUCED INEQUALITIES

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

ALIGNMENT

UN list ☐

EU list ☐

COVERAGE

DENMARK

AGGREGATION

MUNICIPALITIES

AVAILABILITY

ALL DANISH MUNICIPALITIES >

SOURCE Statistics Denmark StatBank

Description of the indicator

This indicator measures the number of women recorded in hospital emergency departments as victims of assaults. Hospitalisation data is considered an improvement over self-reports of violence, as they include a wider population than the one considered in surveys.

Furthermore, these statistics allow for fine-grained analysis of sexual violence. Since no harmonized data are available across Europe at the local level, the case of Denmark is illustrated here as an example.

This indicator addresses aspects of Target 5.2 (end gender violence) of the UN SDGs and it relates to the previous indicator.

European context

The indicator of 'Formal complaints for episodes of violence against women' does not measure the prevalence of sexual assaults against women, rather it is a measure for the propensity of female victims to report sexual offences to the police.

To this regard, it represents a valuable indicator to gauge the effectiveness of public policy in helping women to overcome fear/embarrassment and seek justice at the local level.

This element is extremely relevant in term of gender equality, given the strikingly low level of female victims reporting sexual offences to the police, mainly due to the fear of stigma and the fear of lacking an adequate support by the welfare system.

In this context, the 'female hospitalisation for assault data' allows to integrate the knowledge on the extent of women victimisation in cities and to compare it with formal complaints and eventually improve local public services.

Comments / Limitations

- The same indicator has been used by Aizer in her empirical analysis on the effect of the gender wage gap on domestic violence in the US *(Aizer 2010)*.
- This indicator includes assault occurring both in public and in private life.
- Disaggregated data accounting for the severity and frequency of episodes of violence against women might complement data referring only to the frequency of episodes over total population.
- This indicator differs from the indicator proposed by EUROSTAT at country level. That indicator is obtained through a survey elaborated by the European Union Agency for Fundamental Rights (FRA), according to which women were asked whether they have experienced physical and/or sexual violence in the 12 months prior to the interview.

Metadata

Source: Statistics Denmark Stat Bank database, variable SKADP01. *https://www.statbank.dk/statbank5a/default.asp?w=1536*

Availability and geographical coverage: Danish municipalities

Unit of measurement: Absolute number. Considering the number of hosts, it is recommended to calculate the share with respect to the 100,000 women.

Level of aggregation: Municipality. Statistics show the absolute counts of female population recorded as assault victims at hospital emergency departments. Population is further broken down by 5-years of age intervals.

Time coverage and frequency: 2006-ongoing. Data is collected every year.

5 GENDER EQUALITY

TYPE

SEATS HELD BY WOMEN IN MUNICIPAL GOVERNMENTS

Links to other SDGs

8 DECENT WORK AND ECONOMIC GROWTH
10 REDUCED INEQUALITIES
16 PEACE, JUSTICE AND STRONG INSTITUTIONS

ALIGNMENT
UN list ☑
EU list ☑

COVERAGE
ITALY

AGGREGATION
MUNICIPALITIES

AVAILABILITY
ALL
ITALIAN MUNICIPALITIES

SOURCE **Italian Ministry of the Interior**

Description of the indicator

This indicator measures the share of seats held by women in municipal governments (%). Since no harmonized data is available across Europe at the local level, the case of Italy is illustrated here as an example. The share of seats held by women in municipal governments has to be calculated from the list of individuals holding a position per each municipality, their sex, political coalition and education, as available in the dataset *(Dipartimento per gli affari interni e territoriali 2019)*.

This indicator addresses aspects of Target 5.5 (women participation and leadership) of the UN SDGs.

This indicator relates to the indicator "Proportion of seat in national parliament and governments" proposed in the EU SDGs indicator set.

European context

The European Institute for Gender Equality (EIGE) releases data on the share of seats held by women in national parliaments and regional assemblies, as well as in regional executives.

Looking at figures related to the seats held by women in national parliaments, a constant increase is observed in the period 2003-2018 (20.5%-29.7% Source: *EUROSTAT 2018*). However, since there is no data at the municipal level across EU-28 countries, the case of Italy is presented here as example, where data concerning the composition of all the municipal governments is open and available from the website of the Ministry of the Interior.

Comments / Limitations

- Elaborations on this data allow for an analysis based on gender and not on sexual identity.
- In the literature, several determinants of female representation in government are analysed. Among the several contributions, *(Profeta and Woodhouse 2018)* study the effect of electoral rules in increasing female representation in governments, *Sundström and Wängnerud 2014* investigate corruption as a potential obstacle to women's representation using data on locally elected councillors in 167 regions in Europe and B*askaran and Hessami 2018* collect data for 109,017 candidates in four open-list local council elections in all 426 municipalities of a German state and show that female leaders lead the way for more.

Metadata

Source: *Governo Italiano Ministro dell'Interno* (Italian Ministry of the Interior) *https://dait.interno.gov.it/elezioni/open-data?f%5B0%5D=node%253Afield_argomento%3A180*

Availability and geographical coverage: Italian municipalities.

Unit of measurement: Share.

Level of aggregation: Municipality (LAU). Administrative data.

Time coverage and frequency: 1986-2019. Data is collected every year.

GOAL 6

ENSURE AVAILABILITY AND SUSTAINABLE MANAGEMENT OF WATER AND SANITATION FOR ALL

Description of the Goal

This goal calls for ensuring availability of safe and affordable drinking water for all, guaranteeing access to adequate and equitable sanitation and hygiene, and ending open defecation. It also aims at: reducing water pollution; increasing wastewater treatment and water use efficiency; and reducing the number of people affected by water scarcity implementing integrated water resources management at all levels. At the same time, it seeks for the protection and restoration of water-related ecosystems.

European Dimension

Most people living in the EU enjoy very good access to high quality drinking water and sanitation facilities. Water efficiency has also increased and the average drinking water daily consumption dropped in the last 20 years from 200lt to around 120lt per person (*EEA 2016*).

These results come from a long tradition of water management in many EU countries, but are also in large measure due to European environmental legislation, initiatives as the European Innovation Partnership on Water *(European Innovation Partnerships (EIP) 2019)*, and funding.

However, some existing and emerging challenges for sustainable urban water management need attention also in Europe: demographic changes – due mainly to migration and seasonal tourism – pose additional stress on water supply for households. Climate change also has an effect on water availability and, with other factors, it could increase flooding risk in urban areas.

The Water Blueprint *(European Commission 2012)* tries to address these challenges, by reviewing and outlining actions that concentrate on better implementation of current water legislation, integration of water policy objectives into other policies, and by filling the gaps in particular as regards to water quantity and efficiency. At the local level, the European Commission has launched a joint initiative together with local governments, the Urban Water Agenda 2030, to foster sustainable urban water management in cities *(Urban Water Agenda 2030 2019)*.

Local dimension

Water governance is very complex and diverse across Europe. Water services, including supply of drinking water, collection and treatment of wastewater, and rainwater management, are regulated at EU and national levels, but organised and managed at local level either by public authorities or by private companies.

Cities are directly responsible for delivering drinking water, wastewater services, storm water management, and the related costs. Whether they manage the water supply or not, cities are in charge of approving tariffs, determining the quality of service as well as setting and enforcing environmental and health standards, ensuring excellent wastewater collection and treatment, and protecting wetlands and river basin from urban development.

Local governments play a main role in the achievement of sustainable urban water management, promoting and implementing measures to foster water saving and efficiency. Cities might also be responsible for raising adequate awareness among citizens about plans and projects for the responsible use and management of water. Initiatives as the *Amsterdam rainproof* platform *(Amsterdam rainproof platform 2019)* are successful examples of public administration entities, entrepreneurs and citizen exchanging ideas for better water management.

Lastly, cities are living labs developing innovative and alternative solutions to traditional costly drainage and sewage systems by maximizing water efficiency (*Lisbon (EPAL - Empresa Portuguesa das Águas Livres 2019)*), developing urban interventions that maximize water infiltration and mitigate floods (Antwerp), or using natural waterways as draining systems *(Oslo 2019)*.

6 CLEAN WATER AND SANITATION

TYPE

WASTEWATER SAFELY TREATED

Links to other SDGs

ALIGNMENT

UN list ☑

EU list ☑

COVERAGE

EU-28

AGGREGATION

AGGLOMERATIONS

AVAILABILITY

–

SOURCE **European Environmental Agency**

Description of the indicator

This indicator provides information on the shares of load generated in big cities or big discharge areas (agglomerations) receiving particular types of wastewater treatment. The dataset distinguishes between the following classes of treatment: not collected nor treated, collected but not treated, treated in individual or other appropriate systems, primary treatment, secondary treatment and more stringent treatment. Data is measured or estimated. For more method details see *(EEA 2019b)*.

The indicator addresses Target 6.3 (improve water quality) of the UN SDGs and it matches with the indicator proposed in the UN SDG the EU SDGs indicator set.

European context

The European Urban Waste Water Directive *(EEC 1991)* concerns the collection, treatment and discharge of wastewater and imposes requirements on implementation and treatment.

Member States must report on the level of accomplishment of the UWWD and the identification of sensitive areas where more stringent waste treatment measures should be applied. Land-based activities are responsible for generating an important fraction of marine litter.

More specifically, household related waste seems to generate most of the marine litter in the Mediterranean, Baltic and Black Sea *(EEA 2015)*. This litter is then carried into the marine environment by rivers, drainage systems, sewage systems, or the wind.

Comments / Limitations

- Data are provided at the level of agglomeration (AggloDashboard tab of the viewer), defined as settlements and areas of economic activity with a population equivalent (p.e.) more than 2000 (p.e. is the organic biodegradable load generated by one person per day). Data is also available for cities and big cities (tab: treatment pathways in big cities/cities).
- Big cities are defined as agglomerations of > 150,000 p.e., which is not equivalent to the administrative boundaries of cities.
- This indicator could be complemented with information concerning the progress for implementation of the Urban Waste Water Treatment (UWWT) directive (table T_Art17_FLA Agglomeration of the Waterbase-UWWTD) *(EEA 2019a)*.
- The UWWT directive aims at protecting the water environment from the adverse effects of discharge of urban waste water and from certain industrial discharge.

Metadata

Source: European Environmental Agency (EEA). Urban wastewater agglomerations and receiving areas data viewer *https://tableau.discomap.eea.europa.eu/t/Wateronline*

Availability and geographical coverage: Europe

Unit of measure: Share

Level of aggregation: Agglomeration (cities and big cities)

Time coverage and frequency: 2013 - 2014

6 CLEAN WATER AND SANITATION

TYPE

DRINKING WATER CONSUMPTION

Links to other SDGs

ALIGNMENT

UN list ☐

EU list ☐

COVERAGE

BUDAPEST

AGGREGATION

MUNICIPALITIES

AVAILABILITY

1

SOURCE **Budapest Waterworks**

Description of the indicator

This indicator measures the average annual consumption of drinking water per capita. The definition of the International Water Association (IWA) is employed.

Thus, it is the total volume of metered and/or non-metered water that, during the assessment period (1 year), is received by registered customers, by the water supplier itself, or by others who are implicitly or explicitly authorised to do so by the water supplier, for residential, commercial, industrial or public purposes. Since no harmonised data is available across Europe at the local level, the case of Budapest is illustrated here as an example.

The indicator addresses Target 6.4 (increase water-use efficiency) of the UN SDGs.

European context

The European Union has a 30 year history of drinking water policy. In 2018, the EC adopted the revision of the EU Drinking Water Directive *(European Commission 2018c)*, initially approved in 1998 *(European Commission 1998)*.

The implementation of the Directive has ensured an improvement of the drinking water in European countries in terms of access, standards and transparency of services and costs. This policy ensures that water intended for human consumption can be safely consumed on a life-long basis, and this represents a high level of health protection.

The According to Eurostat, water use by the domestic sector (services and households) is more or less stable over time (2005 - 2015). However, a strong increase was recorded in some countries as France (+122%; 2008 -13), Lithuania (+76%, 2008 -15) and Greece (+65%, 2005 -15) (*EUROSTAT 2017d*). In the same years, water stress increased and the reduction of the consumption is key to ensure a sustainable water system *(EEA 2014)*.

Comments / Limitations

- The managing authorities usually collect and release additional statistics on the water consumption that can complement the analysis of this topics.

Metadata

Source: *Budapest Waterworks* annual Reports available at *https://www.vizmuvek.hu/en/company_information/annual_report ("Annual Report Budapest Waterworks 2017" 2017)*

Availability and geographical coverage: city of Budapest

Unit of measure: m^3/person/year

Level of aggregation: Mucipalities

Time coverage and frequency: 2012, 2015, 2016, 2017

6 CLEAN WATER AND SANITATION

TYPE

RECYCLED WATER USED FOR OPEN SPACES

Links to other SDGs

ALIGNMENT

UN list ☐

EU list ☐

COVERAGE

MADRID

AGGREGATION

MUNICIPALITIES

AVAILABILITY

1

SOURCE **City of Madrid**

Description of the indicator

This indicator measures the volume, expressed in cubic meter, of recycled water used for irrigation of green areas, sport zones and for cleaning other open areas such as roads. Since no harmonised data is available across Europe at the local level, the case of Madrid is illustrated here as an example.

The indicator measures the volume expressed in cubic metres of water regenerated in the regeneration plants of the city (four in the case of Madrid, according to the official measurements that take place every 15 days *(Ayuntamiento de Madrid 2019)*.

The indicator addresses Target 6.4 (Increasing water-use efficiency) of the UN SDGs.

European context

Non-conventional resources (alternative water resources), like recycled water, are commonly used to complement the drinking water, because of its low quality, low quantity or variable and irregular availability for compatible uses.

After treatment, these water resources can be used for activities that do not require the level of quality of drinking water. This kind of practice can be used to reduce the amount of drinking water consumption that is not used for drinking.

Comments / Limitations

- Data can be further disaggregated by month to detect seasonal differences in water use.
- The water production of regenerated water in the treatment plants in Madrid corresponds to 6.35 million of m^3 per year. Of those, the 70% is used to irrigate public green areas, to clean the city streets. The remaining 30% is used by private users (*Municipality of Madrid, 2019*).
- To assess the progress on water-use efficiency over the time, the total amount of reused water should be expressed as a percentage of the total amount of recycled water.

Metadata

Source: Madrid municipality official statistics. Variable (*Volumen de agua regenerada en las plantas regeneradoras de agua residual*) *https://datos.madrid.es/portal/site/egob/menuitem.c05c1f754a33a9fbe4b2e4b284f1a5a0/?vgnextoid=93938090bbbcd510VgnVCM2000001f4a900aRCRD&vgnextchannel=374512b9ace9f310VgnVCM100000171f5a0aRCRD&vgnextfmt=default*

Availability and geographical coverage: Municipality of Madrid

Unit of Measurement: Volume (m^3)

Level of aggregation: Municipality

Time coverage and frequency: 2015 - 2018

6 CLEAN WATER AND SANITATION

TYPE

BLUE CITY INDEX (BCI)

Links to other SDGs

ALIGNMENT

UN list ☐

EU list ☐

COVERAGE

EU-28

AGGREGATION

CITY

AVAILABILITY

45

CITIES

SOURCE **Joint Research Centre**

Description of the indicator

The Blue City Index® or BCI summarises how well a city manages its urban water resources. The BCI is the overall score of the 25 performance-oriented set of indicators which varies from 0 (concern) to 10 points (no concern).

The indicators are divided over seven broad categories representing the entire urban water cycle: water quality, solid waste treatment, basic water services, wastewater treatment, infrastructure, climate robustness and governance.

The BCI is calculated accordingly to City Blueprint® Framework (CBF). The CBF provides an overview of Integrated Water Resources Management (IWRM) performance and its bottlenecks in municipalities and regions. The methodology has been elaborated in 2012 *(van Leeuwen et al. 2012)* and the compete manual revised in 2016 *(Arnold et al. 2016)*.

European context

The City Blueprint® Approach is a diagnosis tool and consists of three complementary frameworks:

- The Trends and Pressures Framework (TPF) assesses the main challenges of cities.
- The City Blueprint® Framework (CBF) describes how cities are managing their water cycle.
- The Governance Capacity Framework (GCF) identifies areas of improvement of cities' water governance.

City Blueprint is one of the Watershare Suite of Tools and it is a component of the European Innovation Partnership (EIP) Water. More information are available at: *https://www.kwrwater.nl/en/tools-producten/city-blueprint/*

Comments / Limitations

- This composite indicator includes several variables; the quality and the coverage of the input data might affect the accuracy of the index.
- Cities can calculate this index applying the documented methodology (*Gawlik et al. 2017*).

Metadata

Source: Joint Research Centre – European Commission. Urban Water Atlas for Europe *(Gawlik et al. 2017)*

Availability and geographical coverage: Over 45 cities and regions in 27 countries.

Unit of measure: The BCI can vary from 0 (concern) to 10 (no concern).

Level of aggregation: City

Time coverage and frequency: 2017

GOAL 7

ENSURE ACCESS TO AFFORDABLE, RELIABLE, SUSTAINABLE AND MODERN ENERGY FOR ALL

Description of the Goal

Goal 7 aims at ensuring access to electricity to the 800 million people in developing countries that still today remain without electricity (*UN 2019*).

Moreover, Goal 7 aims at reducing the energy consumption and improving energy efficiency in all countries.

European Dimension

The EU estimates that the production and use of energy account for more than 75% of its greenhouse gas emissions *(European Commission 2018a)*.

The Juncker Commission implemented the Europe 2020 Strategy, and in December 2019 the von der Leyen Commission launched the "European Green Deal" *(European Commission 2019j)*.

The European Green Deal tackles 4 key sectors: (1) energy, with the goal to decarbonise the energy sector; (2) buildings, to help people cut their energy bills and energy use thanks to building renovation; (3) industrial innovation, increasing the use of recycled materials; (4) mobility, with cleaner, cheaper and healthier forms of private and public transport and mobility, that represents 25% of EU emissions.

Local dimension

Local actions, such as incentives for clean energy and transportation, can have a great impact on the achievement of this Goal, on both carbon emissions and energy efficiency. The SDG targets relevant for local authorities are mainly the ones concerning universal access, renewable and efficient.

The inter-linkages between local factors, policy instruments available at urban level and the local implementation of national legislation enhance the role of cities for what concerns both consumption and production of energy.

With specific reference to the urban fabric and buildings, better energy policies need to go beyond the solely perspective of building energy efficiency, promoting a multidimensional approach. Furthermore, energy policies should adapt to ongoing trends related to demographic changes, shifts in household composition, climate changes and increasing occurrence of urban heat island effect.

Local authorities can put in place specific actions to reduce energy consumption both in public buildings and public spaces, for example reducing the energy consumption (turning off unnecessary lighting and heating in public buildings) and increasing the efficiency (replacing obsolete lighting and heating systems).

7 AFFORDABLE AND CLEAN ENERGY

TYPE

NEW BUILDINGS

Links to other SDGs

11 SUSTAINABLE CITIES AND COMMUNITIES

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

ALIGNMENT
UN list
EU list

COVERAGE
EU-28

AGGREGATION
CITIES

AVAILABILITY
700
CITIES

SOURCE **Joint Research Centre**

Description of the indicator

This indicator measures the share of residential houses that have been built after 1980. This indicator has been calculated on data based on the National Census of 2011 and building stock statistics.

The type of information available for each Member State varies: some countries only collected basic information about the building date of dwellings (grouped in broad categories). Other countries collected more detailed and stratified data on the types of dwellings (e.g. apartments vs. houses, size, occupancy status, construction period, tenure status, number of rooms, household composition, construction material, heating type, and renovation rate).

Data was harmonised to provide comparable information relative to the age of buildings at city level. This dataset was used to derive two indicators, aggregated at the level of Cities, Functional urban areas, and degree of urbanisation: (1) the proportion of old buildings (built before 1980) and (2) the proportion of new buildings (built after 1980) *(Baranzelli, Aurambout, and Lavalle 2016)*.

This indicator refers to the Target 7.1 (renewable energies) of the UN SDGs.

European context

Energy used in buildings represents a large share of the overall energy consumption in the EU-28 (in 2012, it accounted for 40% of total energy consumption and around 55% of electricity consumption). Recent buildings are in general more efficient, and should comply with standards that help reduce energy consumption.

Comments / Limitations

- The indicator is currently available only for 2011. However it can be calculate by cities from the analysis of data from cadastral registers and other survey-based datasets monitoring the housing stock conditions.
- Energy consumption depends on the functional and structural characteristics of buildings. It is also influenced by other factors such as location and climate. Therefore, a detailed evaluation of the energy performance of buildings requires a number of parameters (*Baranzelli, Aurambout, and Lavalle 2016*):
  - Use of the building (residential, industrial, commercial or other);
  - Building/dwelling characteristics (size, age, typology, household structure);
  - Structural details (construction materials, renewal rate, certifications, etc.);
  - Energy-related technological details (including for the production of energy);
  - Climate and geographical location.
- New data sources, such as real estate online platforms, can also provide new opportunities to integrate this indicator.

Metadata

Source: Baranzelli, Claudia; Ronchi, Silvia (2011): UDP - Share of new buildings, 2011 (JRC LUISA Reference Scenario 2016). European Commission, Joint Research Centre (JRC) [Dataset] PID: *http://data.europa.eu/89h/jrc-luisa-udp-sharenewbuild-reference-2016*

Availability and geographical coverage: 700 European cities

Unit of measurement: Share of buildings build after 1980 over total buildings.

Level of aggregation: Cities, Functional urban areas, and degree of urbanisation

Time coverage and frequency: 2011

7 AFFORDABLE AND CLEAN ENERGY

TYPE

TECHNICAL PHOTOVOLTAIC POTENTIAL

Links to other SDGs

11 SUSTAINABLE CITIES AND COMMUNITIES

ALIGNMENT
UN list
EU list

COVERAGE
GERMANY

AGGREGATION
MUNICIPALITIES

AVAILABILITY
11,131
GERMAN MUNICIPALITIES

SOURCE **Weinand et al. (2019)**

Description of the indicator

This indicator provides information on the potential energy production from residential photovoltaic (PV) systems. Since no harmonised data is available across Europe at the local level, the case of Germany is illustrated here as an example. A high-resolution determination of the technical potential of residential roof-mounted photovoltaic systems for each municipality in Germany is presented by *(Mainzer et al. 2014)*.

The method for calculating the potential consists of two stages: first, the usable roof area in each municipality is calculated, based the number and type of residential buildings as well as roof geometries and the usable share of the roofs for photovoltaic systems. Second, the roof area, together with assumptions on the distribution of inclination and azimuth angles, is combined with the solar radiation data for each municipality, as well as the relative irradiation for specific inclination and azimuth angles, to calculate the geographical potential. Combined with the technical PV plant efficiency, the technical potential for each municipality can then be inferred *(Weinand, McKenna, and Mainzer 2019)*.

This indicator refers to the Target 7.2 (renewable energies) of the UN SDGs.

European context

In the last decades, EU countries have made good progress in PV energy production, with significant differences within the EU. According to JRC, "Between 2014 and 2015 alone, the total EU PV production increased by around 8.7% and totalled about 96 TWh at the end of 2015" *(Gonzalez Aparicio et al. 2017)*.

Countries that show significant progress in PV production are the UK, the Netherlands, Austria and Denmark, but there is still potential for increasing the PV production in all Member States.

A recent JRC study estimates that "EU rooftops could potentially produce 680 TWh of solar electricity annually (representing 24.4% of current electricity consumption), two thirds of which at a cost lower than the current residential tariffs" *(Bódis et al. 2019)*.

Comments / Limitations

- This indicator is included in a dataset that provides a compilation of 38 indicators for all 11,131 German municipalities. The other indicators include census data (such as population density), mobility data (such as the number of vehicles), and data on the potential of renewables (such as wind energy).
- The dataset also includes data on the energy consumption sectors “Private Households” and “Transport”, as well as data to estimate the potential for renewable energies, such as spatial high-resolution photovoltaic, wind and hydrothermal potentials.
- This dataset can be employed to address a wide range of energy-related research challenges. A municipality typology has been developed with the data, and the resulting municipality grouping is included in the dataset. The dataset enables energy researchers to conduct studies at municipal and national levels with no need to obtain and synthesise a large amount of data.

Metadata

Source: *(Weinand, McKenna, and Mainzer 2019)* available at *https://figshare.com/articles/German_Municipality_Data/7964609/5*

Availability and geographical coverage: 11,131 German municipalities

Unit of measurement: kWh per year per capita

Level of aggregation: Municipality

Time coverage and frequency: 2017

7 AFFORDABLE AND CLEAN ENERGY

TYPE

Links to other SDGs

11 SUSTAINABLE CITIES AND COMMUNITIES

13 CLIMATE ACTION

ALIGNMENT

UN list
EU list

COVERAGE

the NETHERLANDS

AGGREGATION

NEIGHBOURHOOD

AVAILABILITY

2,462 DUTCH NEIGHBOURHOODS

SOURCE **Mashhoodi, Stead, and van Timmeren 2019**

ENERGY CONSUMPTION PER CAPITA

Description of the indicator

This indicator provides information on the energy consumption per capita within dwellings, and it is expressed in annual expenditure per capita on gas and electricity. Since no harmonised data is available across Europe for this indicator, the case of the Netherlands is illustrated here as an example.

The steps of the method elaborated by *(Mashhoodi, Stead, and van Timmeren 2019)* is the following: (1) identification of the local and national determinants of energy consumption in households using the geographical variability test *(Nakaya et al. 2009)*, (2) estimation and mapping of the impact of national and local determinants, using a semi-parametric geographically weighted regression (SGWR) analysis.

Nine independent variables have been evaluated as effective determinants to calculate the level of energy consumption in households: income, household size, building age, surface-to-volume ratio of buildings, population density, degree days (i.e. number of summer days and number of frost days), wind speed, and land surface temperature *(Mashhoodi, Stead, and van Timmeren 2019)*.

European context

Electricity consumption per capita in the residential sector in the EU-28 in 2017 was 1.6 MWh (1 579 kWh).

Consumption is affected by the choice of energy used for space heating, the climate conditions, and the level of economic development of each country.

The most recent statistics available for the EU Member States show that in 2017 the electricity consumption per capita varied widely, from below 1 MWh in Romania, Poland, Latvia and Slovakia to over 4 MWh in Sweden and Finland (*EUROSTAT 2019d*).

Comments / Limitations

- The indicator is expressed in euro; however, it is possible (and recommended for some specific applications) to compute it in energy units (kWh).
- Most of the incentives and regulations introduced by policies are generally related to building energy efficiency. However, this indicator shows that energy consumption within dwellings is affected by a variety of factors.
- According to *(Majcen, Itard, and Visscher 2013)*, the structure of this indicator helps to understand why the actual energy consumption of labelled dwellings in the Netherlands (similarly in other European countries) does not necessarily match their theoretical energy consumption.

Metadata

Source: *(Mashhoodi, Stead, and van Timmeren 2019)*

Availability and geographical coverage: 2,462 out of the 2,836 neighbourhoods of Netherlands.

Unit of measurement: Euro per capita per year

Level of aggregation: Neighbourhood units

Time coverage and frequency: 2014

7 AFFORDABLE AND CLEAN ENERGY

TYPE

ENERGY CONSUMPTION INDEX

Links to other SDGs

11 SUSTAINABLE CITIES AND COMMUNITIES

ALIGNMENT

UN list
EU list

COVERAGE

ENGLAND

AGGREGATION

NEIGHBOURHOOD

AVAILABILITY

32,482
LOWER SUPER OUTPUT AREAS (LSOAS)

SOURCE **Morris et al. 2016**

Description of the indicator

The Energy Consumption Index (ECI) provides information on the energy performance of households, relative to expected consumption levels. This indicator allows the benchmarking of domestic energy consumption by accounting for factors that are normally not influenced by domestic energy policy tools, relying on available energy statistics. Since no harmonised data is available across Europe for this indicator, the case of England is illustrated here as an example.

According to the method developed by *(Morris et al. 2016)*, "The indicator is computed separately for different types of fuels, at sub-municipal level (neighbourhood), according to the following formula: ECI = recorded consumption / regression predicted consumption *100".

The computation of the "expected energy consumption levels for households" uses a statistical model (multiple linear regression model). The model takes into account several factors including house size and type, income, tenancy, and local weather conditions – that go beyond the energy efficiency of the housing stock. A score of the indicator above 100 refers to a potential inefficiency. The potential inefficiency indicates that, on average, the households in that specific neighbourhood are consuming more than the expected fuel.

The value of this indicator immediately refers to the scale of potential inefficiency: for instance, a value of 120 indicates that the considered neighbourhood is consuming 20% more energy than expected.

European context

The main objective of the analysis of this indicator is to support local authorities in better monitoring the success of strategies for energy efficiency reduction and in reducing energy consumption and target areas of intervention.

Comments / Limitations

- The indicator is computed at sub-municipal level (LSOAs). LSOAs are census output areas of around 500–700 households, defined on homogenous tenure and house types. The indicator can also be computed for entire municipalities and it can be used to compare the domestic energy consumption performance between different Local Authorities.
- The indicator can be used to highlight the relative performance of different sub-municipal areas, assessing the performance of their housing stock and, therefore targeting interventions.
- Although this indicator was not recently updated, it can be derived from the analysis of data normally available through census, cadastral registers and energy providers.

Metadata

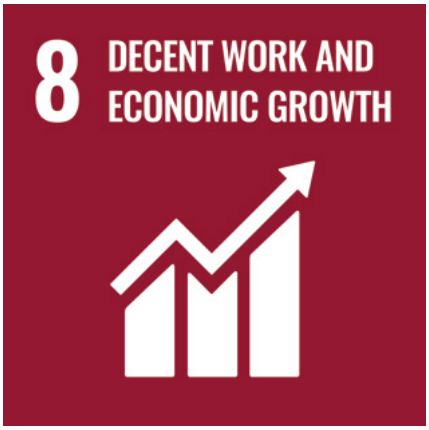
Source: *(Morris et al. 2016)*

Availability and geographical coverage: 32,482 Lower Super Output Areas (LSOAs) in England

Unit of measurement: ratio between recorded consumption and predicted consumption

Level of aggregation: neighbourhood units

Time coverage and frequency: 2010



GOAL 8

PROMOTE SUSTAINED, INCLUSIVE AND SUSTAINABLE ECONOMIC GROWTH, FULL AND PRODUCTIVE EMPLOYMENT AND DECENT WORK FOR ALL

Description of the Goal

Employment creation, decent work and labour rights are the cornerstones of the 2030 Agenda. However, in order to achieve Goal 8, particular attention should be paid to increasing employment opportunities, reducing informal employment and reducing the gender gap. This goal also calls for the promotion of safe and secure working environments.

European Dimension

After the global economic and financial crisis started in 2008, Europe as a whole has recovered almost to the pre-crisis levels (in terms of GDP) although this recovery has not benefitted all citizens and Member States in the same manner.

According to (*EUROSTAT 2018a*):

- Real GDP per capita has been increasing by an average of 1.3 % per year since 2009.
- Europe has not yet reached the employment target of 75% for people aged 20-64 stated in the Europe 2020 Strategy *(European Commission, 2010)*.
- The main challenges in employment remain the gender gap, the large proportion of temporary contracts and the integration into the labour market of young people, non-EU citizens, and people with disabilities.
- Work has become safer, as in physical conditions of work, but less economically secure.

Among other initiatives, in 2014 the EU launched the 'Investment Plan for Europe' to "remove obstacles to investment; to provide visibility and technical assistance to investment projects; and to make smarter use of financial resources".

This initiative included the mobilisation of Funds for Strategic Investment (EFSI). The plan will continue with the 'Invest EU Programme' (2021-2027) that aims to trigger €650 billion in additional investment.

Local dimension

Local authorities have an important role to play in mobilising resources, facilitating local partnerships, building networks and a supportive environment for entrepreneurs, business start-ups and job seekers.

Local authorities can incentivise economic activity and growth through infrastructure, communication investments, and logistical support.

They can also develop and implement local policies and measures that improve education and employment levels and ensure a more inclusive labour market. Furthermore, cities can incentivise the provision of secure working environments, guarantee equal conditions for all, and promote the integration of the most disadvantaged groups into the labour market.

8 DECENT WORK AND ECONOMIC GROWTH

TYPE

UNEMPLOYMENT RATE

Links to other SDGs

1 NO POVERTY

10 REDUCED INEQUALITIES

ALIGNMENT

UN list ☐

EU list ☐

COVERAGE

EU-28

AGGREGATION

CITIES AND GREATER CITIES

AVAILABILITY

600

CITIES AND GREATER CITIES

SOURCE **Eurostat, City Statistics database**

Description of the indicator

The unemployment rate is the number of people unemployed as a percentage of the total labour force *(ILO, 2019)*.

An unemployed person is defined by Eurostat as:

- Someone aged 15 to 74 (in Italy, Spain, the United Kingdom, Iceland, Norway: 16 to 74 years);
- without work during the reference week;
- available to start work within two weeks (or that has already found a job to start within the next three months);
- that has actively searched employment at some time during the last four weeks.

European context

The unemployment rate in EU has decreased, going from 10.9% in 2013 through to 7.6% in 2017, 6.8% in 2018 and 6.4% in April 2019 *(European Commission, 2019)*.

However, large variations in unemployment rates remain across Member States, with Greece having the highest unemployment rate (19.3%) and Czech Republic the lowest rate (2.2%) in2018. Even larger differences are observed at the regional and municipal level *(European Commission, 2019)*.

Comments / Limitations

- It is recommended to calculate this indicator disaggregated by gender, age, education and disability. For example, in 2018 youth unemployment rate (people aged 15-24) in the EU-28 was largely higher than the unemployment rate for persons aged 15-74 *(European Commission, 2019h)*.
- The overall unemployment rate for a country is a widely used measure of its unutilised labour supply. However, other measures also need to be considered to assess the efficiency and effectiveness of an economy:
  - Long-term unemployment: the number of people unemployed for one year or longer as a percentage of the labour force (or as a percentage of the number of unemployed people).
  - Time-related labour underutilisation: this refers to people employed for a very limited number of hours.
  - Working poverty: persons that are living in households with consumption or income per capita below the poverty line despite being employed.
  - Informal work: where labour markets are not efficient and effective and safety nets are not satisfactory, individuals may engage in informal employment.
  - Participation rate: the number of employed and unemployed people as a percentage of working age population. It measures the size of labour supply.

Metadata

Source: Eurostat, City Statistics database (data collected from national statistics), table urb_clma, variable EC1020I.

Availability and geographical coverage: More than 600 cities and greater cities in the EU-28 in 2016.

Unit of Measurement: Share (% of labour force).

Level of aggregation: Cities and greater cities.

Time coverage and frequency: 1991-2018. Data is collected every year.

8 DECENT WORK AND ECONOMIC GROWTH

TYPE

ACCIDENTS AT WORK

Links to other SDGs

3 GOOD HEALTH AND WELL-BEING

ALIGNMENT
UN list
EU list

COVERAGE
EU-28

AGGREGATION
NUTS3

AVAILABILITY
–

SOURCE **Countries**

Description of the indicator

This indicator is defined as the number of accidents at work per employed individual. An accident at work is defined as "a discrete occurrence, while engaged in an occupational activity or during the time spent at work, which leads to physical or mental harm" (*ESAW, 2012*). Methodological aspects regarding the data collection are available in ESAW, 2012.

The Regulation (EC) No 1338/2008 of the European Parliament and of the Council of 16 December 2008 on 'Community statistics on public health and health and safety at work', sets out obligations for European countries to supply annual statistics on accidents at work to Eurostat. Eurostat publishes statistics concerning accidents at work with a national aggregation (*https://ec.europa.eu/eurostat/statistics-explained/index.php/Accidents_at_work_statistics*). Countries share data which also include the geographical location of accidents at NUTS3 level. Therefore, it is suggested that NUTS3 Regions consult the authority responsible for data collection in their own country to ask for an extraction of data for their territory. This indicator addresses aspects of Target 8.8 (promote safe and secure working environments)of the UN SDGs. It relates to the indicators "People killed in accidents at work"proposed in the EU SDGs indicator set.

European context

According to the definition from the European Statistics on Accidents at Work (ESAW),accidents are divided in two categories: non-fatal ("accidents involving more than 3 calendar days of absence from work and not leading to the death of the victim") and fatal ("an accident which leads to the death of a victim within one year of the accident").

Between 2010 and 2017, the incidence rate of non-fatal accidents at work has decreased from 1,665 to 1,558 per 100,000 persons in employment and from 2.09 to 1.65 for what concerns fatal accidents. Men report a higher incidence than women in both non-fatal and fatal accidents (Source of data: Eurostat *https://ec.europa.eu/eurostat/statistics-explained/index.php/Accidents_at_work_statistics*).

Comments / Limitations

- Data can be disaggregated by type of accident, workplace, classification of economic activity, severity of the injury and characteristics of the person injured.
- According to the Framework Directive 89/391/EEC, in Europe, each employer has the obligation to keep a list of occupational accidents resulting in a worker being unfit for work for more than three days.
- Reliable statistical information on accidents at work is crucial to introduce suitable policy measures to limit accidents and promote a safe working environment.

Metadata

Source: Regions can collect data on accidents at work from the authority responsible to collect it in their own country. Administrative data.

Availability and geographical coverage: NUTS3 in Europe.

Unit of Measurement: Ratio (number of accidents at work over employed individuals)

Level of aggregation: NUTS3 level.

Time coverage and frequency: Data at the national level is collected with annual frequency.

8 DECENT WORK AND ECONOMIC GROWTH

TYPE

PERCEPTION ABOUT THE LOCAL LABOUR MARKET

Links to other SDGs

11 SUSTAINABLE CITIES AND COMMUNITIES

ALIGNMENT

UN list ☐

EU list ☐

COVERAGE

EU-28

AGGREGATION

CITIES

AVAILABILITY

83

CITIES

SOURCE **DG REGIO and EUROSTAT, Eurobarometer**

Description of the indicator

This indicator measures the share of people with a negative perception of their city labour market. It refers to the survey question: "In this city is it easy to find a good job?" which was included in the Flash Eurobarometer, 'Quality of life in European cities' *(DG REGIO 2016)*. Possible answers to this question are: "do not know", "strongly disagree", "somewhat disagree", "somewhat agree", "strongly agree". The indicator is calculated as the share of respondents that answered "strongly disagree" and "somewhat disagree" over the total respondents.

This indicator addresses aspects of Target 8.5 (productive employment) of the UN SDGs. It also relates to the indicators "Employment rate" and "Long-term unemployment rate" proposed in the EU SDGs indicator set.

European context

In most cities, a majority of respondents thinks that it is not easy to find a job. However, there are significant differences among cities, ranging from Praha (Czech Republic) where 72% of respondents agree that it is easy to find a job, to Palermo (Italy) where just 3% share this view.

Compared to 2012, the proportion of respondents agreeing that it is easy to find a job in their city has increased in several Irish cities and decreased in cities like Helsinki, Oslo and Lille (*DG REGIO 2016*).

Comments / Limitations

- The survey was conducted in more than 79 European cities. This survey included all capital cities of the countries concerned (except for Switzerland), together with between one and six more cities in the larger countries. In each city, around 500 citizens were interviewed. The TNS Political & Social network carried out this survey in the 28 Member States of the European Union, as well as Iceland, Norway and Switzerland. In June 2015, around 41,000 respondents from different social and demographic groups were interviewed.
- The number of surveyed cities varies over time for the Eurobarometer. The year for which the information is available for most of the cities is 2015 (more than 100 cities and greater cities).
- The framework developed by United Nations Economic Commission for Europe (UNECE) identifies 68 indicators to define employment quality from the perspective of the employed person *(UNECE, 2015)*.
- From the point of view of an unemployed person, a pessimistic view of the labour market lowers the perceived bargaining power and reservation wage *(Cardoso, Loviglio, & Piemontese, 2016)*. The 'bargaining power' is the power that someone has to reach an agreement with somebody else, that is to their own advantage. The 'reservation wage' is the lowest wage at which an individual is willing to work.

Metadata

Source: DG REGIO and EUROSTAT, Eurobarometer, Perception survey results (Variables: PS2012V- PS2016V), *https://ec.europa.eu/eurostat/web/cities/data/database*

Availability and geographical coverage: 83 cities

Unit of Measurement: Share (% of total population).

Level of aggregation: Cities.

Time coverage and frequency: 2004, 2006, 2009, 2012, 2015.

8 DECENT WORK AND ECONOMIC GROWTH

TYPE

GROSS DOMESTIC PRODUCT (GDP) PER CAPITA

Links to other SDGs

1 NO POVERTY

10 REDUCED INEQUALITIES

ALIGNMENT

UN list ☑

EU list ☑

COVERAGE

EU-28

AGGREGATION

FUAs

AVAILABILITY

250

FUAs

SOURCE **Organisation for Economic Co-operation and Development (OECD)**

Description of the indicator

GDP per capita is the ratio between the GDP and the population. It is expressed in USD, at constant purchasing power parity (PPP) prices, with reference year 2010 (*OECD, 2020*).

GDP is "the standard measure of the value added created through the production of goods and services in a country during a certain period. As such, it also measures the income earned from that production, or the total amount spent on final goods and services (less imports)" (*OECD, 2020*). Constant price estimates of GDP are obtained by expressing values in terms of a base period in this case year 2010 (*OECD, 2020*).

GDP per capita at the metropolitan level is estimated using the GDP per capita per NUTS3 regions and the distribution of population based on the Global Human Settlement (GHS) population grids. More details on the methodology used are given in *(OECD, 2018 p.162)*. To account for price differences across countries and allow comparability, GDP is converted into USD at purchasing power parity (PPP).

This indicator addresses aspects of Target 8.1 (economic growth) of the UN SDGs. It matches to the indicator "Real GDP per capita" proposed in the EU SDGs indicator set.

European context

The growth of real GDP per capita in the Euro Area has been generally positive over the past 20 years, with a stronger growth in the 2013-2018 period, when Ireland, Malta, Lituania and Latvia were the best performers in Europe (*EUROSTAT 2019b*).

Despite this positive trend, according to European Economic Forecasts, the economy is entering a period of less dynamic expansion. One of the most relevant factors driving the slowdown of GDP in the Euro area is the downturn in global trade and manufacturing *(European Commission. Directorate-General for Economic and Financial Affairs., 2019)*.

Comments / Limitations

- Calculating the variation over time is recommended.
- Real GDP is commonly referred to as a proxy for countries' material living standards. Whilst real GDP is an important measure of economic activity, it does not provide any information about other important dimensions, such as inequality or environmental degradation. For this reason, a long-standing debate exists over the possibility to replace GDP with composite indexes and dashboards, such as the European Social Progress Index or the OECD's Better Life Index, that allow one to consider additional dimensions of well-being, each of which is assigned a specific weight (*Coyle, 2015*).

Metadata

Source: OECD Metropolitan database, variable "GDP per capita" *https://stats.oecd.org/Index.aspx?DataSetCode=CITIES#*

Availability and geographical coverage: More than 250 FUAs in EU countries in 2015.

Unit of Measurement: USD, constant prices, constant PPP, base year 2010.

Level of aggregation: FUAs.

Time coverage and frequency: 2001–2016. Data is collected every year.

8 DECENT WORK AND ECONOMIC GROWTH

TYPE

LABOUR PRODUCTIVITY

Links to other SDGs

ALIGNMENT

UN list ☑

EU list ☐

COVERAGE

EU-28

AGGREGATION

FUAs

AVAILABILITY

250

FUAs

SOURCE **Organisation for Economic Co-operation and Development (OECD)**

Description of the indicator

Labour productivity is defined as "GDP per worker" (OECD, Metropolitan database) or as the value added per employed person. Since the term 'employed' does not distinguish between full-time and part-time employment, labour productivity is often calculated as GDP per hour worked.

Labour productivity is estimated at the FUA level, using the GDP per NUTS3 regions, and the number of people employed at the NUTS3 level or, better, the total number of hours worked at the same level. More details on the methodology used are given in *(OECD, 2013)*. To make comparisons across countries possible, labour productivity is converted into USD at purchasing power parity (PPP).

This indicator addresses aspects of Target 8.2 (economic productivity) of the UN SDGs and relates to the indicator "Annual growth rate of real GDP per employed person" proposed in the UN SDGs indicator set.

European context

Labour productivity is a key measure of economic performance largely driven by technological progress and human, physical, organisational and institutional capital. Its growth is one of the main determinants of economic growth (*Gomez-Salvador et al. 2006*).

In 2015, capital cities recorded the highest level of labour productivity in each Member States, with just few exceptions. In 2015, Luxemburg, Ingolstadt, Paris and Brussels were the Functional Urban Areas (FUAs) with the highest value of labour productivity, while Pecs, Kielce and Lublin had the lowest.

Comments / Limitations

- Calculating the variation over time is recommended.
- In cases where the contribution to GDP of forms of work other than dependent employment and self-employment are expected to be significant, such as in the case of volunteer work, the exclusion of time-spent in these productive activities can lead to the overestimating of labour productivity.
- The contribution of large companies to GDP is often recorded in the region where headquarters are located. This can artificially inflate the GDP (and therefore labour productivity) of those regions.

Metadata

Source: OECD Metropolitan database, variable "Labour productivity" *https://stats.oecd.org/Index.aspx?DataSetCode=CITIES#*

Availability and geographical coverage: More than 250 metropolitan areas (FUAs) in EU countries in 2015.

Unit of Measurement: USD, constant prices, constant PPP, base year 2010.

Level of aggregation: FUAs.

Time coverage and frequency: 2001–2016. Data is collected every year.

GOAL 9

BUILD RESILIENT INFRASTRUCTURE, PROMOTE INCLUSIVE AND SUSTAINABLE INDUSTRIALIZATION AND FOSTER INNOVATION

Description of the Goal

Sustained investment in infrastructure and innovation, and technological progress are crucial drivers of economic growth and development. Specific targets in Goal 9 include building quality, reliable, sustainable and resilient infrastructure for all, promoting inclusive and sustainable industrialization, and fostering Research and Development (R&D) and innovation.

European Dimension

A modern and sustainable European transport system is fundamental for the future development of the Union. Specific measures, such as the Urban Mobility Package (UMP) *(European Commission 2019l)*, highlight the importance of transport system, stress the need to address its urban dimension, and support European cities in tackling urban mobility challenges.

While European cities are connected by one of the world's best transport systems, mobility within cities can still be difficult and inefficient. For this reason, several initiatives promoted by the EC aim to enhance mobility while reducing congestion, accidents and pollution in European cities.

Industry is also at the heart of the EC political priorities: the 2017 renewed EU Industrial Policy Strategy *(European Commission 2017c)* brings together strategies in line with SDG 9 targets to "*help European industry stay or become the world leader in innovation, digitisation and decarbonisation*". In this context, the EC supports cities to develop and implement strategic plans to become more productive, innovative and improve urban life with several initiatives and actions *(European Commission n.d.)*.

In the new EC programming period, the EC proposes Europe Horizon – the EU's Framework Programme for Research and Innovation – an ambitious €100 billion research and innovation programme to succeed Horizon 2020.The EC has initiated the strategic planning process around three pillars: Excellent Science; Global challenges and European Industrial Competitiveness; and Innovative Europe *(European Commission 2019g)*.

Local dimension

Cities play an important role in innovation, implementing locally new research and development strategies, providing infrastructure and services, strengthening competitiveness, channelling and sharing resources to companies and research and development organisations, and supporting the growth of new businesses.

Sustainable and inclusive industrialization of cities provides opportunities for developing synergies, such as decoupling economic growth from environmental degradation, while at the same time creating employment and fostering clean energy innovation. For this Goal, most of the targets and indicators are usually measured at regional level and it can be hard to catch the city dimension.

In the *Handbook*, four indicators have been included (three at city level and one at regional level): two indicators deal with transport – one aspect of the infrastructural assets of a city – being transport essential both for access to job and to movement of goods; one indicator on enterprises in specific industrial sectors; and one on the number of start-ups, innovative and young enterprises.

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

TYPE

JOURNEYS TO WORK BY PUBLIC TRANSPORT

Links to other SDGs

11 SUSTAINABLE CITIES AND COMMUNITIES

13 CLIMATE ACTION

ALIGNMENT

UN list ☐

EU list ☐

COVERAGE

EU-28

AGGREGATION

CITIES AND GREATER CITIES

AVAILABILITY

400

CITIES AND GREATER CITIES

>

SOURCE **Eurostat, City statistics database**

Description of the indicator

This indicator, as define by EUROSTAT, gives the share of journeys to work that are done using public transport, including rail, metro, bus or tram. A journey to work refers to the usual commute (from the place of residency to the work place, including change of transport mode) of people employed within the city boundary regardless of their place of residency.

This indicator relates to the indicator "Share of collective transport modes in total passengers land transport" proposed in the EU SDGs indicator set.

European context

The use of public transport is a way to reduce congestion, negative environment impacts and health-harming emissions in urban areas, especially when they run on alternative, cleaner fuels. The EC strongly encourages the use of public transport as part of the mix of modes (including walking & cycling) which persons living or working in a city can use (*https://ec.europa.eu/transport/themes/urban/urban_mobility/urban_mobility_actions/public_transport_en*).

Comments / Limitations

- The number of missing values changes from year to year. 2011 has the lowest number of missing observations.
- The missing values for some cities does not allow for the analysis of time series.
- This indicator should be used together with the indicator on access to public transport to properly assess the efficiency of the system.
- While this indicator focuses on the commute to and from the workplace, alternative indicators on different modes of transports for different trips might be available at the local scale (i.e. Share-mobility).
- The same dataset also gives the share done by car, motorcycle, bicycle or foot.

Metadata

Source: Eurostat, City Statisticsdatabase (data collected from national statistics), table urb_ctran, variable TT1010V

Availability and geographical coverage: 400 European cities and greater cities in 2011

Unit of measurement: Share. Calculating the variation over time is recommended

Level of aggregation: Cities and greater cities

Time coverage and frequency: 1990-2018. Data collected every year

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

TYPE

ENTERPRISES IN INDUSTRY, CONSTRUCTION AND SERVICES

Links to other SDGs

8 DECENT WORK AND ECONOMIC GROWTH

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

ALIGNMENT

UN list

EU list

COVERAGE

EU-28 PLUS OTHER

AGGREGATION

METROPOLITAN REGIONS

AVAILABILITY

140 METROPOLITAN REGIONS

SOURCE **EUROSTAT, General and Regional Statistics**

Description of the indicator

This indicator gives the number of active enterprises, including all employers and non-employers (N). It consists of all enterprises that had either turnover or employment at any time during the reference period *(European Communities / OECD 2008)*. According to Eurostat, "an active enterprise is an enterprise that had either turnover or employment at any time during the reference period". For the complete definition see: *https://ec.europa.eu/eurostat/statistics-explained/index.php?*

The indicator collected by Eurostat is listed as *Employer business demography by NACE Rev. 2 activity and metropolitan regions, B-S_X_K642, Industry, construction and services except insurance activities of holding companies*.

European context

Manufacturing provides goods for domestic consumption and for export and has traditionally been considered a cornerstone of economic prosperity within the EU. However, in recent decades the sector has been impacted by wide-ranging transformations, such as deindustrialisation, outsourcing, globalisation, changes in business paradigms (such as just-in-time manufacturing), the growing importance of digital technologies, and concerns linked to sustainable production and the environment. Furthermore, the performance of the manufacturing industry in the EU has become increasingly linked to the competitiveness of (business) services, since many manufactured goods contain a growing share of services inputs: for example, logistical support; research and development; design; computer services; advertising and marketing *(EUROSTAT 2019e)*.

Comments / Limitations

- This data is collected per groups of sectors - it is not possible to separate the three sectors *Industry, construction and services*.
- The analysis of this indicator should be complemented with the calculation of the change in total enterprises in percentage.
- Within the same database, data for more economic sectors is available and could complement the analysis. *https://ec.europa.eu/eurostat/web/products-datasets/product?code=met_bd_en2*

Metadata

Source: EUROSTAT, General and Regional Statistics, variable met_bd_en2

Availability and geographical coverage: 140 metropolitan regions in 2016

Unit of Measurement: Absolute number. Calculating the variation over time is recommended.

Level of aggregation: Metropolitan Regions.

Time coverage and frequency: from 2008 to 2016. Data collected every year.

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

TYPE

START-UPS OVER 1,000 INHABITANTS

Links to other SDGs

8 DECENT WORK AND ECONOMIC GROWTH

ALIGNMENT

UN list
EU list

COVERAGE

AMSTERDAM, BERLIN, ROME, and ROTTERDAM. FOR ALL CITIES RUHR AND IN LT and UK

AGGREGATION

MUNICIPALITIES

AVAILABILITY

ABOUT 30 CITIES

SOURCE **Private provider**

Description of the indicator

This indicator measures number of Start-ups in relation to the size of the population. It is calculated as the number of Start-ups over the total number of inhabitants, divided by 1,000. This indicator can be extracted for existing databases created in the framework of the Dealroom.co *(www.Dealroom.co)*. The number of start-ups can be extracted from the database compiled voluntarily for the city, regions, countries. According to the most common definition, data exists for Start-ups established in the last ten years, but the database contains startups up to 20 years old, that can be eventually excluded in the query.

European context

Start-ups combine fast growth and high reliance on the innovation of products, with a potentially positive impact on innovation, growth and jobs. For this reason, this indicator is an important complement to the total number of enterprises in assessing the targets of sustainable industrialization and fostering innovation. The EU facilitates and promotes the creation of start-ups and ensures conditions are optimal for their operation in the market.

Comments / Limitations

- There are no official statistics on the creation of start-ups and there is no official and homogeneous definition of Start-up characteristics.
- Databases such the one indicated here publish unofficial data, so there is no verification of accuracy, completeness or up-to-dateness of data. Moreover, the platform is owned and managed by a private company.
- The database includes a number of characteristics for each registered start-up, including location, age, business, size, growth, funding, and team.
- DG REGIO started collected data on starts-up in Europe and the publication of their database is expected by 2021. Once available, this would provide a good alternative data source.

Metadata

Source: Start-up Map *http://www.startupeuropemap.eu/* .

Availability and geographical coverage: *Amsterdam*, *Berlin*, *Rome*, *Rotterdam* and all cities in the region of Ruhr, and all cities in *Lithuania* and the *United Kingdom*.

Unit of Measurement: Relative number of start-ups.

Level of aggregation: city

Time coverage and frequency: 2013-2019.

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

TYPE

CITY TRANSPORT PERFORMANCE

Links to other SDGs

11 SUSTAINABLE CITIES AND COMMUNITIES

ALIGNMENT
UN list
EU list

COVERAGE
EU PLUS

AGGREGATION
CITIES

AVAILABILITY
ABOUT 800 CITIES

SOURCE **Joint Research Centre**

Description of the indicator

The city transport performance indicator measures the ratio between the number of people that can be reached within a 90-minute drive (accessible population) and the number of people living within a radius of 120 km (nearby population or proximity) from a specific location. If the entire nearby population can be reached quickly, the transport network is performing well. This indicator is available for European cities on the Urban Data Platform, using the method elaborated by *(Dijkstra, Poelman, and Ackermans 2018)* and the following input data:

- Road network: Trans-tools road network (only Europe's main roads), plus local roads simulated using municipality-specific connections. The methodology used is described in *(Jacobs-Crisioni and Koomen 2017)*.
- Nearby population: all the population that can be reached within 120 km, travelling over the partially observed, partially simulated road network.

The transport performance indicator has been computed for all 2 million inhabited square grid cells of 1 Km^2 in the European Union (EU) and the European Free Trade Association (EFTA). To aggregate this data to a city, the population weighted average of all the cells within the city was taken into account.

European context

In Europe, governments invest some EUR 100 billion in transport each year to provide people and firms with better access. Accessibility indicators can be used to capture the benefits of these investments, for example by measuring how many destinations can be reached. In that sense, they are a significant improvement over indicators such as speed, capacity or congestion. However, they are seldom used in decision-making *(Dijkstra, Poelman, and Ackermans 2018)*. Within the EU, Bulgaria, Croatia, Poland, Romania and Slovakia have the lowest transport performance, while Belgium and the Netherlands score highest. The performance of Spain and Portugal, which have benefited from a longer period of Cohesion Funds, is now above the EU average. The transport performance of a country also depends on how urbanised it is - most metropolitan regions outperform other regions. On average, cities outperform rural areas although not all cities perform that well. Cities in eastern EU Member States achieve a lower performance, especially the smaller ones.

Comments / Limitations

- A complete and in-depth exploration of grid-level results is possible using the interactive *DG REGIO map viewer* that uses the methodology by *(Dijkstra, Poelman, and Ackermans 2018)* and other input data.
- Slight differences in the results might be seen using the same method but different input data.

Metadata

Source: Joint Research Centre. Urban Data Platform + *https://urban.jrc.ec.europa.eu/#/en*

Availability and geographical coverage: 800 European cities

Unit of Measurement: Relative number

Level of aggregation: City

Time coverage and frequency: 2015-2020 and projections available until 2050 every 10 years.

GOAL 10

REDUCE INEQUALITY WITHIN AND AMONG COUNTRIES

Description of the Goal

Inequalities based on income, age, disability, sex, sexual orientation, origin, religion and opportunities continue to persist across the world. Specific targets of Goal 10 are focused on promoting economic, social and political inclusion of all individuals. The Goal addresses inequalities among and within countries, and calls for the facilitation of safe migration and the mobility of people.

European Dimension

In recent years, inequality of income and wealth and inequality of opportunities have risen within the majority of Member States while both social mobility between parents and children and social mobility over the life course of individuals have decreased *(OECD 2018a)*.

These phenomena, fostered by factors such as the surge of migration, unemployment and a weak redistributive effect of taxes and benefits, are threating the sustainability and inclusiveness of growth and the social cohesion of regions and countries. Preventing and reducing inequality largely depends on the actions and reforms of Member States.

The main measures that can help address the inequality challenge are investments in education and personal/working skills, the implementation of changes to the tax and benefit systems, and the provision of adequate and accessible social services. In the last years, the issue of multiple discrimination (based on gender and sex) that affects belonging to ethnic-cultural minorities has also gathered increasing attention.

In particular, the importance of a specific focus on multiple discrimination has been acknowledged by The European Union Agency for Fundamental Right *(FRA 2017b)* and the European Parliament "Report on the situation of women refugees and asylum seekers in the EU" *(Committee on Women's Rights and Gender Equality 2016)*.

Local dimension

Cities are places where ethnic, political, economic and professional diversities become more evident than at the country or regional level.

In urban environments, inequalities can be due to changes in the structure and composition of population, the restructuring of economies, the competition for employment and the changes in the traditional household structure.

Although local governments have limited power to influence the labour market, they can significantly reduce inequalities through policies targeting a wide range of sectoral issues, including education and vocational training, housing, medical and social services, and political participation.

All these actions can also foster trust in local institutions *(Barone and Mocetti 2016)*. Cities have traditionally applied three types of polices to reduce inequalities, as identified in the table below.

PLACE BASED-POLICIES	PEOPLE-BASED POLICIES	CONNECTIVITY BASED POLICIES
Focusing on the upgrading of economically underperforming or ethnic segregated neighbourhoods	Aiming at unlocking unrealised human potential and civic participation; > creating opportunities for people in the areas of education and employment; > promoting residents' accessibility to social services; > fostering their participation in the community.	Linking deprived neighbourhoods with places of opportunities for example by improving the transport network and creating spaces of encounter and discussion for people belonging to different groups.

Table 2 Types of policies to reduce inequalities. Source (OECD 2018b):

10 REDUCED INEQUALITIES

TYPE

GINI INDEX

Links to other SDGs

1 NO POVERTY

8 DECENT WORK AND ECONOMIC GROWTH

ALIGNMENT

UN list ☐

EU list ☐

COVERAGE

AUT | BEL | FRA ITA | NOR | PRT SWE

AGGREGATION

FUAs

AVAILABILITY

20

FUAs

SOURCE **Organisation for Economic Co-operation and Development (OECD)**

Description of the indicator

The Gini index *(Gini 1912)* measures the extent to which the distribution of income after taxes and transfers deviates from a perfectly equal distribution. The value of the Gini index ranges from 0 (complete equality in income distribution) to 100 (complete inequality).

The Gini index proposed by the OECD is based on estimations: the proxy measures are computed by simulating the entire income distribution in each metropolitan area, based on the income distribution in the municipalities belonging to that FUA. This indicator addresses aspects of Target 10.4 of the UN SDGs.

European context

The Gini coefficient has not been included in the latest EU SDGs indicator set. Despite this, it relates to the EU2020 priority to foster an inclusive society. Income inequality is also a dimension measured within the European pillar of social rights. In this *Handbook*, we refer to OECD data because it is available at a higher disaggregation level.

In the period 2010-2018, the Gini index in EU-28 has always fluctuated between 30.5 and 31. In 2018, the European countries with the highest Gini were Bulgaria and Lithuania (39.6 and 36.9), while those with the lowest Gini index were Slovenia and Slovakia (23.4 and 20.9, source of data: Eurostat).

Eurostat data collection on the Gini index differs from that of the OECD. The main difference is that EUROSTAT, in its "Survey on Income and living conditions" (EU-SILC), calculates the Gini index at the NUTS3 level based on the bottom-up approach starting from microdata (*EUROSTAT 2014c*).

Instead, the OECD calculates the Gini index based on the income distribution of municipalities belonging to each FUA (more details are available at *stats.oecd.org/wbos/fileview2.aspx?IDFile=4aed3009-6020-48f3-8eeb-e01a8e5f61c4*).

Comments / Limitations

- The original formulation of the Gini coefficient ranges between 0 and 1.
- The Gini coefficient satisfies important properties. It is comparable over time (as it is invariant to any deflator measures), it is invariant with respect to scale and it satisfies the 'transfer principle': if an amount of income is transferred from a rich individual to a poor one, while still preserving their ranking by income, then the measured inequality decreases *(Boulant, Brezzi, and Veneri 2016)*. For instance, some studies compute Gini over the total household gross income (i.e. before taking into account taxes and social transfers). In this way, results present higher values of inequality as the tax and benefit system usually have an equalising effect *(EUROSTAT 2018a)*.
- This indicator is one of the most frequently mentioned in the literature and in policy contexts in order to measure and discuss income inequalities *(inter alia Alesina & La Ferrara, 2000; EUROSTAT, 2018; OECD, 2016)*, and their relation with redistribution *(Kerr 2014; Bénabou 2000)*.
- According to literature, people are more likely to feel unhappy when inequality is high *(Alesina, Di Tella, and MacCulloch 2004; Glaeser, Resseger, and Tobio 2009)*. Glaeser, Resseger, and Tobio show that, in cities with high levels of inequality, crime rates are higher and that there is a negative relationship between inequality and growth. Work focusing at the national level also confirms the existence of a negative relationship between inequality and growth *(Persson, T., & Tabellini 1994)*.

Metadata

Source: OECD Metropolitan database (*https://stats.oecd.org/Index.aspx?DataSetCode=CITIES*)

Availability and geographical coverage: about 20 FUAs in 8 countries (Austria, Belgium, France, Italy, Norway, Portugal and Sweden)

Unit of Measurement: Index ranging from 0 to 100

Level of aggregation: FUAs

Time coverage and frequency: 2015 and 2016

10 REDUCED INEQUALITIES

TYPE

UNEMPLOYED PEOPLE WITH DISABILITIES

Links to other SDGs

8 DECENT WORK AND ECONOMIC GROWTH

ALIGNMENT
UN list
EU list

COVERAGE
POLAND

AGGREGATION
CITIES

AVAILABILITY
66
POLISH CITIES

SOURCE **Statistic Poland**

Description of the indicator

This indicator measures the number of people with disabilities that are unemployed and registered at the employment exchanges, disaggregated by sex. No harmonised database includes this indicator for European cities, therefore the case of Poland is presented here as an example.

The data regarding registered unemployed people with disabilities include individuals who are (according to Statistics Poland):

- not employed or performing any other kind of paid work;
- available for at least a part-time occupation or service;
- not attending any school full-time;
- registered in the district employment exchange seeking employment or any other paid work.

Registered unemployment does not include individuals who are:

- undergoing traineeships or internship;
- undergoing occupational preparation of adults and social utility work;
- directed to employment agency within the framework of activation appointment.

This indicator addresses aspects of Target 10.2 (inclusion) of the UN SDGs.

European context

According to the *(European Commission, 2017)*, by 2020 about 120 million people - one-fifth of the EU population - are expected to be affected by some form of disability. Disaggregated data on people with disabilities is scarce, but information at the national level can be derived from surveys run by EUROSTAT. The data show a clear gap between people with disabilities and the rest of the population in accessing education, training, jobs, services and opportunities.

The EU has developed disability-related indicators at EU level that help in measuring the achievement of the Europe 2020 strategies, under which the European Disability Strategy 2010-2020 *(European Commission, 2019)* falls. This strategy aims at supporting the implementation at the EU level of the UN Convention on the Rights of Persons with Disabilities (UNCRPD) - the first

international, legally-binding instrument setting minimum standards for rights of people with disabilities *(United Nations, 2006)*. Amongst its actions, the 'Access City Award' recognises the best city that works to become barrier-free.

Comments / Limitations

- We recommend comparing this indicator with the general unemployment rate in the same area.
- The Polish database also includes the number of "Job offers for people with disabilities in 1000 unemployed with disabilities".
- National data show that the gender gap in employent is wider among persons with disabilities *(UNDESA, 2019; European Commission, 2017)*.

Metadata

Source: Statistics Poland, variable P3239 available at *https://bdl.stat.gov.pl/*

Availability and geographical coverage: 66 Polish cities with district status (NUTS4) and 314 Polish districts (Powiat-NUTS4).

Unit of Measurement: Absolute value. Calculating the variation over time is recommended.

Level of aggregation: city with district status (NUTS4) and district (Powiat-NUTS4).

Time coverage and frequency: 2013-2018. Data is collected every year.

10 REDUCED INEQUALITIES

TYPE

GRADUATES BY FIELD AND GENDER

Links to other SDGs

4 QUALITY EDUCATION
5 GENDER EQUALITY
8 DECENT WORK AND ECONOMIC GROWTH

ALIGNMENT

UN list ☐
EU list ☐

COVERAGE

EU-28 PLUS OTHER

AGGREGATION

MUNICIPALITIES

AVAILABILITY

2,970 INDIVIDUAL HIGHER EDUCATION INSTITUTIONS

SOURCE European Tertiary Education Register

Description of the indicator

This indicator measures the number of graduates by field and gender in European cities. The indicator can be obtained from the European Tertiary Education Register (ETER) that provides longitudinal data for the whole period 2011-2016.

This indicator addresses aspects of Target 4.3 (tertiary and vocational education) of the UN SDGs and it relates to the indicator *"Tertiary education attainment"* proposed in the EU SDGs indicator set.

European context

According to (*Eurostat 2019*), "more than one fifth (22.2 %) of all students in tertiary education were studying business, administration or law in 2017" and the majority of graduates in Europe are women.

The number of graduates, especially in specific fields linked to technology and innovation can provide relevant information to assess the offer of specialized labour force. The disaggregation by gender is key to address issues related to Goal 5, especially considering that some fields register gender gap in the number of graduates and also in the access to some job sectors.

Comments / Limitations

- According to the Register, the completeness of the dataset is 85% for tertiary education students.
- Additional information included in the latest release of the datasets includes:
  - Data on numbers of students and graduates divided by ISCED-2011 level, by gender, fields of education, nationality and mobility, including ERASMUS incoming and outgoing students;
  - Data on HEI expenditures (personnel, non personnel, capital) and revenues (core, third-party and fees);
  - Data on the number of staff, divided between academic and non-academic, as well as on the number of professors;
  - Data on research activities: PhD students and graduates, R&D expenditures; Geographical information on satellite campuses.;
  - Enhanced information on university hospitals;
  - New data on researchers' mobility funded by the EU Framework Programs;
  - Six new indicators: Erasmus mobility intensity (incoming and outgoing), STEM orientation (students and graduates), master orientation, researchers' mobility intensity.

Metadata

Source: European Tertiary Education Register (ETER). *https://www.eter-project.com*

Availability and geographical coverage: 2,970 individual HEI in 37 countries [EU-28, EEA-EFTA countries (Iceland, Liechtenstein, Norway, Switzerland), candidate countries (Albania, North Macedonia, Montenegro, Serbia and Turkey)]

Unit of Measurement: Absolute number. Calculating the share and variation over time is recommended.

Level of aggregation: Geolocalised information, cities and provincial level.

Time coverage and frequency: 2011 (a.a. 2011/2012) - 2016 (a.a. 2016/2017).

10 REDUCED INEQUALITIES

TYPE

POPULATION WITH MIGRANT BACKGROUND

Links to other SDGs

4 QUALITY EDUCATION
8 DECENT WORK AND ECONOMIC GROWTH
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS

ALIGNMENT
UN list ☐
EU list ☐

COVERAGE
FRA | NLD | ITA
PRT | GBR | DEU
IRL | ESP

AGGREGATION
CITIES

AVAILABILITY
ALL

SOURCE Joint Research Centre

Description of the indicator

This indicator measures the number of residents by origin at three different levels of aggregations (country, continent, and EU vs. Third country origin). Data is provided at a high spatial resolution (square grid of 100 by 100 m) and with a large geographical coverage that includes approximately 45,000 LAUs. The main data sources used for the preparation of the maps are:

1) The national census statistics, which report the number of persons by country of birth and citizenships living in each census area.

2) The CORINE land cover data together with the European Settlement Map layers, which provide ancillary information to disaggregate data from the census areas into a uniform grid.

More detailed information about this indicator are available in (*Alessandrini et al. 2017*).

This indicator addresses aspects of Targets 10.2 (inclusion) and 10.7 (migration and mobility) of the UN SDGs.

European context

In 2017, 21.6 million individuals of non-EU countries were residing in the EU 28 Member States, and 16.9 million citizens from EU countries had moved to another one within the EU. However, both the magnitude of the phenomenon and the characteristics of migrants vary widely across places *(European Commission, 2018)*.

Comments / Limitations

- The database provides a static representation of the population at the reference year of the 2011 census.
- The method employed to obtain the data is an estimation and subject to confidentiality constraints: therefore, the figures about the population assigned to each cell should not be interpreted as the exact number of people residing in the area. Although data are verified through several validation, procedures, discrepancies are still present with respect to the total population reported at country level in official statistics.
- Tintori, Alessandrini, and Natale summarise the results of the Data Challenge on Integration of Migrants in Cities (D4I). D4I is an initiative launched by the JRC to disseminate to external researchers the data set showing the concentration of migrants in the EU to foster research projects on local aspects of migrants' integration (*Tintori, Alessandrini, and Natale 2018*).
- The proposed dataset makes possible to calculate indicators ranging from the simple ratio of migrants over the total population to more structured indicators of spatial concentration, ethnic diversity and spatial residential segregation *(Cohn and Jackman 2011; Duncan and Duncan 1955; Massey 2012; Sean F. Reardon and Firebaugh 2002; S. F. Reardon and O'Sullivan 2004; Alesina, A., & Ferrara 2005 OECD 2018b)*.
- This database includes high-resolution information and it enables researchers and policy-makers to investigate whether diversity and concentration of migrants are phenomena affecting only cities or also towns, suburbs, and rural areas *(Joint Research Centre 2019)*.
- The high-resolution information provided in this database also makes it possible to develop innovative research (e.g. on the accessibility to services).
- In the literature, the segregation of migrants is a topic highly studied and debated (*Arbaci 2007; Bolt 2009; Cutler, Glaeser, and Vigdor 2008; Edin, Fredriksson, and Åslund 2003; Musterd 2005; Proietti 2014; Natale, Scipioni, and Alessandrini 2018*). In addition, migration is also analysed as a driving force of EU development of cities and regions. For instance, migrants contribute to change the composition of the population living in urban areas, as well as the 'urban fabric' of cities through increased diversity and preferences as well as ethnic entrepreneurship (*Lewis, E. and Peri 2015; Card, Dustmann, and Preston 2012*).

Metadata

Source: Joint Research Centre (*https://ec.europa.eu/knowledge4policy/migration-demography/data-integration-d4i_en#mapsofmigrantcommunities*).

Availability and geographical coverage: Data are open to all researchers upon request for all cities of eight EU Member States (France, Germany, Ireland, Italy, the Netherlands, Portugal, Spain, the United Kingdom).

Unit of Measurement: Absolute number.

Level of aggregation: The grid shows the concentration of migrants in cells of 100 by 100 m.

Time coverage and frequency: 2011.

10 REDUCED INEQUALITIES

TYPE

HOSTED ASYLUM SEEKERS

Links to other SDGs

11 SUSTAINABLE CITIES AND COMMUNITIES

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

ALIGNMENT

UN list

EU list

COVERAGE

LUX | FIN | FRA NLD | NOR | SWE

AGGREGATION

MUNICIPALITIES

AVAILABILITY

ALL

SOURCE **Proietti, Veneri 2019**

Description of the indicator

This indicator refers to the absolute number of hosted asylum seekers per municipality. It is based on exploratory ad-hoc data collection from national statistical offices and governmental agencies in charge of monitoring the reception of asylum seekers. It aims at analysing how homogeneous the distribution of hosted asylum seekers is across cities within the same countries. An asylum seeker is defined by the International Organization for Migration (IOM) as "*an individual who is seeking international protection. In countries with individualised procedures an asylum seeker is someone whose claim has not yet be finally decided on by the country in which he or she has submitted it*".

The term 'hosted asylum seekers' refers to the stock of asylum seekers that is receiving material reception in all the reception typologies specified by the Directive 2013/33/EU regardless of the phase of reception or the type of accommodation (e.g. collective centres, apartments). Definitions and details about the data collection are available in (*OECD 2018c*) and in *(Proietti and Veneri 2019)*. This indicator addresses aspects of Target 10.7 (migration and mobility) of the UN SDGs and relates to the indicator 'Asylum Application' of the EU SDG indicator set.

European context

Notwithstanding that asylum seekers account for a very small share of the foreign-born population in Europe, the recent inflows have pushed countries to make incremental efforts to better manage the flows, such as improving the Common European Asylum System (CEAS). The European Agenda on Migration *(European Commission 2015)* expressed the importance of considering the responsibility to host asylum seekers both across and within countries and this topic has also been covered extensively by the literature *(inter alia Bansak et al., 2018; Bansak, Hainmueller, & Hangartner, 2017)*.

Understanding how asylum seekers are distributed across municipalities and how this distribution changes over time can help identify challenges in terms of accommodation and public services to be provided locally, as well as possible opportunities connected to the increase in local diversity.

Comments / Limitations

- This database represents a first attempt to harmonise data concerning hosted asylum seekers at the local level and for a large number of countries. Notwithstanding that the information collected comes exclusively from official sources, the data still presents some limitations. For instance, monitoring systems of different countries are not always homogeneous, either in the institutions collecting information or in the timing, method and target groups of the data collection. Countries also differ in the degree of openness of the information regarding asylum seekers' reception, and in the accessibility of the information provided in terms of timeliness.
- There are other sources of local data on asylum seekers' reception but they are usually not harmonised. Examples of data are available at: *https://data2.unhcr.org/en/documents/download/58584* (UNCHR) and *http://www.asylumineurope.org/reports/country/france/reception-conditions/housing/types-accommodation*

Metadata

Source: *(Proietti and Veneri 2019)*

Availability and geographical coverage: available from the authors upon request for 18 EU countries at NUTS3 level and in six countries at LAU level.

Unit of Measurement: Absolute value. It is recommend considering also the share of hosted asylum seekers over the number of residents and calculating the variation over time.

Level of aggregation: LAUs and NUTS3

Time coverage and frequency: The broad and comparative data collection concerns the years 2010-2017, but most of the statistical sources mentioned in the data collection disseminate data with an annual frequency.

Box 4

HOW TO DEFINE AND MEASURE DISCRIMINATION AND HATE?

"Discrimination occurs when people are treated less favorably than other people that are in a comparable situation only because they belong, or are perceived to belong to a certain group or category of people. People may be discriminated against because of their age, disability, ethnicity, origin, political belief, race, religion, sex or gender, sexual orientation, language, culture and on many other grounds" (Council of Europe 2019).

The topic of discrimination has been more and more discussed in the last years, both in policy debates and in the literature, as data show alarming rates of experiences with discrimination among several surveyed population groups *(FRA 2017).*

The lack of an official database concerning discrimination and hate has been repeatedly reported by different international and civil society organisations *(inter alia European Commission against Racism and Intolerance (ECRI) 2018).* Harmonised data is still not available for European Cities.

Discrimination is a different concept to hate, where hate speeches *"represent a sort of ideological and psychological basis of discrimination" (PRISM Project 2015)* (PRISM is a project co-financed by the Fundamental Rights and Citizenship Programme of the European Union), while Hate crimes are *"acts motivated by bias or prejudice towards particular groups of people. To be considered a hate crime, the offence must meet two criteria: First, the act must constitute an offence under criminal law; second, the act must have been motivated by bias" (OSCE - ODIHR 2019).*

In the literature, both data on discrimination *(Lunaria 2019b)* and hate speeches and crimes *(inter alia Lunaria 2019a; Denti and Faggian 2018)* are becoming available.

In the framework of VLRs, it could be relevant to include information concerning discrimination and hate speeches and crime at the local level. However, data collections have two main limitations:

First, they rarely provide a complete representation of the phenomenon from the statistical point of view, rather giving an overview of the incidence and typology of cases, vulnerable groups and offenders over time.

Second, data need to be thoroughly analysed to account for duplication and peaks due to large-scale events taking place in a specific municipality and large-scale institutions located in specific municipalities.

GOAL 11

MAKE CITIES AND HUMAN SETTLEMENTS INCLUSIVE, SAFE, RESILIENT AND SUSTAINABLE

Description of the Goal

Goal 11, also known as the "Urban Goal", calls for making cities and human settlements inclusive, safe, resilient and sustainable.

As urbanisation is recognised as a factor for economic and social development, this goal tackles elements that can greatly affect the quality of life in cities. It includes, among others, aspects related to housing (*Balestra and Sultan 2013*), public transport, urban waste, land consumption, participation in planning, public space, and exposure to air pollution by particulate matter.

The implementation of Goal 11 can benefit from the principles and actions identified in the New Urban Agenda (*United Nations 2016*), adopted by the United Nations in Quito, Ecuador in October 2016. It delivers a vision for sustainable urban development, specifically highlighting the potential of cities in tackling global challenges. Cities are therefore considered a key driver for achieving a sustainable future (*EUROSTAT 2019b, 215*).

European Dimension

In the last decades, Member States spent at least 50% of the European Regional Development Fund (ERDF) as part of Cohesion policy in European cities to improve the urban environment, promote urban regeneration and innovative actions, as well as reduce inequalities.

The amount of ERDF directly allocated to integrated strategies for sustainable urban development amounts to 15 billion Euros in the current programming cycle, allowing urban authorities to be directly involved in the selection of projects (*European Commission 2017d*).

An extensive data collection about these strategies is available on the STRAT-Board, the Territorial and Urban Strategies Dashboard *(JRC 2019b)*. The STRAT-Board offers a unique knowledge base on the integrated approach to urban and territorial development as supported by EU provisions and tools in 2014-2020.

In 2016, the EU and its Member States adopted the *Urban Agenda for the EU* that tackles issues and challenges that are particularly impactful in European cities, notably sustainable use of land and nature-based solutions, urban poverty or air quality.

Local dimension

As illustrated in this *Handbook*, all SDGs have a local dimension in which cities are called to take action, and improve and coordinate their efforts with other cities and different levels of government. However, this Goal is urban and local per se: for this reason, in the UN global framework, the SDG 11 targets are designed specifically for cities and communities, and related indicators have to be measured in cities.

As per the rationale of this *Handbook*, many of the indicators usually used to measure the SDG 11 are listed in other goals (i.e. rate of recycled urban waste is in SDG 12) and they are not duplicated in this Goal, even if pertinent. A proper assessment of the differences by degree of urbanization (cities, towns and suburbs, rural areas) can be done for a number of indicators collected by DG REGIO and EUROSTAT and excluded in this *Handbook*.

However they can potentially be used to assess the differences in the performance of European cities versus the other types of settlements.

The Cohesion Report (*European Commission 2017a*) provides a coherent periodic assessment of the EU's economic, social and territorial cohesion in the European Cities and Regions. For an in depth analysis on European cities in the context of cohesion see (*European Union and UN-Habitat 2016*).

11 SUSTAINABLE CITIES AND COMMUNITIES

TYPE

HOUSING COST OVERBURDEN RATE

Links to other SDGs

1 NO POVERTY

10 REDUCED INEQUALITIES

ALIGNMENT

UN list

EU list

COVERAGE

BARCELONA

AGGREGATION

METROPOLITAN CITY

AVAILABILITY

1

METROPOLITAN CITY

SOURCE **Sistema d'Indicadors Metropolitans de Barcelona (SIMBA)**

Description of the indicator

The indicator measures the share of the resident population in living households where more than 40% of the total household income is spent on housing expenses. The rental or mortgage interest (if owned by pending payments) and other associated expenses related to housing (water, electricity, gas, community, insurance or municipal taxes) are accounted for as housing expenses. The overburden measurement of housing expenses is calculated on an individual level.

A harmonised and updated database for European cities is not available. EUROSTAT collects this data at NUTS3 level in the EU-SILC (a periodical survey). The case of the metropolitan city of Barcelona is presented here as an example of local collection of the same indicator. This indicator refers to the SDG target 11.1 (adequate and affordable housing).

European context

The SDG Target 11.1 aims at ensuring access to adequate, safe and affordable housing for all. In other regions of the world the most urgent issue is the improvement of living conditions of people living in slums. In Europe, the focus is more on access to affordable and adequate housing *(Salvi Del Pero, Adema, and Ferraro 2016)*.

The Housing Partnership of the Urban Agenda for the EU highlights that "The EU has more than 220 million households, and an alarming number 82 million citizens are overburdened by housing costs – many are even at risk of eviction." *(The Housing Partnership 2018)*.

In many European cities new phenomena negatively affects housing affordability: for example the increasing presence of housing investors that leads to the 'financialisation of housing' *(see Box 5 Citown: Who owns our cities?)*.

Comments / Limitations

- The information related to the rent in the proposed indicator refers to the year before the one of the realization of the survey.
- The housing issue in Barcelona is object of a joint research effort coordinated by the *Observatori Metropolità de l'Habitatge de Barcelona* (Barcelona metropolitan housing Observatory). The Observatory combines different data sources and produces statistics on housing affordability and about the relationship between rent offer and demand *(Observatori Metropolità de l'Habitatge de Barcelona 2018; 2019)*.
- This indicator addresses one specific aspect of access to housing, but other dimensions of housing should be assessed to have a full picture of living condition in cities. Recent studies on housing exclusion in Europe highlight that inequalities in housing exclusion have increased between 2010 and 2016, with the situation of people below the poverty line having worsened in particular (*inter alia OECD 2019; Baptista and Marlier 2019; Abbé Pierre Foundation and FEANTSA 2018*).
- UN-HABITAT developed a training module for the global comparison of indicators for this target (UN-Habitat 2018d).

Metadata

Source: Sistema d'Indicadors Metropolitans de Barcelona (SIMBA), *Variable Taxa de sobrecàrrega de despeses de l'habitatge segons quintils de renda https://iermbdb.uab.cat/index.php?ap=0&id_ind=1710&id_cat=-2*

Availability: Barcelona (Spain).

Unit of measure: share. Calculating the variation over time is recommended.

Level of aggregation: metropolitan city

Time coverage and frequency: 2016-2017 and 2017-2018. Data collected every year.

11 SUSTAINABLE CITIES AND COMMUNITIES

TYPE

BICYCLE TRAFFIC

Links to other SDGs

3 GOOD HEALTH AND WELL-BEING

ALIGNMENT

UN list ☐

EU list ☐

COVERAGE

WIEN

AGGREGATION

MUNICIPALITIES

AVAILABILITY

1

SOURCE **Vienna City Administration**

Description of the indicator

This indicator counts the number of bicycles on selected routes and monitored by the Bicycle traffic census.

This indicator can provide more insights than other indicators traditionally used to measure this mobility mode, i.e. the length of bicycle lines (Km).

A harmonized and updated database for European cities is not available for this indicator. The case of the city of Wien is presented here as example of local collection of this statistics that can complement other existing indicators measuring active mobility.

European context

Cycling offers a sustainable and affordable mode of transport in European cities. It has been estimated that in Europe the share of the population cycling every day is around 26% *(DG MOVE 2017)*. Despite the importance of this transport mode, the collection of comparable and reliable data on this topic is inconsistent.

In 2017, DG MOVE published a study on the lack of comparable data and statistics on cycling in European cities, providing an overview of the types of data currently available and of the possibilities offered by new technologies and data sources *(DG MOVE 2017)*.

According to this study, the main open access data source found on cycling infrastructure is the Open Cycle Map, but other sources and methodology can be further explored.

Comments / Limitations

- In order to compute this indicator, more than 350 routes are regularly monitored in the city of Wien.
- This indicator does not allow for the comparison with other cities.
- This indicator should to be complemented with other information regarding the quality and lenght of the cycling network and as well as other transport modes.

Metadata

Source: Vienna City Administration - Municipal Department 46 - Traffic Organisation and Technical Traffic Affairs *https://www.data.gv.at/katalog/dataset/stadt-wien_radverkehrszhlungen-derstadtwien*

Availability: city of Wien.

Unit of measure: Absolute value. Calculating the variation over time is recommended.

Level of aggregation: Municipality

Time coverage and frequency: 2011-2016. Data collected every year.

11 SUSTAINABLE CITIES AND COMMUNITIES

TYPE

ACCESS TO PUBLIC TRANSPORT

Links to other SDGs

3 GOOD HEALTH AND WELL-BEING
8 DECENT WORK AND ECONOMIC GROWTH
10 REDUCED INEQUALITIES

ALIGNMENT
UN list ☑
EU list ☐

COVERAGE
EU-28

AGGREGATION
CITIES AND GREATER CITIES

AVAILABILITY
409
CITIES AND GREATER CITIES

SOURCE **DG REGIO**

Description of the indicator

The indicator estimates the share of population living within the administrative boundaries of a city or an urban centre having access to specific level of public transport service. It is based on the frequency and the mode of transport and it establishes five levels of service. The proposed indicator is calculated with the method elaborated by Poelman and Dijkstra *(Poelman and Dijkstra 2015)*.

This indicator measures access to public transport by combining the frequency of public transport services available, with the ease of walking the stops. The frequency of public transport stops considers both the location of stops and the frequency of departures.

This indicator addresses aspects of Target 11.2 of the UN SDGs that aims at reducing the use of private means of transportation; improving the access to areas with a high proportion of transport disadvantaged groups (i.e. elderly citizens, physically challenged individuals, and low income earners), or areas with specific dwelling types (i.e. high occupancy buildings or public housing). This indicator relates to the indicator "difficulties in accessing public transport" proposed in the EU SDGs indicator set.

European context

To encourage a modal shift towards collective transport modes, easy access to public transport is a prerequisite. However, data collected in 2012 show that one in five European citizens reported 'high' or 'very high' levels of difficulty in accessing public transport (20.4%), indicating that convenient public transport is not universally accessible to EU citizens. Disadvantaged groups such as the elderly, those at risk of poverty and those with disabilities are likely to be most affected by barriers to accessing public transport. Access is also particularly important for people with low incomes because they are less likely to be able to afford a car *(EUROSTAT 2019b, 220)*.

Comments / Limitations

- Walking distance is calculated for metro and train stops (833 metres) and for bus or tram stops (417 metres) according to estimated willingness to walk. Residential population distribution is provided as input data at the highest resolution available.
- In the upcoming review of the Working Paper *(Poelman and Dijkstra 2015)*, these thresholds will be updated to 500 meters for bus and trams stops and 1,000 meters for metro and trains stops, to be in line with UN-Habitat recommendations for the related SDG indicator.
- The combination of data about access to public transport with share of trips to work by different means other than public transport would provide relevant information on additional parameters that may influence the mode of transport.
- UN-HABITAT published the suggested method for the calculation of this indicator (UN-Habitat 2018c).

Metadata

Source: *European Commission, DG REGIO (DG REGIO 2015).*

Availability and geographical coverage: 409 EU-28 cities and greater cities, and 318 urban centres in 2018. The indicator can also be visualized on interactive maps (DG REGIO 2019)

Unit of measurement: share

Level of aggregation: Percentage of total population in cities, urban centres or countries.

Time coverage and frequency: 2018. An update is foreseen in 2020.

11 SUSTAINABLE CITIES AND COMMUNITIES

TYPE

BUILT-UP AREA PER CAPITA

Links to other SDGs

15 LIFE ON LAND

ALIGNMENT
UN list
EU list

COVERAGE
EU-28

AGGREGATION
CITIES

AVAILABILITY
800
CITIES

SOURCE **Joint Research Centre**

Description of the indicator

This indicator captures the amount of built-up area per capita per each urban centre. This indicator is calculated using modelled land use maps. "Built-up" is defined by the presence of buildings (roofed structures). This definition largely excludes other parts of urban environments and the human footprint such as paved surfaces (roads, parking lots), commercial and industrial sites (ports, landfills, quarries, runways) and urban green spaces (parks, gardens).

Consequently, such built-up area may be significantly different from other urban area data that use alternative definitions. The number of inhabitants is calculated within the boundaries of the area of interest (urban centres) according the gridded population layer produced in the same framework.

The indicator addresses the SDG target 11.3 (land consumption) and it relates to the indicator "Settlement area per capita" proposed in the EU SDGs indicator set 2020.

European context

While densely populated cities can provide a resource-efficient way for people to live and reduce land take, recent trends have shown that the land in urban areas is not always used efficiently. Since the mid-1950s, settlement areas have been expanding more quickly than the growth of urban population. Over this period, the total area of cities in the EU has increased by 78% compared to a population growth of 33%. As a result, the loss of land and ecosystem services remains one of the major environmental challenges Europe is facing.

Despite EU efforts to increase the land use efficiency, settlement area per capita — comprising both sealed and non-sealed surfaces — has increased by 9.2% since 2009: this does not put the EU on track to achieve its goal of halting land degradation *(EUROSTAT 2019b)*. In 2015, each EU inhabitant occupied an average of 263sqm, almost the double in comparison to 40 years before *(Pesaresi et al. 2016)*. Between 1990–2015, urban centres in Europe accommodated 12 million new people and expanded over 7,000 km^2 *(Schiavina et al. 2019)*.

Comments / Limitations

- Calculating the variation over time is recommended.
- This indicator differs from the official UN indicator 11.3.1, which is the Land Use Efficiency (LUE).The LUE expresses as Land Consumption Rate over Population Growth Rate. For a detailed discussion over the differences of these two indicators see *(Schiavina et al. 2019; UN-Habitat 2018e)*.
- In this *Handbook*, the Built-up area per capita has been preferred to the LUE. The former expresses a concept (area occupied by each person) easier to communicate to citizens; the latter is a 'ratio of ratios'.

Metadata

Source: Joint Research Centre, for the methodology see (Florczyk et al. 2019). For download: *http://cidportal.jrc.ec.europa.eu/ftp/jrc-opendata/GHSL/GHS_STAT_UCDB2015MT_GLOBE_R2019A/*

Availability and geographical coverage: about 10,000 urban centres

Unit of Measurement: squared metre / capita

Level of aggregation: Urban Centres

Time coverage and frequency: 2000 and 2015

11 SUSTAINABLE CITIES AND COMMUNITIES

TYPE

Links to other SDGs

3 GOOD HEALTH AND WELL-BEING

15 LIFE ON LAND

ALIGNMENT

UN list

EU list

COVERAGE

EU-28 PLUS OTHER

AGGREGATION

CITIES AND GREATER CITIES

AVAILABILITY

800

CITIES AND GREATER CITIES

SOURCE DG REGIO

POPULATION WITHOUT GREEN URBAN AREAS IN THEIR NEIGHBOURHOOD

Description of the indicator

This indicator describes the share of total population of a city who does not have green urban areas in its neighbourhood. It is calculated by analysing the surface of green urban areas within walking distance, from people and the served population. This indicator is calculated considering an area of easy walking distance considering approximately 10 minutes of walking time.

For this indicator, the most recent updated working paper *(Poelman 2018)* presents a methodology that takes into account the spatial distribution of both population and green areas throughout the cities' territory, and produces also indicators about the proximity of the green areas to the urban population. To obtain comparable results for all cities, harmonised EU-wide data sources were used, such as the complete set of Copernicus Urban Atlas land use data and census-based population figures at the highest spatial resolution available. This indicator addresses aspects of Target 11.7 (public space) of the UN SDGs.

European context

Green areas in cities, like parks, public gardens and nearby forests fulfil a variety of functions, ranging from ecological value to recreational functions. They also provide aesthetic value and they play a role in promoting public health. In general, these areas contribute to a better quality of life of the inhabitants.

Based on the available data, covering almost all cities in the EU and in the EFTA countries, substantial variation in green urban areas' proximity can be observed, both in bigger and smaller cities. There is almost no relationship between this value and the city size. Amongst the capital cities with more than 1 million inhabitants, values vary between less than 12 hectares in cities such as Lisbon, Bucharest, Athens, Dublin, Paris, Budapest and Rome, to more than 50 hectares in Prague and Stockholm. Moreover, green urban areas also need to be spatially distributed in a suitable way to fulfil relevant functions.

The differences in the share of population having no green areas in their neighbourhood shed some light on the spatial distribution of these areas. In almost a quarter of the cities under review, less than 2% of population has no green areas within walking distance. Some of the outstanding bigger cities in this group are Madrid, Vienna, Torino, Stockholm, Prague and Glasgow.

On the other hand, in about 10% of cities, this percentage is higher than 20% (e.g. in several cities in Romania and Italy *(see Poelman 2018)*).

Comments / Limitations

- This indicator is calculated using data from 2012, but it could be updated using most recent input data.
- For more information on official UN SDG indicator on public space "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", see (*UN-Habitat 2018c*).

Metadata

Source: European Commission, DG REGIO *(DG REGIO 2018)*

Availability and geographical coverage: 830 EU-28 cities and greater cities and 800 urban centres for 2018.

Unit of measurement: share

Level of aggregation: cities and greater cities, urban centres and countries.

Time coverage and frequency: 2018

11 SUSTAINABLE CITIES AND COMMUNITIES

TYPE

Links to other SDGs

3 GOOD HEALTH AND WELL-BEING
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
11 SUSTAINABLE CITIES AND COMMUNITIES

ALIGNMENT
UN list
EU list

COVERAGE
EU-28

AGGREGATION
CITIES

AVAILABILITY
800
CITIES

SOURCE **Joint Research Centre**

POPULATION EXPOSED TO NO_2 CONCENTRATION

Description of the indicator

The indicator measures the total number of people exposed to atmospheric annual mean concentrations of NO_2 exceeding 30 µg /m3. The EU Air Quality Directive (2008/50/EC) has set forth legally binding limit values for annual and daily ground-level concentrations of NO_2, with the annual value being more restrictive. The European Environmental Agency (EEA) publishes and updates annually the AirBase database that includes monitored values of concentrations of main pollutants including NO_2 *(EEA n.d.)*. Extrapolated results of NO_2 concentrations are combined with population density maps to derive total population exposed. This indicator addresses aspects of Target 11.6 (environmental impact) of the UN SDGs.

European context

Air pollution is still a major environmental risk for human and ecosystems in Europe and is the main reason of premature deaths *(IHME 2013)*. NO_2 concentrations are especially high in cities, as pollution is primarily determined by local emission sources such as traffic or industry. During the last decades, the EU has developed measures to regulate anthropogenic emissions pollutants.

In 2013, the EC published the 'Clear Air Package' that set out concrete objectives for reducing the health and environmental impacts of air pollution by 2030, and contained legislative proposals to implement stricter standards for emissions and air pollution. In line with these, several measurements and strategies have been implemented at city, regional and national level. Specifically for NO_2 these measures focus primarily on reductions of net emissions of NO_2 by improving automobile technologies *(EC 2007)*, promoting alternatives to road transport or imposing traffic regulation measures. Despite of the improvement, still a large proportion of urban population in Europe is exposed to concentrations of NO_2 over the imposed legislation levels (*EEA 2018a*).

Comments / Limitations

- JRC annual mean concentrations of NO_2 were calculated using LUR models in which independent variables are related to human activities like traffic or industrial activities allocated with high resolution maps (100m). This allow to produce highly detailed maps of concentrations. Population exposed is calculated based on these maps, whereas EEA assumes same levels of concentration within certain areas of interest defined with proximity criteria.
- The Joint Research Centre has also developed maps with land use regression (LUR) models, of current (2015) and future (up to 2030) population exposed to NO2 according to different emission reduction scenarios.
- EEA AirBase database includes monitored values of concentrations of main pollutants including NO2. For EEA data on population exposed, only aggregated data by country are available.

Metadata

Source: Joint Research Centre. Data are available online on the Urban Data Platform Plus *https://urban.jrc.ec.europa.eu/#/en*.

Availability and geographical coverage: 800 European cities

Unit of Measurement: ug/m^3

Level of aggregation: cities, defined on population density clusters.

Time coverage and frequency: 2010 – 2020 – 2030 (modelled). AirBase database publishes yearly data since 2013.

11 SUSTAINABLE CITIES AND COMMUNITIES

TYPE

Links to other SDGs

4 QUALITY EDUCATION

8 DECENT WORK AND ECONOMIC GROWTH

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

ALIGNMENT
UN list
EU list

COVERAGE
EU-28 PLUS OTHER

AGGREGATION
CITIES

AVAILABILITY
165
CITIES

SOURCE **Joint Research Centre**

CULTURAL CREATIVE CITIES INDEX – C3 INDEX

Description of the indicator

The C3 Index is a composite indicator (or synthetic indicator of performance) derived from the Cultural and Creative Cities Monitor. The *second edition of the Cultural and Creative Cities Monitor* shows how well 190 selected cities in 30 European countries perform on a range of measures describing the 'Cultural Vibrancy', the 'Creative Economy' and the 'Enabling Environment' of a city, using 29 quantitative indicators as well as qualitative information.

The scores of these three measures are then aggregated in an overall index (the 'C3 Index') based on a set of weights designed together with experts in the field *(European Commission 2019a)*. For the methodology see *(Montalto et al. 2019 Annex 1)*. The indicator addresses the SDG target 11.4 (Cultural and Natural Heritage).

European context

The Cultural and Creative Cities Monitor represents a first step towards creating a better measurement and understanding of how diverse Cultural and Creative Cities behave and perform across Europe. The *Countries and Cities pages* of the accompanying online tool allow user to browse the 190 selected cities and the quantitative and qualitative information describing their performance. Its interactive tools make it possible to:

- adapt the weights of the measured policy dimensions so to produce customised rankings that better reflect cities' priorities;
- create a new city entry, by adding new data;
- compare it to the cities included in the Monitor;
- simulate the impact of policy actions (e.g. increased city visitors) on the final scores, thus allowing users to build scenarios *(JRC 2019a)*.

Comments / Limitations

- This composite indicator includes several variables; the quality and coverage of the input data might affect the accuracy of the index. Imputed indicators are marked with an asterisk in the online city pages.

Metadata

Source: Joint Research Centre, *Cultural and Creative Cities Monitor* (*JRC 2019a*) at *https://composite-indicators.jrc.ec.europa.eu/cultural-creative-cities-monitor/*

Availability and geographical coverage: 190 cities across the 30 European countries

Unit of Measurement: from raw values to normalised scores

Level of aggregation: Cities, greater cities, NUTS3

Time coverage and frequency: 2017 - 2019

Box 5

CITOWN: WHO OWNS OUR CITIES?

An exploratory research activity on the financialisation of housing markets

Authors: *Sjoerdje Charlotte van Heerden and Ricardo Barranco (JRC)*

Many European cities currently have a high demand for housing because of what they offer potential residents in terms of lifestyle, culture, jobs and education. These cities not only attract students, job seekers, and tourists, but also (international) investors seeking to establish residential property portfolios. With urban property being a finite resource, in numerous cities, property and rental prices have quickly shot up, having a negative impact on housing affordability. The increasing presence of investors is referred to as the 'financialisation of housing', whereby housing is primarily treated as a commodity rather than a social good.

In the framework of the local monitoring of the SDGs, it could be relevant to introduce a measure of housing affordability.

To get a better understanding of the extent to which housing markets have been financialised, as well as overall housing affordability, JRC has examined the following cities: Amsterdam (The Netherlands), Athens (Greece), Barcelona (Spain), Berlin (Germany), Lisbon and Porto (Portugal), Paris (France), and Vilnius (Lithuania). Two workshops supported the study: one focused on methodology and data, the other on policy measures. The final findings of the study will be published in a report in early 2020.

City studies

In **Amsterdam** the investment volume in residential housing has been increasing steadily since 2013. In parallel, the amount of social housing has decreased, the private rental market has grown driven by the demand, and housing prices have rapidly increased. It is estimated that almost 7000 dwellings have been withdrawn from the owner-occupied market to rent out on short-term rental platforms, such as Airbnb. The city is actively working on policy measures to increase housing affordability.

Large institutional investors are hardly involved in the housing market in **Athens**. In this city, financialisation mostly takes the form of small-scale and mostly non-corporate investors' activity. This is strongly related to the demand for short-term rentals (i.e., 'touristification') and residence permits (the Golden Visa programme), which has pushed housing prices and rent prices up, making renting and buying a property less affordable.

In 2018, the average rent price per month in **Barcelona** hit a new historical maximum, so that Spanish tenants have the highest overburden rate across EU Member States. Property purchase prices have also increased over the past years. Between 2014 and 2017, transactions made by natural persons decreased from 67.2% to 63.5%, while that of legal entities rose from 17.9% to 21.3%. The Barcelona 'Right to Housing' plan has been adopted to ensure housing maintains its social function by means of 59 specific initiatives.

An increase in median housing prices and rent prices was also observed in **Berlin** between 2011 and 2018. In 2017, almost 60% of the dwellings were privately owned, around 15% was owner occupied, 15% was owned by municipal housing companies and almost 10% was owned by cooperatives. More specifically, for 2010-2011 data show that almost 7% of the dwellings belonged to private companies, such as banks, insurances, and funds (next update is expected in 2021). Berlin is using

various instruments to expand supply through new construction, counteract the decline of the number of rent-controlled flats, and ensure that housing is not used for short-term rental.

In **Paris** low interest rates and credit distribution were the main factors contributing to house price increases. However, credit is primarily distributed to the richest part of the population, reinforcing social segregation. The private rental market is squeezed between self-occupied ownership and affordable housing for low-income households. A growing concern is the private intermediate rental market, since middle income households experience more and more difficulties to access housing in the centre of the city.

In Portugal, housing stock is traditionally characterised by high rates of home ownership, a significant number of vacant homes, and by a strong role of family in housing provision. Nevertheless, in recent years both in **Lisbon** and **Porto** issues such as the economic and social development process, the crisis, rent freeze, and unbalanced supply and demand have negatively impacted access to housing, as well as housing conditions. However, both cities resurged from the mid-2000s, strongly stimulated by tourism. Airbnb made a massive entrance to the market from 2015 onwards, with 75% of rented dwellings concentrated in central city areas. This development appears to be strongly related to the rise of housing prices and rent values, particularly in central locations. Foreign direct investment in real estate activities and construction doubled in the last 10 years. However, it is not possible to determine the full extent of financialisation in both cities, as there is no complete information on (foreign) investors, due to bank and tax secrecy. Most of these investors are linked to real estate funds or operate through national companies.

In **Vilnius** the housing market began to take shape after independence (1918). The Soviet period generally left a poor housing situation, energy inefficient homes, and unresolved property restitution issues. Nearly every family owns its home and 90% of them without any bank credits attached. The municipal social housing sector in Vilnius accounts for 2.8 % of the total. Over the past 3 years, the share of prestigious apartment sales in the primary market rose to 10-15 percent, and in 2018 developers offered a record number of luxury apartments. Another changing feature is the demand for rent, with investors getting ready to develop this market further.

GOAL 12

ENSURE SUSTAINABLE CONSUMPTION AND PRODUCTION PATTERNS

Description of the Goal

This Goal calls for ensuring sustainable consumption and production patterns by including policies and procurement procedures that improve resource efficiency, reduce waste and mainstream sustainability practices across all sectors of the economy. Therefore, this Goal focuses on urgent actions required to ensure that current material needs do not lead to resource over-extraction or to degradation of environmental resources. The related indicators measure elements such as material footprint, food lost, hazardous waste, recycling rates, sustainable tourism, and the implementation and monitoring of sustainability plans both for public and private entities. In addition, Goal 12 aims at promoting sustainability over the long term by increasing the awareness of people on the importance of choosing lifestyles in harmony with nature.

European Dimension

This Goal is addressed by several EU policies, and in particular by the *Circular Economy Strategy (European Commission 2018b)*. A circular economy preserves the value of resources for as long as possible and regenerates them at the end of product life cycles, in opposition to linear economy in which we take, use and dispose of resources in an accelerating and unsustainable way.

Waste management activities promote recycling, which not only reduces the amount of waste going to landfills (not recycled) and the associated environmental impacts, but also leads to higher resource efficiency. Recycling further helps to create jobs while reducing the demand for raw materials. The 'waste hierarchy' is an overarching logic guiding EU policy on waste, which prioritises waste prevention, followed by re-use, recycling, other recovery and finally disposal (including land filling) as the last resort. Five EU countries already recycle more than 50% of their municipal waste and landfill less than 5%.

Local dimension

Cities are where the highest amount of waste is generated: according to the World Bank, in 2012, every citizens generated every day 1.2kg of urban waste. This value is projected to increase to 2.2 kg/capita/day in 2025 *(Burke et al. 2012)*. Urban circular economy applies to all those (combined) economic activities that are implemented by public and private actors in an urban context with the aim of increasing resource efficiency and reducing waste generation.

These activities include: (i) designing and producing products and assets for longevity and zero waste, (ii) promoting the sharing of products and assets amongst various users, and (iii) keeping urban resource streams (e.g., materials, energy, water, etc.) in closed loops and at their highest possible value throughout a product's or asset's life-cycle *(see Montenegro Navarro and Jonker 2018, 15)*. Among the several aspects of circular economy that local governments can influence, urban waste, pollutants, consumers' behaviours in the transition from linear economy to circular economy, and sustainable tourism are all considered in this *Handbook*. Regarding urban waste, two aspects are considered: the recycling rate of municipal waste - direct responsibility of the local administration regarding the collection and management - and the generation of urban waste per capita, which can be influenced through education and awareness raising campaigns targeting the citizens.

The EU has set target to 60% of municipal waste to be recycled and prepared for reuse in EU member States by 2030. Cities can also monitor and reach agreements with industrial facilities that emit pollutants in their territories. With increasing urbanisation, cities are the ideal level at which to implement circular changes and originate the circular city concept. However, the assessment at urban scale is still a challenge and needs improvements (see *Box 6)*.

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

TYPE

LOCAL RECYCLING RATES

Links to other SDGs

7 AFFORDABLE AND CLEAN ENERGY

11 SUSTAINABLE CITIES AND COMMUNITIES

ALIGNMENT

UN list ☑

EU list ☑

COVERAGE

PORTUGAL

AGGREGATION

MUNICIPALITIES

AVAILABILITY

ALL

PORTUGUESE MUNICIPALITIES

SOURCE **PORDATA**

Description of the indicator

This indicator describes the recycling rate at local level. It is calculated as the share of the Recycled Waste (in tonnes) over the total waste. In most EU countries, different agencies or institutions (environmental agencies, regions, ministries, etc.) collect this indicator, depending on the governance system. Data is then aggregated by the National Statical Office.

The case of Portugal is similar to most of the EU countries, with the difference that data about this indicator is collected on a single platform for different level of aggregation (municipality, region, country), whereas in other Member States the information, at municipal level, is usually available in single municipalities' platforms.

The indicator relates to Target 12.5 (reduce waste) of the UN SDGs.

European context

The EU waste legislation has driven improvements in waste management since the '70s. The EU waste hierarchy ranks waste management as follows: prevention, preparing for reuse, recycling and recovery – with disposal as the last option. The new rules aim at supporting Member States to become top performers in recycling:

- By 2030, at least 70% of all packaging waste in each EU country should be recycled.
- By 2035, all EU countries should recycle at least 65% and landfill should be less than 10% of municipal waste *(Directorate-General for Environment (European Commission) 2018)*.

Since 2000, the recycling rate in Europe has continuously increased (+21.1%). In 2017, almost half of the municipal waste generated in the EU was recycled (46.4%). EU and national strategies prioritising efficient waste management have largely contributed to these results *(EUROSTAT 2019b)*. In 2017, the EU country with the highest recycling rate was Germany (67.6%).

Comments / Limitations

- In the same datasets other useful information is available at different levels of aggregation: total waste, landfill, energy and organic valorisation (NUTS3).
- This dataset presents data in several formats: tables, graphs and maps.
- The recycling rate depends both on the waste collection (behaviours of the citizens) and on the capacity of the waste management system (managing authorities). Depending on the country, the waste management authorities can be at city, sub-regional or regional level.

Metadata

Source: Official data collected by IACSB (until 2001) | Estatísticas dos Resíduos Municipais (since 2002) from responsible agencies or administrations. The variable Residuos urbanos total e por tipo de opera o de destino (total urban waste per type of use or destination) is available at: *https://www.pordata.pt/Municipios/Res%c3%addduos+urbanos+total+e+por+tipo+de+opera%c3%a7%c3%a3o+de+destino-67*

Availability and geographical coverage: all Portuguese municipalities.

Unit of Measurement: Absolute number. Calculating the variation over time is recommended for the share of the Recycled Waste (tonnes) over the total waste and the variation over time.

Level of aggregation: Municipalities, regions, country

Time coverage and frequency: 2002 and 2009-2017 period. Data is collected every year.

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

TYPE

URBAN WASTE PER CAPITA

Links to other SDGs

7 AFFORDABLE AND CLEAN ENERGY

11 SUSTAINABLE CITIES AND COMMUNITIES

ALIGNMENT

UN list

EU list ☑

COVERAGE

PORTUGAL

AGGREGATION

MUNICIPALITIES

AVAILABILITY

ALL

PORTUGUESE MUNICIPALITIES

SOURCE **PORDATA**

Description of the indicator

This indicator describes the waste collected per capita in one year expressed in kg (*Resíduos urbanos recolhidos por habitante kg/hab*). In most of the EU countries, different agencies or institutions (environmental agencies, regions, ministries, etc.) collect this indicator, depending on the governance system. Data is then aggregated by the National Statical Office.

The case of Portugal is similar to most EU countries, with the difference that data about this indicator is collected on a single platform for different level of aggregation (municipality, region, country), whereas in other Member States the information, at municipal level, is usually available in single municipalities' platforms.

The indicator relates to Target 12.5 (reduce waste) of the UN SDGs.

European context

In 2017, each EU inhabitant generated 1.3 kilograms (kg) of municipal waste per day on average (about 475 kg per year), which was just 0.1 kg less than the 2000 figure.

Although the EU has not substantially reduced its municipal waste generation in the past 15 years, it has clearly shifted to more sustainable modes of managing a large bulk of it *(EUROSTAT 2019b)*, whereas more efforts are required regarding the reduction of the waste produced.

Comments / Limitations

- Information about the total amount of waste produced in one year per capita can inspire more sustainable choices by customers regarding packaging, use of plastic bottles, etc.
- This indicator can be easily presented and disseminated to the public, because it is easily linked to individual consumption habits.

Metadata

Source: Official data collected by IACSB (until 2001) | Estatísticas dos Resíduos Municipais (since 2002) from responsible agencies or administrations. The variable Residuos urbanos recolhidos por habitante (collected urban waste per inhabitant) express in kg per capita per year is available at: *https://www.pordata.pt/Municipios/Resíduos+urbanos+recolhidos+por+habitante-438*

Availability and geographical coverage: all Portuguese municipalities.

Unit of Measurement: Share

Level of aggregation: Municipalities, regions, country

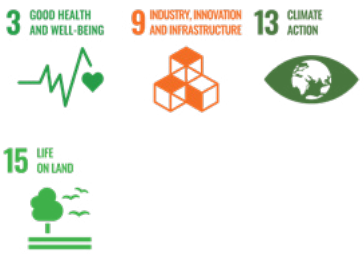
Time coverage and frequency: 2002 and 2009-2017 period. Data collected every year.

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

TYPE

POLLUTANTS RELEASED FROM INDUSTRIAL FACILITIES

Links to other SDGs



ALIGNMENT

UN list

EU list

COVERAGE

EU-28 PLUS OTHER

AGGREGATION

MUNICIPALITIES

AVAILABILITY

30,000 INDUSTRIAL FACILITIES IN EUROPE

SOURCE **E-PRTR**

Description of the indicator

The indicator is calculated as the annual variation of the total amount in pollutants released by industrial facilities in the area of interest, by pollutant. Information concerning the amount of pollutants released by industrial activities is useful to monitor the effects of industrial production at the local scale.

The indicator relates to 12.4 (chemical management) of the UN SDGs.

European context

The European Pollutant Release and Transfer Register (E-PRTR) is the Europe-wide register that provides easy access to key environmental data from industrial facilities in EU Member States and in Iceland, Liechtenstein, Norway, Serbia and Switzerland. It replaced and improved upon the previous European Pollutant Emission Register (EPER).

The new register contains data reported annually by more than 30,000 industrial facilities covering 65 economic activities across Europe.

For each facility, information is provided concerning the amount of pollutants releases to air, water and land as well as off-site transfers of waste and pollutants in waste water from a list of 91 key pollutants including heavy metals, pesticides, greenhouse gases and dioxins for years 2007 onwards *("E-PRTR" n.d.)*.

Comments / Limitations

This database is limited to facilities covering 65 economic activities within 9 industrial sectors that fulfil the following criteria:

- the facility falls under at least one of the 65 *E-PRTR economic activities* listed in Annex I of the E-PRTR Regulation and exceeds at least one of the *E-PRTR capacity thresholds*;
- the facility transfers waste off-site which exceed specific thresholds set out in *Article 5* of the Regulation;
- the facility releases pollutants which exceed specific thresholds specified for each media - air, water and land - in *Annex II* of the E-PRTR Regulation.

Metadata

Source: European Pollutant Release and Transfer Register (E-PRTR) *https://prtr.eea.europa.eu/#/home*

Availability and geographical coverage: more than 30,000 industrial facilities

Unit of Measurement: Variation from one year to the other of the total amount of the pollutants released by industrial facilities in the area of interest.

Level of aggregation: Data is available for each facility and it can be selected by location (Municipalities) *https://prtr.eea.europa.eu/#/facilitylevels*

Time coverage and frequency: Data is collected every year within the 2001-2004 and 2007- 2017 periods.

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

TYPE

LOCAL TOURISM INTENSITY

Links to other SDGs

8 DECENT WORK AND ECONOMIC GROWTH

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

ALIGNMENT

UN list
EU list

COVERAGE

EU-28

AGGREGATION

NUTS3

AVAILABILITY

800
CITIES

SOURCE **Joint Research Centre**

Description of the indicator

The indicator 'Local tourism intensity' is calculated as the ratio of nights spent at tourist accommodation establishments relative to the total permanent resident population of the area. Therefore, it relates the size of tourism in a place with the size of its population.

This metric gives an indication of the pressure that tourism might exert on a territory as well as of its economic dependence on tourism. The higher the value, the higher the potential tourism pressure and dependence.

Data about tourism are extracted from official statistics (Eurostat) on yearly number of nights spent available at NUTS2 level. This data is then disaggregated at NUTS3 Level. Eurostat provides data on population at NUTS3 level. The indicator relates to Target 12.b (sustainable tourism) of the UN SDGs.

European context

Tourism intensity *(Voltes-Dorta, Jiménez, and Suárez-Alemán 2014)* provides information about the importance of tourism in a specific territory.

Tourism intensity is highest in the alpine region, Spanish and Greek islands, Algarve, Corsica, central Italy, Croatian and Bulgarian coast, and in parts of Britain *(Batista e Silva et al. 2018)*.

Comments / Limitations

- The indicator can be updated based on tourism and population data from Eurostat published yearly.
- The indicator 'Local tourism intensity' considers only data from Eurostat based on accounting provided by accommodation establishments. However, nights-spent in home stays (e.g. brokered by online platforms) may not be reflected in official statistics. Hence, actual number of nights-spent and, consequently, tourism intensity may be underestimated.
- *Batista e Silva et al. (2018)* combine data from official statistical sources with big data from emerging sources and propose monthly tourist density grids at 100 x 100 m resolution. However, the concept of tourism density differs from that of tourism intensity as it measures the average daily number of overnight tourists' per given spatial reporting unit.
- By combining tourism intensity with seasonality (a measure that reflects the variation of tourism during the year), another policy relevant indicator can be derived: tourism vulnerability. Tourism vulnerability measures the "the susceptibility of a region to be affected in case of shocks or disruptions in the tourism sector" *(Batista, Kavalov, and Lavalle 2019)*

Metadata

Source: Joint Research Centre *(Batista e Silva et al. 2018)* *https://urban.jrc.ec.europa.eu/rel2018/#/en/download*

Availability and geographical coverage: NUTS3 European regions

Unit of measurement: No. of nights spent per inhabitant.

Level of aggregation: NUTS3.

Time coverage and frequency: 2016.

Box 6

CONSUMER FOOTPRINT IN CITIES

The Joint Research Centre of the European Commission is working ona tool that will enable single cities to calculate their consumer footprint. The upcoming Consumer Footprint indicator assesses the potential environmental impacts coming from household consumption, covering five critical areas: housing, mobility, food, household goods, and appliances.

The analysis is performed separately for each area, using the basket of products (BoP) approach, as well as for the sum of the areas of consumption. The BoP approach combines information on the structure and intensity of final consumption with the life cycle inventories of products consumed in order to calculate the environmental impact profile of the final consumption of an average European Union citizen *(Sala et al. 2019)*. These environmental impacts refer to the entire life cycle of the chosen basket of goods and services for each area of consumption.

These areas are selected based on relevance in terms of mass and value consumed in Europe and due to the potential impact associated with their supply chains. For each area of consumption, a process-based life cycle inventory model for a basket of products is built (for technical details consult Sala and Castellani 2019).

A limitation of this indicator is that the products included in the baskets are only a subset of total consumption. Therefore, the Consumer Footprint will provide an index for monitoring and analysis, and not an absolute measure of environmental impact per person.

In the framework of VLRs, it could be relevant to include information concerning the local consumer footprint.

(Source: *Mirabella, Allacker, and Sala 2019*)

GOAL 13

TAKE URGENT ACTION TO COMBAT CLIMATE CHANGE AND ITS IMPACTS[2]

Description of the Goal

Climate change has evident effects. Therefore, solutions aimed at reducing CO_2 emissions need to be implemented, coordinated and monitored. In particular, targets of Goal 13 focus on: strengthening the resilience and adaptive capacity to climate-related hazards and natural disasters, including response planning; integrating climate change measures into national policies and strategies; improving education, awareness and institutional capacity on climate change; and mobilising funds and mechanisms to facilitate climate change planning in developing countries.

European Dimension

Climate change is an on-going phenomenon affecting the entire globe *(EEA 2017)*. Addressing climate change is one of the priorities of the European Union, that has set ambitious short and long-term emission reduction targets. For instance, in November 2018, the EC presented the document "Long Term Climate Strategy" (COM, 2018).

Following current trends, the EU is broadly on track to achieve its targets on greenhouse gas (GHG), renewable energy, and energy efficiency established for 2020 *(European Commission 2010)*. In the last days of 2019, the new EC presented the European Green Deal *(European Commission 2019j)*, one of the priority strategies for 2019-2024 includes a major economic plan to tackle the climate emergency with a proposed target of net-zero carbon by 2050 and halving emissions by 2030. This ambitious programme aims at making Europe the first climate-neutral continent.

Within the context of pan-European strategies, the EU has put in place specific policies and initiatives to support climate change and energy initiatives at regional and local level:

- Funding regions and cities under the "European Structural and Investment Funds" (ESIF), to establish specific measures aligned with the national energy and climate plans;
- Creating and engaging in numerous climate change networks: the "EU Covenant of Mayors for Climate and Energy" and the "Global Covenant of Mayors for Climate & Energy" (GCoM) have the commitment to mitigate climate change by increasing the energy efficiency and the use of renewable energy sources.
- Launching and participating in specific initiatives at European and international levels, such as the Climate-ADAPT platform for accessing and sharing data across Europe *(EC and EEA n.d.)*, the Urban Low Emission Development Strategies *(Urban LEDS 2019)*, the Urban Resilience Hub *(UN-Habitat 2018f)*.

Local dimension

The world's urban areas accounted for about 64% of global primary energy use and produced 70% of the planet's carbon dioxide emissions in 2016 *(IEA 2016)*. Therefore, cities can play a central role to tackle climate change, in coordination with their surrounding regions and national authorities *(European Parliament 2018)*.

Indeed, the implementation of all leading pathways that limit global warming to 1.5° C requires action in and by cities *(IPCC 2018)*. This action must be led by local authorities through the Local climate plans, but requires the commitment of all local actors.

Local authorities can implement mitigation and adaptation measures based on urban planning, mobility, public transport and infrastructure development, energy efficiency of buildings and local subsidies or taxes. Local authorities can also raise awareness on climate change amongst their residents. Cities have also taken the lead in the creation of networks to fight climate change. The best-known example is the "C40 cities" *(C40 2019)*, which connects 94 world's megacities committed to addressing climate change. Local actors, with their motivation and habits, can substantially influence the local carbon footprint and the private sector can foster innovative solutions to climate challenges.

Links to other SDGs

ALIGNMENT
UN list ☑
EU list ☐

COVERAGE
EU-28

AGGREGATION
MUNICIPALITIES

AVAILABILITY
ALL

SOURCE **Emergency Events Database (EM-DAT)**

PEOPLE AFFECTED BY DISASTERS

Description of the indicator

This indicator measures the number of deaths, missing and directly affected persons attributed to disasters per 100,000 people (including people experiencing health problems, being displaced, or that have suffered direct damages to their livelihoods, economic, physical, social, cultural and environmental assets). More details are available in *(UNISDR 2017a)*.

This indicator addresses aspects of Target 13.1 (climate-related hazards and natural disasters) of the UN SDGs.

European context

Disaster risk management (DRM) needs a comprehensive approach that goes beyond the first respond. Better knowledge, stronger evidence and a greater focus on transformative processes and innovation are all essential elements to improve the understanding of disasters risk resilience and risk-informed approaches to policy-making, and contribute to smart, sustainable and inclusive growth.

The "Disaster Risk Management Knowledge Centre" (DRMKC) provides a networked approach to the science-policy interface in DRM, across the Commission, EU Member States and the DRM community within and beyond the EU *(see European Commission 2019b)*.

The 2017 report "Science for disaster risk management 2017: knowing better and losing less" *(Poljanšek et al. 2017)* provides an example of support from science to strategies for disaster risk reduction.

Comments / Limitations

- The Emergency Events Database (EM-DAT) was created with the initial support of the World Health Organisation (WHO) and the Belgian Government. The main objective of the database is to support the humanitarian action at national and international levels. In particular, the initiative aims at rationalising decision-making for disaster preparedness, as well as providing a reliable base for vulnerability assessment and priority setting.
- The database includes information from various sources, including UN agencies, non-governmental organisations, insurance companies, research institutes and press agencies.
- Registration to the EM-DAT website is requested to access data and data is not always easy to relate to the city level, since a single event could be registered at different levels.
- NatCatSERVICE is a database that provides similar data for the 1980-1990 period.

Metadata

Source: Emergency Events Database (EM-DAT) EM-DAT *https://www.emdat.be/*

Availability and geographical coverage: worldwide coverage

Unit of measurement: Number of deaths, missing and directly affected persons per 100,000 people

Level of aggregation: Municipal data

Time coverage and frequency: since 1990s (with variation per each country). Data is collected every year

13 CLIMATE ACTION

TYPE

GREENHOUSE GAS EMISSIONS

Links to other SDGs

7 AFFORDABLE AND CLEAN ENERGY
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
11 SUSTAINABLE CITIES AND COMMUNITIES

ALIGNMENT
UN list ☐
EU list ☑

COVERAGE
EU-28

AGGREGATION
MUNICIPALITIES

AVAILABILITY
SIGNATORY CITIES

SOURCE **Global Covenant of Mayors**

Description of the indicator

This indicator estimates the tonnes of CO_2 equivalents yearly emitted by a city. Under the Kyoto Protocol, it shall account for emissions of seven gases currently required for greenhouse inventory reporting: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), and nitrogen trifluoride (NF_3).

Annual greenhouse gas emission inventories must be elaborated and reported following the guidelines included in the "Global Protocol for Community-Scale Greenhouse Gas Emission Inventories" (GPC, see *WRI C40 & ICLEI 2014*). GPC is a widely endorsed standardised emission reporting system, fully compliant with the "Intergovernmental Panel on Climate Change" guidelines *(IPCC 2006)*. It has also been recommended by the United Nations Framework Convention on Climate Change (UNFCCC) "Local Authorities Majors Group" and the GCoM in its reporting framework *(Global Covenant of Mayors 2018)*, ensuring the comparability amongst a wide range of European and worldwide cities.

This indicator addresses aspects of Target 13.2 ("Integrated climate change actions") and matches the EU SDG indicator 13.10 ("Greenhouse gas emissions").

European context

European cities play a key role in promoting the mitigation of climate change. In fact, cities are a significant, growing source of energy consumption and greenhouse gas emission (*World Bank 2010*). The ability of cities to take effective action on mitigating climate change and monitoring the progress also depends on access to good quality data on GHG emissions. Establishing a GHG inventory enables cities to understand the emissions contribution of different activities in the community.

Comments / Limitations

- The data included in the GCoM database is not as complete as recommended in the GPC *(Global Covenant of Mayors 2018)* (i.e. cities report on industrial and agricultural sectors only if emissions from these sectors are significant).
- Research work is ongoing to model and harmonize this indicator data. One example is the Gridded Global Model of City Footprints (GGMCF), which downscales subnational carbon footprint (CF) into a 250 m gridded model using regionalised data on population and purchasing power. For Europe, City Footprint data for 178 NUTS2 regions over 20 countries; has been collected from the study of Ivanova et al (2017). Results are available as total metric tonnes of CO_2 emitted yearly by a city equivalents and metric tonnes of CO_2 equivalents per inhabitant. Results are intercomparable and homogeneous for different cities, as the same methodology has been applied. Data is available in *(Moran et al. 2018).*

Metadata

Source: Global Covenant of Mayors (GCoM) (*https://www.globalcovenantofmayors.org/cities*) basedon municipalities' data

Availability and geographical coverage: signatory cities

Unit of Measurement: Tonnes of CO_2. Calculating the variation over time is recommended

Level of aggregation: Municipal level, disaggregated by sector of emissions

Time series and frequency: Data is collected every year

13 CLIMATE ACTION

TYPE

URBAN FLOOD RISK

Links to other SDGs

11 SUSTAINABLE CITIES AND COMMUNITIES

ALIGNMENT

UN list ☐

EU list ☐

COVERAGE

EU-28

AGGREGATION

CITIES

AVAILABILITY

800 CITIES

SOURCE Joint Research Centre

Description of the indicator

This composite indicator reflects the relative flood risk within urban areas by taking into account both the natural exposure and the sensitivity of the city to river flooding.

The natural exposure of the city is assessed by determining the share of flooded area and the mean of water depth for a modelled 100-year return period flood.

The associated sensitivity is calculated in terms of potential human and physical losses (population living in the area plus commercial and industrial areas). The indicator categorises the relative urban flood risk into 5 classes: very low, low, moderate, high, or very high, not at risk. The definitions and methodology used for the calculation of this indicator are available in (*Kompil et al. 2015*).

European context

River flooding remains one of the most important natural hazards occurring in Europe in terms of economic damage (*EEA 2016b*). The impacts of flooding on human activity are especially high in urban areas, due to the density of the population and the presence of physical assets/infrastructure. Even though European cities are taking action to mitigate flooding through various technologies and physical barriers both in urban areas and upstream, many improvements can still be made.

According to data for 2010, flood risk is high in central European, Romanian and Spanish cities. It is also notable that cities with larger population tend to have a higher flood risk, except in the Scandinavian countries, northern UK, Ireland and Greece (*Kompil et al. 2015*).

In addition to this indicator, an important factor that can be assessed for cities is their adaptive capacity, or resilience: the higher this is, the easier for a city to recover following a flooding event *(Lung et al. 2013)*.

Indeed the risk is the combination hazard, exposure and vulnerability. Therefore, a proper risk assessment should include also additional elements of vulnerability conditions such as overall first aid, transport network, economic assets, natural resources and crops and agriculture.

Comments / Limitations

- The overall index shows some notable changes in urban areas over time, due both to climate variability (resulting in a varied predicted flood extent) and to the growth or de-population of the agglomeration (*Kompil et al. 2015*).
- Regions such as the Netherlands, Germany, and Northern France might experience high flood risk, but they also have the highest protection levels against flooding (*Kompil et al. 2015*).
- This indicator has been computed taking into account only river flooding: therefore, it is not fully representative for the flood hazard experienced in cities along the coastlines, which may also experience coastal flooding.

Metadata

Source: Joint Research Centre, Urban Data Platform Plus (*https://urban.jrc.ec.europa.eu/#/en*)

Availability and geographical coverage: 800 European cities

Unit of Measurement: Categorical variable

Level of aggregation: Cities

Time coverage and frequency: 2010, 2020, 2030, 2040, 2050 (modelled data)

13 CLIMATE ACTION

TYPE

HEAT VULNERABILITY

Links to other SDGs

3 GOOD HEALTH AND WELL-BEING

ALIGNMENT

UN list ☐

EU list ☐

COVERAGE

WIEN

AGGREGATION

MUNICIPALITIES

AVAILABILITY

1

SOURCE **Econten - Stadt Wien**

Description of the indicator

This indicator measures the vulnerability of children and elderly to heat waves.

According to (*Bhattacharjee 2019*), the urban heat vulnerability index of an area is calculated by the difference between the adaptive capacity and the product of exposure and sensitivity. That value of the heat vulnerability index ranges from 0 to 1, where 1 is the maximum heat vulnerability.

Since no harmonised data is available across Europe at the local level, the case of Wien is illustrated as an example.

- Adaptive capacity refers to the ability to cope with, recover and adjust to the impacts of heat events. Greenery and water-bodies help in cooling the urban environment. Therefore, the adaptive capacity is calculated through the sum of the enhanced vegetation index (for measuring the density of vegetation) and the normalised difference vegetation index (for measuring water-bodies).
- Exposure refers to the direct danger of urban heat. It manifests as the prevalence of very high temperatures. It can vary based on various factors of the given area and its built environment. It is calculated by taking the weighted average of the annual maximum at-satellite brightness temperatures from 2015 to 2019 as obtained from Landsat 8 satellite.
- Sensitivity refers to the strength of human's reaction to high temperatures and depends on individual characteristics as age, pre-existing health problems, etc. In this indicator, sensitivity is calculated on the basis of the density of the age-groups below 14 and above 60 (as per recommendation by the Intergovernmental Panel on Climate Change).

European context

Europe has experienced several extreme heat waves since the year 2000, with the number of warm days almost doubling since 1960. Such events are projected to occur repetitively and with higher intensity also in the future. In addition, the increasing urbanisation has negatively impacted the vulnerability of European cities (*EEA 2014a*).

Comments / Limitations

- This indicator can be used to highlight areas where people are most vulnerable to heat, and it can inform governments' plans to protect people's health more effectively.
- There are different approaches and methodologies to measure heat vulnerability, as discussed in *(Bao, Li, and Yu 2015)*.
- Poverty and education might also be considered as factors affecting heat vulnerability (*Wiesböck et al. 2016*).

Metadata

Source: Ecoten and Stadt Wien *(Bhattacharjee 2019)*.

Availability and geographical coverage: city of Wien.

Unit of measurement: Index, values between 0 and 1.

Level of aggregation: District and sub-district level.

Time coverage and frequency: Average values calculated between 2015-2019.

Box 7

LOCAL DISASTER RISK REDUCTION STRATEGIES

Between 1980 and 2016, the damage cost related with disasters for Member States (both natural and manmade) amounted to more than €410 billion, not including losses related to cultural heritage or ecosystems and not including the cost of human life losses (*EEA 2018*). Floods, storms, heat or cold waves, ice and snow and forest fires were most recurrent risks among natural disasters. Better data and a better European Disaster Risk Management could help diminishing the costs of disasters.

At the beginning of 2019 the UN Office for Disaster Risk Reduction (UNDRR) published a guidebook to advise local governments on developing and implementing a holistic and integrated local disaster risk reduction (DRR) and resilience strategy *(Hardoy, Jorgelina; Filippi, María Evangelina; Gencer, Ebru; Morera, Braulio Eduardo; Satterthwaite 2019)*. It proposes a set of "Ten Essentials for Making Cities Resilient" *(UNISDR 2017)* in line with priorities and targets of the *(UNISDR 2015)*. The "Ten Essentials" is one of the key tools for local governments to track their progress and to evaluate their commitment towards resilience. Assessments of local Disaster Risk Reduction Strategies (DRRS) should be coherent with the "Sendai Framework for Disaster Risk Reduction 2015-2030".

The Sendai Framework for Disaster Risk Reduction 2015-2030 was adopted by UN Member States on March 2015 in Sendai, Japan.The framework applies to *"the risk of small-scale and large-scale, frequent and infrequent, sudden and slow-onset disasters, caused by natural or manmade hazards as well as related environmental, technological and biological hazards and risks. It aims to guide the multi-hazard management of disaster risk in development at all levels as well as within and across all sectors" (UNISDR 2015)*, mitigate existing disaster risks, hazard exposures and vulnerabilities and prevent new ones. The framework also aims at increasing preparedness for response and recovery.

Examples of cities that have already implemented local disaster risk reduction strategies are mentioned in the "Campaign Making Cities Resilient" (*https://www.unisdr.org/campaign/resilientcities/cities*). However, urban resilience to disasters is not entirely within cities' competences, and needs extensive engagement of various stakeholders, including the different levels of government, private sector, agencies focused on emergency response, and citizen groups.

GOAL 14

CONSERVE AND SUSTAINABLY USE THE OCEANS, SEAS AND MARINE RESOURCES FOR SUSTAINABLE DEVELOPMENT

Description of the Goal

SDG 14 aims at preserving oceans and ensuring their sustainable use. This includes the safeguard of marine and coastal ecosystems, preserving at least 10% of coastal and marine areas by introducing protected areas, as well as preventing and reducing marine pollution and the impacts of ocean acidification.

European Dimension

Human-induced change in marine ecosystems has greatly increased in the past 60 years. The main causes of such change are: the high and increasing population densities along European coasts; intensive fishing activities; agricultural and industrial chemical pollution; coastal over tourism; shipping and other maritime activities (*EEA 2019a*).

In 2008, the EU adopted the Marine Strategy Framework Directive (MSFD): this provides the legal framework for the protection and sustainable management of EU seas and oceans. Its final objective is the achievement of good ecological status of European Marine Waters in 2020.

Marine litter has been recognised as a key environmental challenge in the 7th Environment Action Programme, which establishes the reduction of marine litter as a main target. Specific regulations are in place to control marine pollution by limiting the input of nutrients and chemicals *(European Parliament 2000)* and plastics (EU strategy for plastics) into marine waters. Moreover, regulations also protect marine habitats and species and aim at achieving sustainable coastal development *(European Parliament 2000)*. Besides these centrally-defined policy objectives, several European Regional Sea Conventions have been focusing on the protection and conservation of European seas. Furthermore, the EU is supporting implementation measures with a bottom-up approach, which allow local groups and governments as well as individual citizens to implement local actions for sustainable development.

Local dimension

There are few SDG indicators related to Goal 14 that are suitable for cities, as the achievement of many of its targets go beyond the competences of local governments. Currently, only the VLR of the city of Bristol includes an indicator for this Goal. Nevertheless, some other cities, such as Los Angeles or Taipei, include specific strategies and recommendations to achieve Goal 14. Nonetheless, cities, in particular those located in coastal areas, can contribute to improving marine ecosystems.

Cities can help to substantially reducing ocean pollution originating from the urban environment; this pollution includes a wide variety of hydrocarbons, household hazardous wastes, and other toxic agents. Cities can achieve this with the adequate design and maintenance of catchment basins and urban drainage systems. Cities can also implement local measures to improve wastewater treatment, and effectively reduce and treat recycle waste, in particular plastics. Cities greatly contribute to greenhouse gas emission and climate change, with direct effects on oceans and seas, such as the intensification of marine heatwaves, the acidification and loss of oxygen, salinity intrusion and sea level rise. Local governments can play an important role in controlling emissions, as many of them are directly related by the management of relevant urban issues such as transportation and energy consumption (see Goal 13). Local governments cooperate with private sector and civil society organisations on the sustainable development of fisheries and coastal areas through the Fisheries Local Action Groups (FLAGs). These partnerships, funded by the *European Maritime and Fisheries Fund (EMFF)*, take decisions within the framework of a local strategy, developed in response to specific needs and opportunities identified at the local level.

14 LIFE BELOW WATER

TYPE

BATHING SITES WITH EXCELLENT WATER QUALITY

Links to other SDGs

6 CLEAN WATER AND SANITATION

ALIGNMENT

UN list ☐

EU list ☑

COVERAGE

EU-28 PLUS OTHER

AGGREGATION

MUNICIPALITIES

AVAILABILITY

22,000 COASTAL BEACHES AND INLAND SITES >

SOURCE European Environmental Agency

Description of the indicator

This indicator gives the total number of bathing sites classified as having 'excellent' water quality. Local authorities collect water samples at officially identified bathing sites (e.g. coastal, transitional, river and lake water bodies) throughout the bathing season (e.g. May - September). The samples are then analysed for two types of bacteria that indicate contamination from sewage or livestock according with EEA Methodological prescriptions. Depending on the levels of bacteria detected, the bathing water quality is classified as 'excellent', 'good', 'sufficient' or 'poor'.

This indicator matches with the indicator "Bathing water with excellent water quality" proposed in the EU SDGs indicator set.

European context

The EU "Bathing Waters Directive" *(EC 2006)* requires Member States to identify popular bathing places in fresh and coastal waters and monitor them for microbiological contamination (amongst other substances) throughout the bathing season.

Every year, the European Commission and the European Environment Agency (EEA) publish a summary report on the quality of bathing water, based on the information provided by the Member States. The report tracks the water quality at more than 22,000 bathing sites across the EU, Switzerland and Albania.

In this way, the public can have access to high-quality information regarding bathing water quality. Bathing water information is made available to the public through the EEA website: users can access information regarding bathing water quality for more than 22 000 coastal beaches and inland sites across Europe. Users can check bathing water quality on an interactive map, download data and individual country reports and compare the water quality over time (*EEA 2015a*).

Comments / Limitations

- It is recommended to consider also the share of bathing sites with excellent quality over the total number of bathing sites.
- It is recommended to consider also the number and share of bathing sites classified with 'good', 'sufficient' or 'poor' quality and their trends over time.
- Countries run national or local websites with detailed information on each bathing water site. These websites usually include a map search function and allow the public to monitor the water status, both in real time and for previous seasons.

Metadata

Source: European Environmental Agency - EEA *https://www.eea.europa.eu/data-and-maps/data/bathing-water-directive-status-of-bathing-water-11/bathing-water-directive-status/excel-format-zip*

Availability and geographical coverage: 22,000 coastal beaches and inland sites across Europe. Data has to be aggregated per municipality.

Unit of Measurement: Absolute value.

Level of aggregation: single coastal sites

Time coverage and frequency: 2008 - 2018. Data is collected every year.

14 LIFE BELOW WATER

TYPE

Links to other SDGs

17 PARTNERSHIPS FOR THE GOALS

ALIGNMENT

UN list

EU list

COVERAGE

20 EU countries

AGGREGATION

MUNICIPALITIES

AVAILABILITY

357 PROJECTS

SOURCE **European Fisheries Areas Network (FARNET)**

PARTICIPATION OF LOCAL GOVERNMENTS IN COMMUNITY-LED LOCAL DEVELOPMENT (CLLD) PROJECTS

Description of the indicator

This indicator assesses the participation of local governments in "Community-Led Local Development" (CLLD) projects.

CLLD is a specific tool to use at the sub-regional level. CLLD can mobilise and involve local communities and organisations to contribute in the achievement of the Europe 2020 Strategy goals of smart, sustainable and inclusive growth, fostering territorial cohesion and reaching specific policy objectives (*EC 2014*).

Since 2007, CCLDs have also been used within the European Maritime and Fisheries Fund to support Fisheries Local Action Groups (FLAGs), managing authorities, citizens and experts from across the EU to work together on the sustainable development of fisheries and coastal areas. In these projects, the local actors define and develop the local strategy according to their specific needs and opportunities (*FARNET 2016*).

The value of the indicator is 1 if a local authority participates in FLAGs in the context of a CLLD project, and 0 otherwise.

This indicator addresses aspects of Target 14.7 (economic benefits from sustainable use of marine resources).

European context

CLLDs were developed for the first time in fisheries and aquaculture areas in 2007-2013, under the European Maritime and Fisheries Fund (EMFF). In the 2014-2020 programming period, they were integrated under the European Structural and Investment Funds. The available funding was primarily targeted at creating employment and new economic activity as well as improving the quality of life in areas affected by a decline in fishing activities, or by other specific challenges hindering the viability of local fisheries communities.

For the next long-term EU budget 2021-2027, the EMFF will continue to support small-scale fishermen; it will also help unleash the growth potential of a sustainable blue economy. It will contribute to strengthening international ocean governance for safer, cleaner, more secure, and sustainably managed seas and oceans and it will have a specific focus on protecting marine ecosystems from climate change (*EC 2019*).

Comments / Limitations

- An analysis of CLLD projects is available on the website of the European Fisheries Areas Network (FARNET) *(FARNET 2016)*. For each project, information is provided on challenges, priorities and allocated budget.
- In European cities, this type of project could target specific vulnerable groups, minorities or areas lagging behind.

Metadata

Source: This data can be collected by municipalities where there is at least one water body suitable for fisheries activities.

Availability and geographical coverage: 357 CLLD projects in 20 different EU countries have been financed so far under the European Maritime and Fisheries Fund (EMFF).

Unit of Measurement: Dichotomous variable.

Level of aggregation: Municipal level.

Time series and frequency: Data can be collected every year.

GOAL 15

PROTECT, RESTORE AND PROMOTE SUSTAINABLE USE OF TERRESTRIAL ECOSYSTEMS, SUSTAINABLY MANAGE FORESTS, DESERTIFICATION, AND HALT AND REVERSE LAND DEGRADATION AND HALT BIODIVERSITY LOSS

Description of the Goal

Goal 15 aims to protect, restore and promote the conservation and sustainable use of terrestrial, inland-water and mountain ecosystems. This includes efforts to sustainably manage forests; combat deforestation, desertification and droughts; restore degraded land and soil, and preserve biodiversity also by protecting threatened species.

European Dimension

Monitoring SDG 15 in an EU context focuses mainly on ecosystem status, land degradation and biodiversity. The EU has made progress in improving the ecosystem status over the past few years. However, progress in slowing land degradation and increasing biodiversity has been mixed *(EUROSTAT 2019b)*.

The EU Urban Agenda seeks to improve the quality of life in urban areas by creating smart, low-carbon and climate-resilient cities and promoting sustainable use of land. The EU Research and Innovation policy agenda for "Nature-Based Solutions and Re-Naturing Cities" aims to bring more nature and natural features and processes particularly into cities, to provide environmental, social and economic benefits.

Local dimension

With an increasing urban population in Europe and associated continuously increasing demand on natural resources, urbanisation is a major threat to natural ecosystems.

Local governments can play an important role in achieving the targets of Goal 15 by protecting natural areas surrounding cities, reversing land by degradation (also limiting land abandonment), and preserving existing biodiversity also in urban areas, for example by promoting green infrastructures.

Green urban spaces improve air quality and climate-change mitigation, and are a fundamental component of well-being *(Fuller & Gaston, 2009; Van den Berg A.E., Hartig T., 2007)*, having positive effects on both mental and physical well-being *(Fuller, Irvine, Devine-Wright, Warren, & K.J., 2007)* and social cohesion *(Coley, Sullivan, & Kuo, 1997)*. Attractive green spaces also bring direct positive economic effects as their presence can induce considerably higher property prices *(Daams, Sijtsma, & Van der Vlist, 2016; Daams, Sijtsma, & Veneri, 2019)*.

15 LIFE ON LAND

TYPE

URBAN GREENNESS

Links to other SDGs

11 SUSTAINABLE CITIES AND COMMUNITIES

13 CLIMATE ACTION

ALIGNMENT

UN list ☐

EU list ☐

COVERAGE

EU-28

AGGREGATION

URBAN CENTRE

AVAILABILITY

ALL

URBAN CENTRES

SOURCE **Joint Research Centre**

Description of the indicator

This indicator gives the total amount of green area in square metres as approximated by the Normalised Difference Vegetation Index (NDVI) based on satellite imagery. For the technical description of the indicator and its computation see (Sabo, Corbane, Politis, & Kemper, 2019).This specific indicator is included in the Level 3 classification of the European Settlement Map 2019 release, produced by the JRC in the framework of the Global Human Settlement Layer (GHSL).

European context

The greenness in EU cities has increased by 38% over the last 25 years. Besides that, the presence of green areas varies greatly across Europe.

The presence of urban green areas influence many aspects of both the natural environment and social life.

From a planning point of view, the public character of urban green is significant, since it is considered to contribute to the quality of life. On the other hand, the preservation of green areas within cities represents a value to preserve of biodiversity; reduce of the heat island effect; increase the permeability of the soil, and reduce the flood risk.

Comments / Limitations

- Although several vegetation indices exist, NDVI is a numerical green indicator which combines the visible and near-infrared bands of the electromagnetic spectrum and is widely adopted for vegetation extraction *(Rouse, Haas, Schell, & Deering, 1973)*.
- This indicator could be replaced by local indicators on green areas, if available, keeping in mind the possibility to replicate the data collection over time to preserve the comparability.
- This indicator can also be calculated in relation to the number of inhabitants. It is recommended to calculate its variation over time.

Metadata

Source: Joint Research Centre. European Settlement Map 2019 release. *https://ec.europa.eu/jrc/en/publication/european-settlement-map-2019-release*

Availability and geographical coverage: Data is available upon request for European cities.

Unit of Measurement: Absolute value expressed in square meters.

Level of aggregation: Urban centres, according to the Degree of Urbanization.

Time coverage and frequency: 2015, 2018 (in preparation).

15 LIFE ON LAND

TYPE

LAND ABANDONMENT

Links to other SDGs

3 GOOD HEALTH AND WELL-BEING

11 SUSTAINABLE CITIES AND COMMUNITIES

ALIGNMENT

UN list ☐

EU list ☐

COVERAGE

EU-28 PLUS OTHER

AGGREGATION

NUTS3

AVAILABILITY

ALL

NUTS3

SOURCE **Joint Research Centre**

Description of the indicator

This indicator represents the share of agricultural abandoned land with regard to the total Utilised Agricultural Area (UAA).

Agricultural abandoned land can be defined in different ways. The most common definition refers to "land that was previously used for crop or pasture/livestock grazing production, but does not have farming functions anymore (i.e. a total cessation of agricultural activities) and has not been converted into forest or artificial areas either" *(Perpiña Castillo et al., 2018)*.

UAA is defined as "the total area taken up by arable land, permanent grassland, permanent crops and kitchen gardens used by the holding, regardless of the type of tenure or of whether it is used as a part of common land" (Eurostat, n.d.)

The indicator presents data concerning the current status of land abandonment and future projections (2015-2050) at national, regional (NUT2/NUTS3) and grid level for EU-28 Member States. More details on the computation of the indicator are available in *(Perpiña Castillo et al., 2018)*.

European context

In the period 2015-2030 about 11% (more than 20 million ha) of agricultural land in the EU is under high potential risk of abandonment due to factors related to biophysical land suitability, farm structure and agricultural viability, population and regional specifics. The risk is particularly severe for around 800 thousand ha (0.4%), located in Southern and Eastern Romania, Southwestern France, Southern and central Spain, Portugal, Cyprus, Poland, Latvia and Estonia. The bulk of abandoned agricultural land (4.8 million ha gross) is likely to remain unused within 2015-2030 because of negligible re-cultivation of once-abandoned land. For instance, less than 600 thousand ha are projected to be converted into forests and natural areas, while the conversion into build-up area will be minimal – just 18 thousand ha.

Comments / Limitations

- This indicator is calculated at NUTS 3 level, and is not available at city level. Despite that, in some specific context it can support the assessment of the city within its region.
- Drivers and consequences of land abandonment are widely discussed in the literature (*inter alia Benayas et al. 2007; Munroe et al. 2013; EUROSTAT 2013a*)

Metadata

Source: Joint Research Centre Urban Data Platform + *https://urban.jrc.ec.europa.eu/#/en/trends?context=Complete&territorial-scope=EU28&level=NUTS3&indicator=LUISA_ABAND*

Availability and geographical coverage: 1350 NUTS3 regions.

Unit of Measurement: Share.

Level of aggregation: NUTS3 level.

Time coverage and frequency: 2015, plus projections for 2020, 2030, 2040, 2050.

15 LIFE ON LAND

TYPE

TREE COVER DENSITY

Links to other SDGs

11 SUSTAINABLE CITIES AND COMMUNITIES

13 CLIMATE ACTION

ALIGNMENT

UN list ☐

EU list ☐

COVERAGE

EU-28

AGGREGATION

MUNICIPALITIES

AVAILABILITY

GRID MAP >

SOURCE European Environment Agency – Copernicus service

Description of the indicator

The Tree Cover Density Change (TCDC) 2012 – 2015 consists of three types of (status) products and additional change products. The status products are available for the 2012 and 2015 reference years: (1) Tree cover density as a range from 0-100% (2) Dominant leaf type: broadleaved or coniferous (3) A Forest type product. The layer is released at 100-meter resolution and can be calculated within city boundaries. More information is available at *(Copernicus, n.d.)*.

European context

This indicator is derived by a Copernicus layer. Copernicus is a European system for monitoring the Earth, which, thanks to the use of satellite imagery, monitors the European continent and produces information on several six thematic areas: land, marine, atmosphere, climate change, emergency management and security (see *https://land.copernicus.eu/*).

Comments / Limitations

- For the complete constrains in access and use see: *https://land.copernicus.eu/pan-european/high-resolution-layers/forests/tree-cover-density/change-maps/2012-2015?tab=metadata*
- This indicator needs to be calculated for the area of interest using GIS software.
- This indicator can be calculated using different generative and discriminative models *(Lefebvre, Picand, & Sannier, 2015)* as well as using national, regional or local datasets, where available.
- The presence of trees can be a proxy for biodiversity, but a full assessment of this topic requires further specific studies and analysis.

Metadata

Source: European Environment Agency – Copernicus service *https://land.copernicus.eu/pan-european/high-resolution-layers/forests/tree-cover-density/change-maps/2012-2015*

Availability and geographical coverage: Europe

Unit of Measurement: Share (increase or decrease of real tree cover density changes)

Level of aggregation: 100 meter resolution. It can be calculated on the area of interest (municipality, FUAs, etc.)

Time coverage and frequency: 2012 - 2015

GOAL 16

PROMOTE PEACEFUL AND INCLUSIVE SOCIETIES FOR SUSTAINABLE DEVELOPMENT, PROVIDE ACCESS TO JUSTICE FOR ALL AND BUILD EFFECTIVE, ACCOUNTABLE AND INCLUSIVE INSTITUTIONS AT ALL LEVELS

Description of the Goal

Goal 16 aims at promoting peaceful societies in which access to justice is guaranteed to all and violence is discouraged in all its forms. It supports the eradication of illicit financial and weapons trade and the development of effective, accountable and inclusive institutions, while ensuring public access to information and promoting active participation of citizens in democratic life.

European Dimension

The European Union was awarded the 2012 Nobel Peace Prize unanimously for its contribution to "the advancement of peace and reconciliation, democracy and human rights in Europe" *(The Nobel Peace Prize 2012)*.

Undisputedly, peace, justice and the quality of institutions have been improving in Europe over the last years. For instance, improvements have been seen in: death rate due to homicide; occurrences of crime, violence and vandalism; perception of corruption; total expenditure on law courts, and perceived independence of the justice system.

However, the increase in employment precariousness *(Eurostat 2019g)* and the shrinkage of the welfare system have been fostering citizens' discontent with politics. In order to counter this trend, there has been a push, both in Europe and globally, to increase democratic participation through, for example, participatory budgeting, deliberative pools, citizen assemblies *(Fishkin, Luskin, and Siu 2014; Fung and Warren 2011; Smith 2009)* and transparency (open government initiatives).

Local dimension

In 2017, 18% of people living in cities felt exposed to crime, violence or vandalism: in towns and suburbs (10%) and rural areas (6%) these rates were lower (*EUROSTAT 2019b*).

Insecurity reduces the level of life satisfaction and trust towards others and institutions. Cities can contribute to lowering crime rates through a variety of initiatives, including: engaging youth in social activities (especially in the most deprived neighbourhoods); providing basic support to individuals struggling financially, and ensuring an efficient local police system *(Becker 2007)*.

The local level is also the primary gateway to restoring trust in institutions through democratic participation and innovation. Engaging citizens on what matters most in their everyday life can foster their participation also in national and European elections (*World Bank 2016; Giuliano and Nunn 2013*). Furthermore, the local level is where it is easiest for citizens to access information and contribute to society.

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

TYPE

MURDERS AND VIOLENT DEATHS

Links to other SDGs

5 GENDER EQUALITY

10 REDUCED INEQUALITIES

ALIGNMENT

UN list ☑

EU list ☑

COVERAGE

EU-28

AGGREGATION

CITIES AND GREATER CITIES

AVAILABILITY

550

CITIES AND GREATER CITIES

>

SOURCE **Eurostat, City statistics database**

Description of the indicator

This indicator, according to EUROSTAT, measures the number of unlawful deaths purposefully inflicted on a person by other persons,including serious assault leading to death, and fatalities caused by terrorist attacks. It excludes attempted homicide, manslaughter, death due to dangerous driving, legal intervention, justifiable homicide in self-defence, armed conflicts, abortion and assisted suicide. Data harmonised by EUROSTAT is sourced from police records.

This indicator addresses aspects of Target 16.1 (end violence) of the UN SDGs and relates to the indicator "Death rate due to homicide" proposed in the EU SDGs indicator set.

European context

The absolute number of homicides in the EU-28 drop from 6,329 in 2008 to 5,155 in 2017 with a reduction of 19% (Source: *EUROSTAT, Crime statistics*).

When considering the homicide victims per 100,000 inhabitants, most of EU countries registered values below 2. In the same year, in EU-28 countries the values range from 5.6 to 0.3 in 2017. Countries that registered the lower number of homicide per 100,000 inhabitants 2017 are Malta, Italy, Czech Rep. (Source: *Eurostat - data code: crim_off_cat*).

On average, homicide rate in Europe was below 2 per 100,000 people in 2015, much lower that the global average in the same year (about 6 per 100,000). Globally, menmake up around 80% of homicide victims overall, but women constitute 64% of homicide victims of intimate partner/family-related homicide (*United Nations 2019b*).

Comments / Limitations

- The number of murders and violent deaths is under-representative of the total number of crimes committed in a city.
- Security in urban public areas is still a greater concern for women than men. Local authorities can help by, for example, providing better street lighting, building better alternatives to dark and secluded walkways, or even positioning bus stops in safer areas. Effective interventions often promote consultation and participation from women themselves.

Metadata

Source: Eurostat, City Statistics Database, (data collected from national statistics). Table: urb_clivcon,Variable: SA3005V (*https://ec.europa.eu/eurostat/web/cities/data/database*)

Availability and geographical coverage: more than 550 cities and greater cities in Europe in 2016

Unit of Measurement: Absolute number. Administrative data. Calculating the variation over time and share is recommended

Level of aggregation: Cities and greater cities

Time coverage and frequency: 1990-2018. Data collected every year

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

TYPE

LEVEL OF TRUST TOWARD OTHER PEOPLE

Links to other SDGs

6 CLEAN WATER AND SANITATION

10 REDUCED INEQUALITIES

ALIGNMENT
UN list
EU list

COVERAGE
EU-28

AGGREGATION
CITIES

AVAILABILITY
83
CITIES

SOURCE **DG REGIO and EUROSTAT, Eurobarometer**

Description of the indicator

This indicator measures the share of people with a positive level of trust toward other people. It is based on the survey question: "can most of the people in your city be trusted?", which was included in the Flash Eurobarometer, 'Quality of life in European cities' *(DG REGIO 2016)*. Possible responses included "do not know", "strongly disagree", "somewhat disagree", "somewhat agree", and "strongly agree". The indicator is calculated as the share of respondents that answered "strongly disagree" and "somewhat disagree" over the total respondents.

European context

In 2015, trust in people living in the same city was high in more than 75% of cities. Levels of trust tended to be lower in EU capitals than in other cities (*DG REGIO 2016*). Oulu (Finland) and Aalborg (Denmark) were the laces with the highest shares of people feeling that they could trust most people in their cities (more than 90%) (*Eurostat 2016*).

Comments / Limitations

- The number of surveyed cities varies over time for the Eurobarometer. The year for which the information is available for most of the cities is 2015 (more than 100 cities and greater).
- The survey was conducted in more than 79 European cities. This survey included all capital cities of the countries concerned (except for Switzerland), together with between one and six more cities in the larger countries. In each city, around 500 citizens were interviewed. The TNS Political & Social network carried out this survey in the 28 Member States of the European Union, as well as Iceland, Norway and Switzerland. In June 2015, around 41,000 respondents from different social and demographic groups were interviewed.
- This indicator proxies perception towards trust, which might differ from trusting behaviour *(Guerra and John Zizzo 2004)*.
- Trust is a key component of social capital *(Glaeser, Scheinkman, and Soutter 1999; S. Knack 2001)*. The literature suggests that social capital influences a wide range of economic and political outcomes *(Akcomak and ter Weel 2012; Akçomak and ter Weel 2009; Boschma 2005; Guiso, L., Sapienza, P., & Zingales 2004; Nannicini et al. 2013; Portes 1998; Woolcock 2001; P. J. Z. and S. Knack 2001)*. However, the literature also suggests that the generalised level of trust varies greatly depending on degree of urbanisation (*Węziak-Białowolska and Dijkstra 2015*), the composition of communities (e.g. more or less homogeneous in terms of income, ethnicity, etc., see *Alesina & La Ferrara, 2002*) and the people to trust *(Fratesi, Percoco, and Proietti 2019; Helliwell 2001)*.

Metadata

Source: DG REGIO and EUROSTAT, Eurobarometer, Perception survey results (Variables: PS3092V-PS3096V), (*https://ec.europa.eu/eurostat/web/cities/data/database*)

Availability and geographical coverage: 83 EU cities

Unit of Measurement: share

Level of aggregation: Cities.

Time coverage and frequency: 2009, 2012, 2015.

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

TYPE

LEVEL OF SATISFACTION CONCERNING ADMINISTRATIVE SERVICES IN THE CITY

Links to other SDGs

11 SUSTAINABLE CITIES AND COMMUNITIES

ALIGNMENT

UN list ☑

EU list ☑

COVERAGE

EU-28

AGGREGATION

CITIES

AVAILABILITY

83

CITIES

SOURCE **DG REGIO and EUROSTAT, Eurobarometer**

Description of the indicator

This indicator measures the share of people with a positive level of satisfaction concerning administrative services in the city. It is based on the survey question: "When you contact administrative services of this city, do they help you efficiently?", which was included in the Flash Eurobarometer, 'Quality of life in European cities' (No 419) *(DG REGIO 2016)*. Possible responses included "do not know", "strongly disagree", "somewhat disagree", "somewhat agree", and "strongly agree". The indicator is calculated as the share of respondents that answered "strongly disagree" and "somewhat disagree" over the total respondents.

This indicator addresses aspects of Target 16.6 (efficient and transparent institutions) of the UN SDGs and relates to the indicator 'Population with confidence in EU institutions' proposed in the EU SDGs indicator set.

European context

The European Quality of Government Index (EQI) is the most used survey to assess the quality of governance at regional level within the EU. Data from this survey focuses on both perceptions and experiences with public sector corruption, as well as the extent to which citizens believe various public sector services are impartially allocated and of good quality *(Charron, Dijkstra, and Lapuente 2015; Rothstein, Bo, Nicholas Charron 2013)*. The EQI is derived from 16 questions, the responses to which are aggregated from the individual to the regional level and combined into a single number for each region in the study. The questions are in large part framed around the central concepts of quality, impartiality and corruption, and enquire about both respondents' experiences and their perceptions.

Since the EQI is not available at the city level, the reference used is the perception survey database, that provides information about the level of satisfaction with administrative services in cities. Normally, satisfaction with the administration is positively correlated with the EQI. In 50 of the 83 cities for which data is available, most of the respondents consider that services provided by the local administration help people efficiently. EU capitals usually register lower ratings than other cities *(DG REGIO 2016)*.

Comments / Limitations

- The indicator provides information only about perceived satisfaction, and does not include any reference to objective measures of service quality.
- The number of surveyed cities varies over time for the Eurobarometer. The year for which the information is available for most of the cities is 2015 (more than 100 cities and greater).
- The survey was conducted in more than 79 European cities. This survey included all capital cities of the countries concerned (except for Switzerland), together with between one and six more cities in the larger countries. In each city, around 500 citizens were interviewed. The TNS Political & Social network carried out this survey in the 28 Member States of the European Union, as well as Iceland, Norway and Switzerland. In June 2015, around 41,000 respondents from different social and demographic groups were interviewed.

Metadata

Source: DG REGIO and EUROSTAT, Eurobarometer, Perception survey results (Variables PS2042V-PS2046V) (*https://ec.europa.eu/eurostat/web/cities/data/database*)

Availability and geographical coverage: 83 EU cities

Unit of Measurement: Categorical variable

Level of aggregation: Cities.

Time coverage and frequency: 2004, 2006, 2009, 2012, 2015

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

TYPE

TRANSPARENCY OF THE PUBLIC ADMINISTRATION

Links to other SDGs

11 SUSTAINABLE CITIES AND COMMUNITIES

17 PARTNERSHIPS FOR THE GOALS

ALIGNMENT

UN list ☐

EU list ☐

COVERAGE

ITALY

AGGREGATION

MUNICIPALITIES

AVAILABILITY

ALL

ITALIAN MUNICIPALITIES

SOURCE **Italian National Authority Against Corruption (ANAC)**

Description of the indicator

This indicator is dichotomous and assumes value 1 if a municipality publishes the list of all public procurement contracts exceeding a given threshold, and 0 otherwise.

Since no harmonised data is available across Europe at the local level, the case of Italy is illustrated as an example. In Italy the National Authority Against Corruption (ANAC) collects and publishes data concerning all public procurement contracts whose value exceeds 40,000 euro. This list also includes their main characteristics (e.g. typology, sector, amount of resources, opening and closing data, assigned/not etc.).

Public procurement refers to the process by which public authorities, such as government departments or local authorities, purchase goods or services from companies.

This indicator addresses aspects of Target 16.6 (efficient and transparent institutions) of the UN SDGs.

European context

Public procurement is a key economic activity of governments *(Piga and Tatrai 2016)*, and accounts for over 14% of EU GDP *(European Commission 2018d)*. While public procurement is regulated by law to ensure the public sector gets the best value for money and that three key principles are observed: equal treatment; non-discrimination, and transparency, it is also one of the most vulnerable activities to corruption *(OECD 2016)*. For instance, the amount of resources involved and the stability of the cash flow make public procurement attractive for rent-seekers. Increased transparency reduces the risk of corruption as well as favour the best provider *(Chvalkovská and Skuhrovec 2010)*.

All public procurement procedures in the EU are carried out on the basis of national rules, with higher value contracts based on general EU rules. The thresholds that mark when EU rules are used depend on the subject of the purchase, and who is making the purchase. As a general rule, tenders for public contracts that fall under EU rules must be published in the online version of the Supplement to the Official Journal of the European Union - the Tenders Electronic Daily (TED) portal *(European Union 2019)*. Other contracts are not required to do so, although the basic rules of the European Union Treaties, such as transparency, equal treatment, open competition, and sound procedural management, still apply.

Comments / Limitations

- Making this information available does not directly reduce irregularities in the procurement process. In order to do so, the literature shows that reforms increasing transparency should be accompanied by measures strengthening citizens' capacity to access the information *(Chvalkovská and Skuhrovec 2010)* and act *(Lindstedt and Naurin 2010)*.

Metadata

Source: ANAC (National Authority Against Corruption), Banca Dati Nazionale Contratti Pubblici (*http://portale-trasparenza.anticorruzione.it/microstrategy/html/index.htm*)

Availability and geographical coverage: all Italian municipalities

Unit of Measurement: List of public procurement contracts whose value exceeds 40,000 euro, issued by every public authority

Level of aggregation: Municipalities (LAUs), Provinces (NUTS3), Regions (NUTS2)

Time coverage and frequency: 2011-2018. Data is collected for all public procurement contracts

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

TYPE

VOTER TURNOUT IN MUNICIPAL ELECTIONS

Links to other SDGs

11 SUSTAINABLE CITIES AND COMMUNITIES

ALIGNMENT

UN list ☐

EU list ☐

COVERAGE

GREECE

AGGREGATION

MUNICIPALITIES

AVAILABILITY

ALL

GREEK MUNICIPALITIES

SOURCE **Ministry of the Interior - Hellenic Republic**

Description of the indicator

This indicator gives the share of people who vote in a municipal election over the total eligible population (eg. over 18 years of age, and holding citizenship). A municipal election represents a democratic moment in which people are called to contribute towards the day-to-day functioning of their community through the election of local representatives. Since there is no harmonised database on municipal voter turnout for all Member States, the case of Greece is given as an example.

This indicator addresses aspects of Target 16.7 (participatory and representative decision-making) of the UN SDGs.

European context

The European election database collects information on voting in all European countries. Beside that, the database is very informative on the political parties involved in elections and on official sources of data on European, national and local elections (usually up to maximum NUTS3 level) across countries.

Official data on voter turnout at the more detailed municipal level is available for each country from national statistical offices. Many EU countries also publish data on voter turnout at the neighbourhood scale.

Comments / Limitations

- Disaggregated data on voter turnout can be used to monitor the participation of specific minority groups.
- Voter turnout is often used as a proxy for democratic legitimacy. Considerable variations detected in voter turnout may reflect, to some degree, the trust people have in the political system (*Hooghe 2018*).
- Voter turnout is also a proxy of social capital: the higher the voter turnout, the higher the social capital. This is generally regarded as a positive element in civic involvement *(Akcomak and ter Weel 2012; Boschma 2005)*.

Metadata

Source: Ministry of the Interior - Hellenic Republic at https://www.ypes.gr/ekloges/ethnikes-ekloges/apoteles-mata-ethnikon-eklogon

Availability and geographical coverage: all Greek municipalities

Unit of Measurement: Share

Level of aggregation: Municipal level (LAU)

Time coverage and frequency: 1996-2019. Data collected for every election

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

TYPE

MUNICIPAL PARTICIPATORY BUDGETING

Links to other SDGs

5 GENDER EQUALITY

10 REDUCED INEQUALITIES

11 SUSTAINABLE CITIES AND COMMUNITIES

ALIGNMENT

UN list ☑

EU list ☑

COVERAGE

LISBOA

AGGREGATION

-

AVAILABILITY

1

SOURCE **Camara municipal de Lisboa**

Description of the indicator

This indicator gives the amount of resources that a municipality allocates through participatory budgeting (PB). PB is a structured and cyclical process of engagement where ordinary citizens become central actors in decision-making processes on the allocation of public funds. PB is usually done with the engagement of local or regional authorities.

Since no harmonised data is available across Europe at the local level, the case of Lisboa is illustrated here as an example.

This indicator addresses aspects of Target 16.7 (participatory and representative decision-making) of the UN SDGs.

European context

PB was originally developed in Latin America and diffused there since the '80s. In Europe it was limited to a small number of cities until the financial crisis and the fall in political participation pushed a number of local governments to test new means of democratic engagement. Nowadays, PB is used in most of the largest European cities also due to new opportunities provided by digital technologies.

Recent research mapped participative platforms currently used in Europe, including participatory budget initiatives (*Spada, P., Copello, K., Allegretti, G. Secchi, M., Cordeiro, L. and Fonseca 2018*). Among the most famous PB projects is the Portuguese national platform known as Orcamento participativo Portugal.

Comments / Limitations

- The analysis of the types of projects proposed and accepted for the implementation of the PB can also provide additional insight on the use of this tool.
- It is crucial for municipalities that are currently engaged with PB to include information on both the budget initially allocated and the amount spent, by initiative.
- Municipalities could also introduce additional information, for example the participation rate in PB by groups (e.g. gender, couples with young children, low income people). This information would help in understanding if PB enables local authorities to engage additional people other than those already active in traditional political activities.
- Involvement in PB increases trust in the public administration, when it effectively manages the expectations of participants.

Metadata

Source: Camara municipal de Lisboa (*https://op.lisboaparticipa.pt*)

Availability and geographical coverage: Municipality of Lisboa

Unit Measurement: Amount of resources in euro devoted to PB. Calculating the share of the resources devoted to PB over the total budget of the municipality and its variation over time is recommended

Level of aggregation: Municipality

Time coverage and frequency: 2008-2018. Data collected every year

GOAL 17

STRENGTHEN THE MEANS OF IMPLEMENTATION AND REVITALIZE THE GLOBAL PARTNERSHIP FOR SUSTAINABLE DEVELOPMENT

Description of the Goal

The creation of effective partnerships among governments and among public, private actors, and civil society is essential to achieve the Sustainable Development Goals. Goal 17 focuses on enhancing cooperation and strengthening the means of implementation and monitoring of the SDGs.

European Dimension

The creation of partnerships and the effective involvement of different stakeholders is essential to achieve the Sustainable Development Goals.

European countries are committed to mobilising financial resources for development cooperation through official resources like Official Development Assistance (ODA), Other Official Flows (OOF), private resources such as Foreign Direct Investments (FDI), and remittances. However, for this cooperation to continue and for Member States to pursue their own sustainable development, they need to ensure their own financial stability.

To enhance policy coherence for sustainable development, the overall statistical capacity to monitor progresses towards the SDGs should be improved. The internet has become an important instrument to access information, and foster cooperation.

Local dimension

After the 2008 financial crisis, government debt had to be limited according to the Treaty on the functioning of the European Union *(Official Journal of the European Union, n.d.)* in order to pursue Member States' sustainable development. In this context, local authorities also had to limit the level of their debt, while at the same time continuing to ensure the delivery of local services, especially those targeting the most vulnerable groups.

The crisis also induced a widespread degradation of the average economic conditions of migrants, which impacted on remittance flows *(Bartolini & Castagnone, 2015)*. Cities are where most foreign citizens live and whereout flow of remittances is usually the highest. Therefore, cities are also the most suitable actors to implement initiatives to reduce inefficiencies linked to remittances (e.g. promoting financial inclusion and education, and transparent transaction costs).

Municipalities are also the most suitable actors to bridge the digital divide, implementing local initiatives to increase digital literacy and participation, especially in certain geographic areas and targeting vulnerable groups *(Kiss, 2017)*.

17 PARTNERSHIPS FOR THE GOALS

TYPE

REMITTANCES AS A PROPORTION OF GDP

Links to other SDGs

10 REDUCED INEQUALITIES

ALIGNMENT

UN list ☐

EU list ☐

COVERAGE

ITALY

AGGREGATION

NUTS3

AVAILABILITY

ALL

NUTS3

SOURCE **Bank of Italy**

Description of the indicator

The indicator considers the ratio between remittances and the GDP. Remittances are usually understood as financial or in-kind transfers made by migrants to friends and relatives back in their community of origin. However, the statistical definition of international remittances includes two main components *(Wang & Wang, 2009)*:

- Personal transfers: all current transfers in cash or in-kind made or received by residents from or to individuals in other countries.
- Compensation of employees: income earned by temporary migrant workers in the host country, and the income of workers employed by embassies, international organisations and foreign companies. Furthermore, the salaries of staff employed by foreign employers also count as remittances, as these civil servants, diplomats, military personnel and others are considered residents of the origin country.

Since no harmonised data is available across Europe at the local level, the case of Italy is given as an example.

This indicator addresses aspects of Target 17.3 (financial resources for developing countries) of the UN SDGs and relates to the indicator "EU financing to developing countries through private flows" proposed in the EU SDGs indicator set.

European context

Over the last years, the remittance growth rate in real terms has increased in Europe, together with the increase in migration and also depending on transnational family distribution *(Bartolini, 2015)*. Remittances are found to be less volatile and more effective in promoting the social and economic development of households than other financial transfers *(Bettin, et al., 2017)*, despite the fact that the high costs of money transfers reduce the benefits.

Several initiatives are ongoing in Europe and in the world with the objective to reduce the average costs of transferring remittances. Among these initiatives, Greenback 2.0 is a project of The World Bank aiming at increasing transparency and efficiency in the market for remittance services, by involving migrants, remittance service providers, and public authorities *(The World Bank, 2014; World Bank Group, 2015)*.

Comments / Limitations

Official figures are likely to underreport the total amount of remittances because:

- The indicator of remittances captures only financial flows. Besides that, commodity transfers also happen among countries (e.g. consumer items).
- Remittances can also be social in nature: ideas, social capital and knowledge that people acquire outside their country of origin and that can be transferred to their original communities *(Levitt, 1998)*.
- It is also important to consider that a part of remittances is not moved through official channels *(Adams & Page, 2005)*.

Metadata

Source: Bank of Italy (*https://www.bancaditalia.it/statistiche/tematiche/rapporti-estero/rimesse-immigrati/*) for data on remittances and ARDECO for regional GDP (*https://ec.europa.eu/knowledge4policy/territorial/ardeco-database_en*)

Availability: all Italian NUTS3.

Unit of Measurement: Ratio. Remittance outflows from the Province in Euro (Millions) divided by regional GDP.

Level of aggregation: NUTS3.

Time coverage and frequency: Data available from 2005 to 2015 (included). Data is collected every year.

17 PARTNERSHIPS FOR THE GOALS

TYPE

Links to other SDGs

VLR INDICATORS FROM OFFICIAL STATISTICS

ALIGNMENT

UN list ☐

EU list ☐

COVERAGE

–

AGGREGATION

MUNCIPALITIES

AVAILABILITY

–

SOURCE –

Description of the indicator

This indicator is the ratio between the number of indicators included in the VLR which are gathered, elaborated and disseminated according to the Fundamental Principles for Official Statistics adopted by the United Nations Statistical Commission, in its Special Session of 11-15 April 1994 (United Nation General Assembly 1994) over the total number of indicators included in the VLR (including experimental indicators).

This indicator addresses aspects of Target 17.18 (increase data capacity) of the UN SDGs.

European context

More and more cities are getting involved in the production of VLRs. However, official data at the municipal level and in a comparative perspective are usually scarcer than data at lower level of disaggregation (e.g. Regions). Hence, cities tend to use, coherently with what is recommended by this *Handbook*, both official and experimental data.

Target 17.18 also requires by 2020 to increase the availability of high-quality, complete time-series and reliable data at the finest granularity available, in order to provide information based on gender, income, age, race, ethnicity, migratory status, disability. Therefore, it is useful for cities to monitor, together with their progress towards single targets also their progress in improving statistics as an instrument to achieve sustainable development.

Comments / Limitations

- The use of experimental indicators is useful to gather information regarding topics for which official indicators are not yet available. However, municipalities should invest in validating experimental data and increasing the range of phenomena which are measurable also with official statistics.
- This indicator is relevant to understand the evolution of statistics in support of the monitoring of SDGs.

Metadata

Source: Data has to be calculated by the municipality once the VLR is completed.

Availability: -

Unit of Measurement: Ratio.

Level of aggregation: Municipal level (LAU).

Time coverage and frequency: Every VLR edition.

Part 3

STATE OF ART AND WAYS FORWARD

3

3.1 Local governments measuring the SDGs

In the last years, several local authorities have started publishing VLRs around the world and in Europe.

Some frontrunner cities published their VLRs already in 2018, but New York City was the first one to present its VLR to the High Level Political Forum (HLPF), the annual UN meeting designed to discuss the progress towards the achievement of the 2030 Agenda.

In their effort to prepare their VLRs, the first local governments engaging with this activity did not benefit from official UN guidance given to national governments with regard to Voluntary National Reviews. Therefore, these frontrunners represented an inspiration for the cities that would follow. An initial and consistent review of the published VLRs is presented by *(Deininger et al. 2019)*.

In the next sub-paragraphs, some of the key elements of selected VLRs are highlighted. Even if this *Handbook* is designed mainly for European mucipalities, the following overview of the published VLRs includes also regions and cities from other parts of the world, since many of the challenges and issues are common to all local governments willing to prepare a VLR, and local authorities may benefit from sharing knowledge and practice with peers at a broader scale.

Table 3 provides an overview of the published VLRs, to the best of the authors' knowledge at the time of the publication of this *Handbook (December 2019)*.

In February 2020, UN-Habitat will launch the New Urban Agenda Platform (UN-Habitat n.d.). It is intended to host information about the actions towards the implementation of the New Urban Agenda (NUA), which will possibly include also the VLRs.

In the next sub-paragraphs, some of the key elements of selected VLRs are highlighted.

An official repository of the VLRs does not exist so far, **but in the European Commission's Urban Data Platform Plus[10], users can find the published VLRs, not only in Europe but also in other regions of the world, and useful links to the cities' webpage.**

Helsinki (Finland)

The review published by the City of Helsinki in 2019 *(Helsinki 2019)* is structured around five goals using a limited number of local indicators with an in-depth analysis of the different challenges. For each indicator a detailed description is provided along with the desired tendency. Helsinki started to approach the 2030 Agenda mapping the city's strategy versus the SDGs.

The first part of the review presents the summary of this mapping exercise, made in two phases: Mapping 1 presents the relation between the three themes of the Helsinki City Strategy 2017-2021 *(Helsinki 2017)* and the SDGs; Mapping 2 presents the SDGs versus the objectives of the same plan. The city's approach focused on the five Goals under review at the HLPF 2019, namely: quality education (SDG4), decent work and economic growth (SDG8), reduced inequalities (SDG10), climate action (SDG13) and peace, justice and strong institutions (SDG16). The description of the progresses for each Goal has been collected by a group of experts. A selection of key indicators tailored to the main challenges in Helsinki complemented the analysis. The key indicators were picked primarily from the monitoring meters of the Helsinki City Strategy *(Helsinki 2019)*, trying to be consistent with the EU-level SDG indicators identified by EUROSTAT. Some selected indicators are very specific to the Finnish situation, i.e. integration of no-Finnish speakers in the educational system *(see Goal 4: Quality education)*. Regarding the SDG 10 (reduce inequalities), the VLR also focuses on some local issues, such as the inclusion of children and youth and the link to mental and social health for this specific age groups.

The process of the VLR production lasted about 7 months (November 2018 - May 2019). The Mayor committed to present the next VLR in 2021, to align

10 *https://urban.jrc.ec.europa.eu/#/en/sdgs*

AUTHORITY	YEAR/S	REGION OF THE WORLD	SDGS REVIEWED	LEVEL OF GOVERNMENT	ONLINE DATABASE CONNECTED TO THE VLR	REFERENCE (HYPERLINK)
1. Euskadi Basque Country (Spain)	2017 and 2018	Europe	all SDGs	Sub-national	no	(Euskadi Basque Country 2017; 2018) *https://www.euskadi.eus/2030-agenda/*
2. Kitakyushu (Japan)	2018	Asia	all SDGs	City	no	(City of Kitakyushu and Institute for Global Environmental Strategies 2018)
3. Shimokawa (Japan)	2018	Asia		City	no	(Shimokawa Town 2018)
4. New York City (USA)	2018 and 2019	North America	SDGs under review	City	yes	(The City of New York 2018; 2019)
5. La Paz (Bolivia)	2018	South America	all SDG	City	yes	(Gobierno Autónomo Municipal de La Paz - Secretaría Municipal de Planificación para el Desarrollo 2018) *http://sitservicios.lapaz.bo/sit/ods/*
6. Taipei (Taiwan)	2019	Asia	7 SDGs	City		(Taipei City 2019)
7. Oaxaca (Mexico)	2019	Central America	to check	Province	no	Preliminary review (Oaxaca 2019 *http://www.agenda2030.oaxaca.gob.mx/*
8. Barcelona (Spain)	2019	Europe	all SDGs	City	yes	(Gabinet Tècnic de Programació and Oficina Municipal de Dades 2019)
9. Bristol (UK)	2019	Europe	all SDGs	City	no	(Fox and Macleod 2019)
10. Helsinki (Finland)	2019	Europe	SDGs under review	City	yes	(Helsinki 2019)
11. Jaén (Spain)	2019	Europe	all SDGs	Province	yes	(Herrador Lindes, Mesa, and Fernández Moreno 2019)
12. Los Angeles (USA)	2019	North America	all SDGs	City	yes *https://sdgdata.lamayor.org/*	(City of Los Angeles 2019b)
13. Buenos Aires (Argentina)	2019	South America	all SDGs	City	no	(Government of Buenos Aires 2019)
14. Santana de Parnaíba (Brasil)	2019	South America	3 SDGs	City	no	(Prefeitura de Santana de Parnaiba 2019)

Table 3 Overview of the published VLRs (update December 2019) in chronological order.

this exercise with the strategic city plan, the conclusion of his mandate, and the municipal elections.

Additional considerations elaborated from the VLR highlights: (1) how a strong leadership of the Mayor's office led the VLR process; (2) the VLR did not reveal a huge gap in the actions addressing specific challenges, leaving open questions about the identification of follow-up actions. In the conclusions, the authors outline the development needs and critical issues emerged during the reporting process, more specifically:

- The city noted that some UN targets refer to international cooperation and responsibility of the national governments and therefore are not applicable to local governments.
- The VLR focuses mainly on the city strategy and therefore refers to the related action identified in the strategic documents of the city.
- The VLR does not cover the entire municipality's fields of actions.
- There was the need to complement the UN indicators with local ones, making harder the potential comparison with other cities.
- The SDG targets are complex and it is important to analyse the convergence of the target with the local-level operations, to highlight the most urgent areas of action for the city.
- More activities on awareness and training of key players are needed to facilitate VLR effectiveness.
- Helsinki is working to achieve recognition for the importance of cities in key international fora and networks, in order to enable cities to participate in the setting of the agendas - and not just in their implementation.

Bristol (UK)

Bristol prepared the VLR *(Fox and Macleod 2019)* almost simultaneously to the preparation of the Bristol One City Plan *(Bristol City Office 2019)*.

Bristol's VLR is an independent study conducted by two researchers from the Cabot Institute for the Environment of the University of Bristol. It is based on the VNR guidelines, but it definitely widens the scope and tools used, including an informative and accurate data annex.

Regarding the method used, all SDGs have been reviewed (apart for SDG 17) with different numbers of indicators per Goal and the benchmarking year selected is 2010, enabling a proper assessment of trends. At the beginning of the study, some key findings highlight areas with bad performance, but also SDGs where the data gap is most evident.

The VLR also highlights the question of the geographical area to be monitored: the functional urban area of Bristol is much larger than the City of Bristol, but some SDGs need to be assessed at larger scale. Moreover, some indicators at city level hide inequalities among the different parts of the city.

Apart from the data collected from different official sources, the VLR includes observations resulting from an online survey that collected information from 88 local organisations, in support of a qualitative assessment of the local actions.

In 2016, a number of city stakeholders constituted the *Bristol SDG Alliance* (SWIDN n.d.), bringing together energies and resources for the achievement of the SDGs at local scale. This was instrumental in compensating the loss of financial resources that the City received from the central government. In the report, the authors claim that the budget reduction could affect the capacity of the local government to deliver the SDGs: therefore, the **tasks and responsibilities of the 2030 Agenda have to be shared among a wide range of actors and stakeholders**. In order to ensure the coordination with the City's actions, the Mayor appointed a SDG Ambassador in the Cabinet.

Kitakyushu and Shimokawa (Japan)

The VLR of the **City of Kitakyushu** was published in 2018 *(City of Kitakyushu and Institute for Global Environmental Strategies 2018)*. In the preparation of the review, the city was supported by the *Institute of Global Environmental Strategies*. As the Japanese city was a frontrunner in Asia and in Japan on this activity, the decision of the administration and its experts was to follow a very specific methodology, with a review of all the Goals.

The use of ad-hoc and contextualised indicators unfortunately does not allow the comparison with other cities. In some cases, indicators aim at providing information on the accomplishment of commitments, measuring the efficacy of local actions, even if these are not innovative actions. *(City of Kitakyushu and Institute for Global Environmental Strategies 2018)*

The VLR of the **Town of Shimokawa** follows a structure similar to the one used by Kitakyushu. The VLR brought four key benefits *(Kataoka, Asakawa, and Fujino 2018)*:

1. The review was a chance to take a fresh look at the region through the lens of the 17 SDGs and it led to new insights and discoveries towards local issues.
2. Looking at the present state of the town through the lens of the future (ideals and vision) allowed a more solid development of **Shimokawathrough** carefully considered action.
3. Partnering with a wide range of key players enabled the town to do a step forward toward the resolution of pressing social issues and the creation of new value.
4. The SDG framework allowed the Town of Shimokawa to communicate its attractive qualities and future vision to a broad domestic and international audience.

New York City (USA)

New York City launched the first VLR in 2018 (The City of New York 2018), representing an example and a call for action to other cities on the global stage.

The VLR model chosen by the city was to be committed to submit a review every year and to present it to the HLPF, analysing the progresses of the city towards the SDGs under review every year, following the structure of the VNRs.

The 2019 VLR focuses on the four SDGs under review at the HLPF 2019, namely SDGs 4 (Quality Education), 8 (Decent Work and Economic Growth), 10 (Reduced Inequalities), 13 (Climate Action), and 16 (Peace, Justice, and Strong Institutions) *(The City of New York 2019)*.

The VLR of New York City uses indicators elaborated for the specific need of the city and provided by different public agencies within the administration. In some cases, the indicators refer also to financial investment or commitments used to address a specific issue. In most of the cases, they refer to a baseline year in order to check the increment or the decrement of the value.

This example is valuable, among other aspects, because of the accountability and the commitment of the administration to the SDG review exercise. Another relevant element is the clear link of the monitoring with the public investments. On the other hand, this approach is not replicable or comparable due to the uniqueness of the data references.

Provincia de Jaén (Spain)

The Spanish Province of Jaén developed a full set indicators and related methodologyto assess the achievement of the SDGs within its territory *(Herrador Lindes, Mesa, and Fernández Moreno 2019)*. The authors identified a different number of indicators for each goal (zero for SDG14, 13 for SDG3). When possible, they included disaggregation by gender and historical series from 2008. They also compared the value for the Province of Jaén to averages for Andalusia (region) and Spain (country).

For each indicator, time series are presented along with detailed metadata and the desired trends or target to be achieved. A balance is ensured among indicators covering different aspects of sustainability and the goals are analysed through the local characteristics linked to the prevalence of the agricultural sector.

The indicator fiche (with the main metadata) provides an excellent example for the minimum required information to be included in a proper database *(Herrador Lindes, Mesa, and Fernández Moreno 2019)*.

La Paz (Bolivia)

The VLR of the Autonomous Municipality of La Paz (Bolivia) was published in July 2018 *(Gobierno Autónomo Municipal de La Paz - Secretaría Municipal de Planificación para el Desarrollo 2018)*.

The most innovative element of the VLR produced by La Paz is that the report includes maps of the indicators per city district. It is therefore possible to visualise the differences and inequalities within the areas of the city. This is the only published VLR - up to authors' knowledge – that tackle the issue of inequalities within the city (excluding some mentions in the VLR of Bristol).

The report includes data and reports on five Goals (1, 3, 4, 11, 16) with specific focus on SDG 11.

The VLR identifies key policies to achieve the SDGs at city level:

- Development of information system for the SDGs.
- Implementation of plans, programs, projects, and initiatives linked to the SDGs
- Configuration of the Municipal Commission for the achievement of the SDGs.

Regarding the development of the information system for the SDG – knowledge base for the VLR – the strategic actions include: analysis and selection of data sources at municipal level; definition of measurable targets by 2030; building indicators of processes and impacts; studies and research on the effectiveness and results of programs, plans, and actions; consolidation of the online data platform; publication of periodic results *(Gobierno Autónomo Municipal de La Paz - Secretaría Municipal de Planificación para el Desarrollo 2018)*.

Taipei

The VLR of Taipei was published in September 2019 *(Taipei City 2019)* and analyses seven Goals with a number of indicators identified through a process led by the Council for Sustainable Development – a body composed by city officials, experts and scholars, NGOs and business representatives since 2004. In 2016, the Council established a number of specific actions to align city actions to the 2030 Agenda and the SDGs. The selection of the seven Goals identified as development priorities is based on three criteria:

- Relatability and achievability;
- Link to authority and responsibility of the local government;
- High-priority themes.

Los Angeles (USA)

Los Angeles published the VLR in 2019 *(City of Los Angeles 2019b)*. The SDG implementation in Los Angeles is a multi-phase multilateral project aimed at adopting and adapting the Goals across Los Angeles. According to the dedicated webpage, "*The project is a collaborative effort between the Mayor's office, Mayor Eric Garcetti, and the Conrad N. Hilton Foundation, which provides technical and financial support to the program. Other key partners include Occidental College, Arizona State University, University of Southern California, and University of California, Los Angeles.*" *(City of Los Angeles 2019a)*

The VLR follows the example of New York City, with two main distinctions:

- The City has, where applicable, localised the national targets to align them to city government plans and policies. All indicators are available on the online platform: *https://sdgdata.lamayor.org*
- The VLR contains the alignment between the city's actions and the SDG targets.

Buenos Aires (Argentina)

Similarly to Helsinki, the city of Buenos Aires also published its first VLR in July 2019 and presented it at the HLPF 2019. The review follows a structure similar to the one of the New York City, reviewing in details only the goals under review in 2019 *(Government of Buenos Aires 2019)*.

Buenos Aires' VLR includes detailed indicators dedicated to the specific situation of the city and analysis of actions deployed by the government of the city.

The VLR of Buenos Aires is part of a national effort to involve all level of governments in the implementation of the SDGs, with coordinated actions on training, publication of guidelines and communication and dissemination. The Argentinian Government highlights the need to adapt the SDG to the local situations: "*Each provincial and mu-*

nicipal jurisdiction that adheres to the SDGs adjusts the objectives and goals according to their needs."[11]

A manual for Argentinian cities on the localisation of the SDGs has been published by the National Government in 2019 *(Consejo Nacional de Coordinación de Políticas Sociales (CNCPS) 2019a)*. It aims at focusing on issues such as the strengthening of management capacities, jurisdictional competencies and the analysis of local situations as key aspects for the formulation and monitoring of goals for the achievement of the SDGs at the local level.

3.2
How to integrate the SDG monitoring and the strategic plans

If it is true that the SDG11 specifically focuses on cities, it has been highlighted how *"the role of local administrations in the achievement of the Agenda goes far beyond Goal 11. All of the SDGs have targets that are directly or indirectly related to the daily work of local and regional governments" (United Cities and Local Governments 2015)*.

A common first step for cities is to map the actions and priorities pre-identified (though city strategic plans) and verify if and how do they match or align to the SDGs. This is the case, for example, for New York City and Helsinki.

However, even if it proves very useful, the mapping exercise is not sufficient *per se* to take immediate policy action and subsequently monitor its implementation. The evidence-based analysis done using indicators can indeed help in **highlighting the possible interlinks and multiple effects of single actions, programmes and plans, and understanding trade-offs and win-wins. The VLR can then support the identification of priority areas of actions**. This is ideally accompanied by the involvement of stakeholders and communities in co-creation settings.

Through the analysis of the Goals provided in the Part 2 of the *Handbook*, it has been shown that it is possible to identify possible key areas of policy action for the local government to achieve the Goals. Moreover, the use of harmonised and existing indicators collected by the NSOs or international institutions can facilitate the preparation of the VLRs and allow benchmarking with peer cities. In addition to the metrics identified according to the suggestions provided by the *Handbook*, cities can also add indicators among the ones collected for specific actions or programs. Looking at the published reviews, the list of indicators can vary substantially in number.

Several documents and guidelines published by leading organisations approached the process of SDG localisation in support of their constituencies from a governance point of view. They represent valid references for cities willing to complement their knowledge on the topic with the one addressed in this *Handbook*. Some examples of these organisations are: UCLG *(Global Task Force of Local and Regional Governments 2018)*, the Committee of the Regions *(European Committee of the Regions - Commission for European Policy 2019)*, the International Centre for the Promotion of Human Rights *(ICPHR 2018)*, the Council of European Municipalities and Regions & PLATAFORMA *(Bardot et al. 2018)*.

Other organisations are also helping local and regional leaders in developing policy approaches and action plans to localise the SDGs, such as the Organisation for Economic Co-operation and Development (OECD), which is developing pilot projects with selected cities.[12]

The interest on this topic is demonstrated also by groups of cities that committed to localise the 2030 Agenda in Europe *("Seville Commitment. Cementing a Local-Global Movement to Localizing the Sustainable Development Goals" 2019)* or in Latin America *(La Red Iberoamericana de Municipios Por Los ODS 2017)*.[13]

11 More information on the program on SDGs in Argentina are available (in Spanish) at https://www.odsargentina.gob.ar/

12 https://www.oecd.org/cfe/territorial-approach-sdgs.htm

13 In depth analysis of the localisation of the SDGs in Latin America have been published by UNDP Bolivia (UNDP Bolivia 2017) and the Government of Argentina (Consejo Nacional de Coordinación de PolíticasSociales (CNCPS) 2019b).

“While the SDGs [...] recognize the strong urban dimension of sustainable development, the 2030 Agenda does not specify the responsibilities of local actors in implementation. It also does not specify the framework conditions needed by local authorities and other local actors to support the implementation of the SDGs. Moreover, **it is up to every member state to decide whether, how and to what extent to involve** local governments in implementation.”

(European Committee of the Regions - Commission for European Policy 2019)

The process of localisation

According to the literature and the analysis of the different actions, the SDG local reviews kick off with a **commitment of the city to contribute actively to the 2030 Agenda** (public commitment, preliminary assessment, working agreements, etc.). The commitment needs to be followed by awareness and capacity building activities within the local administration and with groups of selected stakeholders, created ad-hoc for the SDGs, or reorganised from existing one.

After the commitment, the key steps are:

- The definition of the management method (appointment of a *spoke-hub person* or "SDG ambassador", election of a team of experts or selection of external consultants).
- Mapping exercise of the SDGs versus the existing city strategic plan development.
- Definition of the number and type of Goals the city wants to assess and monitor.
- SDG diagnosis through the VLR preparation (including the selection of the indicators to use and the data collection).
- Co-creation sessions with stakeholders and communities.
- Definition of an agenda and targets, redefinition of the monitoring indicators, adaptation of the management mechanisms.
- Realisation of pilot projects.
- Monitoring of the projects.
- Evaluation of the projects and redefinition of priority actions.

Training and raising awareness activities throughout the whole process for an effective civil servants' and citizens' involvement

The most critical element to consider along this process is that **the local actions for the 2030 Agenda need to be innovative and transformative in order to be strategic**.

Of course, good governance by the city will support the well-being of the citizens, but **the acceleration of transformative actions is essential to effectively boost sustainability and reduce inequalities**.

3.3 Some considerations on VLR methods and comparability

As discussed in the previous paragraphs, the local monitoring of the SDGs is challenging both from a political and governmental point of views. Moreover, there are technical and methodological issues that emerge.

While **the desired trend** is easy and intuitive to interpret for several indicators (for example number of people affected by disasters, people with access to public transport, etc.), this is not straightforward for others. When considering indicators such as "the number of people in social housing", the situation cannot be fully assessed considering only this figure. The increment can be either due to the fact that there is more population in need of social housing (negative trend), or that the city is able to provide support to a wider group of people, thanks to specific funds or programs (positive trend).

When it comes to having an overall picture of the situation of SDGs in cities, **composite indexes** such as the ones elaborated by SDSN (USA, Spain, Italy, Europe) *(Alainna Lynch 2019; Lafortune and Zoeteman 2019; Sánchez de Madariaga, GarcíaLópez, and Sisto 2018; Cavalli and Farnia 2018)* could be useful tools. However, data is hard to obtain at the city level for all the countries. Therefore, SDSN, as well as other organisations building composite indexes, usually include a limited set of indicators per each goal, or indicators measured at both municipal and NUTS level.

As noted in Part 1, UNDESA and EUROSTAT measure - when possible - **the distance to targets**. In some cases, the target is clearly identified in the Goals. For example, Target 3.1 aims to "reduce the global maternal mortality ratio to less than 70 per 100,000 live births by 2030". In many other cases, the targets are not univocally defined. For example: Target 10.1 sets "by 2030, progressively achieve and sustain income growth of the bottom 40 per cent of the population at a rate higher than the national average".

In order to overcome this limitation, organisations such as the OECD are working for the calculation of the distance to targets.

Another important element to consider in the use of urban indicators for the local SDG monitoring is the selection of the **baseline**[14] **year**. The city of Bristol clearly states in its "VLR that the benchmark year is 2010" *(Fox and Macleod 2019, 9)*.

One other technical element not mentioned in published VLRs is the **frequency of measurement and the periodicity** of the VLRs.

If on the one hand it would be important to monitor indicators on a yearly basis, on the other hand this could be not sustainable or meaningful. For instance, data collection can be very demanding from the financial point of view in particular for "slow" phenomena such as land consumption or transport development (sectors that require long-time investments). The challenge is therefore to find a balance among what is relevant to measure, what can be measured and how often.

Georeferenced data and information at local scale are critical to assess the **inequalities within cities**. Indeed, as much as national averages hide inequalities among regions and cities, this is true also within the cities, where citizens can experience different quality of life and access to services according to the area they line in. This challenge can be overcome developing new methods such as the downscaling of data and the use of new data sources.

The JRC is working on downscaling data from the regional level to higher level of disaggregation and also on modelling techniques to produce scenarios at the intra-urban level. An example is offered by **the maps of population by age classes**, and by the related statistics and indicators that could be derived.

Another approach explored in the last years by the JRC is the **integration of official data with non-traditional sources**, as data from online platforms and big data. This integration requires high capacity of data management and attention to the analysis of the information.

Another relevant issue that should be addressed at the very beginning of the preparation of a VLR is the area of study. In most of the cases, **the area of study** would be the administrative boundary of the city, which follow under the authority of the local government. Nevertheless, some key topics should be analysed disregarding the city boundary, and the related statistics and indicators would be most likely available at different levels of aggregation. This is the case of transport infrastructures and services, environmental aspects, air pollution, water distribution, but also waste management.

Therefore, identifying a-priori a level of analysis can result in distorted assessment results. The method should be flexible enough to enable for an assessment that takes into account different scales and the city within its regional and national context.

3.4 Ways forward

Looking at the availability of harmonised indicators for European cities provided in Part 2, a scarcity of data emerges, particularly for: SDG 2 (Zero Hunger), SDG 10 (Reduced Inequalities), SDG 12 (Responsible Consumption and Production) and SDG 17 (Partnership for the Goals).

14 A baseline study is an analysis of the current situation to identify the starting points for a program or project. It looks at what information must be considered and analysed to establish a baseline or starting point, the benchmark against which future progress can be assessed or comparisons made. (Source: Eurostat https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Baseline_study

SDG target 17.18 specifically calls for improving the availability of **disaggregated data**. Still disaggregated and harmonised data are challenging to obtain, especially on very specific topics. Paradoxically, also local harmonised data on digitalisation in European cities is not extensive. Besides this, upcoming initiatives led by the EC, single countries, research centres and institutions, and cities' networks are trying to improve data availability.

Indeed, **data gaps** could be potentially filled using new techniques and non-traditional sources (crowd-sourced and big data), always considering that disaggregated data is essential and that reporting at city-wide scale may mask variations and inequalities.

Cities where data gaps are more extensive could benefit from working in **partnership with universities and research centres, but also associations and institutions** that can support with the data collected and integration. In the era of data revolution such as the current one, citizens and researchers can benefit from new instruments to access data, fostering public administration accountability such as the FOIA – freedom of information acts.[15]

The commitment of the JRC does not stop with the identification of indicators and data, data production and scientific support, but takes a step forward in making available the **Urban Data Platform Plus**[16] (UDP+) for the collection and consultation of data, making new knowledge available in a user-friendly way.

The UDP+ hosts data from a variety of sources and aims at becoming a European and global knowledge hub for local governments, policy-makers, researchers and citizens.

The JRC, in partnership with DG REGIO and UN-HABITAT, will also test the data and methods illustrated in this *Handbook*, with a selected number of cities, in order to update and improve the methodology for the SDGs local monitoring.

Inaugurating the "SDG Decade of Action" *(United Nation General Assembly 2019)*, the JRC will continuing to support and foster the knowledge base on cities and territories, in order to accelerate the implementation of all SDGs and the New Urban Agenda.

---

15 The goal of the FOIA is also to promote greater transparency in the relationship between institutions and civil society and to encourage an informed public debate on issues of collective interest.

16 The Urban Data Platform Plus is a joint initiative of the Joint Research Centre (JRC) and the Directorate General for Regional and Urban Policy (DG REGIO) of the European Commission. It is a key component of the Knowledge Centre for Territorial Policies and aims at providing access to information on the status and trends of European cities and regions, as well as to the exploration of EU supported integrated urban and territorial development strategies. https://urban.jrc.ec.europa.eu/#/en

CONCLUSIONS

This *Handbook* intends to offer to policy makers, researchers and practitioners an inspirational framework to understand and study the local implementation of the SDGs. Localised tracking and monitoring is a fundamental tool to **raise awareness** on the SDGs and the 2030 Agenda, to monitor progress, and to sustain the **transformative** and inclusive action of local actors towards the achievements of the global goals.

Following the Communication issued in the occasion of the adoption of the 2030 Agenda (European Commission 2016a), in 2019 the EC presented its "Reflection Paper on a Sustainable Europe by 2030" (European Commission 2019g). it highlights the need to speed up the implementation of the SDGs at all levels of government, as well as the importance of integrated responses to challenges with an appropriate policy-mix..

The examples of official and experimental local indicators proposed in this Handbook are available to cities as a useful reference **to tailor their SDG monitoring system and Voluntary Local Reviews to their local needs and priorities, while preserving at the same time the possibility to benchmark with peers.** This combination of local focus and global comparability feeds further into the relevance and robustness of the approach and allows for international cooperation and peer learning opportunities.

In shaping their VLRs, this Handbook suggests that cities can potentially assess every Goal taking into account several factors, **highlighting the interlinkages and exploiting thematic synergies.** In this way the scope of the VLRs can well go beyond the mere tracking of the achievement of the SDGs. VLRs can get fully integrated in city strategies and monitoring systems, informing policy action, periodical reviews and adjustments of implementing programmes and schemes.

This approach would make Agenda 2030 and the SDGs become intimately embedded into individual city targets and ambitions.

Moreover, it would make the VLRs effective tools to develop a **sense of ownership of the SDG process.** In this perspective, **the SDGs offer a common language for different local and territorial partners** across the private, public and third sectors to address sustainable development and cooperation – and VLRs could indeed act as powerful enablers for increased and more inclusive citizens' engagement into both local challenges and global goals.

Ultimately, the VLRs should also take into consideration the obstacles that the **jurisdictional complexity** poses in delivering the SDGs. Flows of goods, people and money from place to place challenge the silo approach, not only amongst the SDGs but also amongst territories. Every actor should look for allies in the journey towards sustainability.

With their periodic reviews, cities can give an evident, concrete and evidence-based **sign of their commitments to global challenges**, teaming up with peers and communities, and acting as key player joining the dots between the citizens and the global fora. Getting full grasp and ownership of both local strategies and global goals lies at the very heart of the localisation of the SDGs.

"Only what gets measured gets done."

Ursula Von Der Leyen,
President of the European Commission
at the COP 25, 2 December 2019

“Europe must now move forward, **improve its competitiveness**, invest in sustainable growth and lead the way for the rest of the world.” Reflection Paper - Towards a Sustainable Europe by 2030.

(European Commission 2019)

REFERENCES

A

Abbé Pierre Foundation, and FEANTSA. 2018. "Third Overview of Housing Exclusion in Europe 2018," 36–82.

Adams, Richard H., and John Page. 2005. "Do International Migration and Remittances Reduce Poverty in Developing Countries?" *World Development* 33 (10): 1645–69. *https://doi.org/10.1016/j.worlddev.2005.05.004.*

Adelphi and Urban Catalyst. 2015. "Sustainable Development Goals and Habitat III: Opportunities for a Successful New Urban Agenda." 3. *Cities Alliance.*

Aizer, Anna. 2010. "The Gender Wage Gap and Domestic Violence." *American Economic Review* 100 (4): 1847–59. *https://doi.org/10.1257/aer.100.4.1847*.

Akçomak, I. Semih, and Bas ter Weel. 2009. "Social Capital, Innovation and Growth: Evidence from Europe." *European Economic Review* 53 (5): 544–67. *https://doi.org/10.1016/j.euroecorev.2008.10.001*.

Akcomak, T. Semih, and Bas ter Weel. 2012. "The Impact of Social Capital on Crime: Evidence from the Netherlands." *Regional Science and Urban Economics* 42 (1–2): 323–40. *https://doi.org/10.1016/j.regsciurbeco.2011.09.008*.

Alainna Lynch, Anna LoPresti and Caroline Fox. 2019. "The 2019 US Cities Sustainable Development Report," 61.

Alesina, A., & Ferrara, E. L. 2005. "Ethnic Diversity and Economic Performance." *Journal of Economic Literature* 43 (3): 762–800.

Alesina, Alberto, and Eliana La Ferrara. 2000. "Participation in Heterogeneous Communities." *Quarterly Journal of Economics* 115 (3): 847–904. *https://doi.org/10.1162/003355300554935*.

———. 2002. "Who Trusts Others?" *Journal of Public Economics* 85 (2): 207–34. *https://doi.org/10.1016/S0047-2727(01)00084-6*.

Alesina, Alberto, Rafael Di Tella, and Robert MacCulloch. 2004. "Inequality and Happiness: Are Europeans and Americans Different?" *Journal of Public Economics* 88 (9–10): 2009–42. *https://doi.org/10.1016/j.jpubeco.2003.07.006*.

Alessandrini, A., F. Natale, F Sermi, and M. Vespe. 2017. "High Resolution Map of Migrants in the EU, EUR 28770 EN." *https://doi.org/10.2760/0199*.

Amsterdam rainproof platform. 2019. "Elke Druppel Telt | Amsterdam Rainproof." 2019. *https://www.rainproof.nl/*.

"Annual Report Budapest Waterworks 2017." 2017. Budapest.

Arbaci, Sonia. 2007. "Ethnic Segregation, Housing Systems and Welfare Regimes in Europe." *European Journal of Housing* Policy 7 (4): 401–33. *https://doi.org/10.1080/14616710701650443*.

Arnold, Mona, Nicola Bazzurro, Alexandre Bredimas, Melek Cevza Kazezyilmaz Alhan, Frederic Clarens, Katia Dahmani, Peter Easton, et al. 2016. "BlueSCities. Revised Practical Guidance Document," no. July: 1–12.

B

Balestra, Carlotta, and Joyce Sultan. 2013. "Home Sweet Home: The Determinants of Residential Satisfaction and Its Relation with Well-Being. Working Paper." *OECD Statistics Working Paper Series*, no. STD/DOC(2013)5: 42. *https://doi.org/10.1787/5jzbcx0czc0x-en*.

Bansak, Kirk, Jeremy Ferwerda, Jens Hainmueller, Andrea Dillon, Dominik Hangartner, Duncan Lawrence, and Jeremy Weinstein. 2018. "Refugees Using Algorithmic Assignment" 329 (January): 325–29.

Bansak, Kirk, Jens Hainmueller, and Dominik Hangartner. 2017. "Europeans Support a Proportional Allocation of Asylum Seekers." *Nature Human Behaviour* 1 (7). *https://doi.org/10.1038/s41562-017-0133*.

Bao, Junzhe, Xudong Li, and Chuanhua Yu. 2015. "The Construction and Validation of the Heat Vulnerability Index, a Review." *International Journal of Environmental Research and Public Health* 12 (7): 7220–34. *https://doi.org/10.3390/ijerph120707220*.

Baptista, Isabel, and Eric Marlier. 2019. *Fighting Homelessness and Title Housing Exclusion in Europe A Study of National Policies*.

Baranzelli, Claudia, Jean-Philippe Aurambout, and Carlo Lavalle. 2016. "European Regional Energy Balance and Innovation Landscape (EREBILAND) - Energy Demand of Buildings." *https://doi.org/10.2791/462472*.

Bardhan, Pranab. 1997. "Corruption and Development: A Review of Issues." *Journal of Economic Literature* 35 (3): 1320–46.

Bardot, Lisa, Pedro Bizarro, Adrien Licha, Tiago Stichelmans, and Laia Vinyes Marcé. 2018. "Sustainable Development Goals. How Europe's Towns and Regions Are Taking the Lead." Brussels: PLATFORMA & the Council of European Municipalities and Regions (CEMR).

Barone, Guglielmo, and Sauro Mocetti. 2016. "Inequality and Trust: New Evidence from Panel Data." *Economic Inquiry* 54 (2): 794–809. *https://doi.org/10.1111/ecin.12309*.

Bartolini, Laura. 2015. "The Role of Transnational Family Distribution in Shaping Remittance Flows."

Bartolini, Laura, and Eleonora Castagnone. 2015. "Remittances and the Economic Crisis: Evidence from the Greenback 2.0 Survey in Italy," 27.

Baskaran, Thushyanthan, and Zohal Hessami. 2018. "Does the Election of a Female Leader Clear the Way for More Women in Politics?" *American Economic*

Journal: Economic Policy 10 (3): 95–121. *https://doi.org/10.1257/pol.20170045*.

Basu, A., I. Jaising, and L. Collective. 2005. "Violence against Women: A Statistical Overview, and Challenges and Gaps in Data Collection and Methodology and Approaches for Overcoming Them Needs of Users of Data Collection."

Batista e Silva, Filipe, Mario Alberto Marín Herrera, Konštantín Rosina, Ricardo Ribeiro Barranco, Sérgio Freire, and Marcello Schiavina. 2018. "Analysing Spatiotemporal Patterns of Tourism in Europe at High-Resolution with Conventional and Big Data Sources." *Tourism Management* 68: 101–15. *https://doi.org/10.1016/j.tourman.2018.02.020*.

Batista, Filipe, Boyan Kavalov, and Carlo Lavalle. 2019. "Socio-Economic Regional Microscope Series. Territorial Patterns of Tourism Intensity and Seasonality in the EU." Luxemburg. *https://doi.org/10.2760/061885*.

Becker, Gary S. 2007. "Crime and Punishment: An Economic Approach." *Economic Analysis of the Law: Selected Readings*, 255–65. *https://doi.org/10.1002/9780470752135.ch25*.

Bénabou, Roland. 2000. "Unequal Societies: Income Distribution and the Social Contract." *American Economic Review* 90 (1): 96–129. *https://doi.org/10.1257/aer.90.1.96*.

Benayas, J M Rey, Ana Martins, Jose M Nicolau, and Jennifer J Schulz. 2007. "Abandonment of Agricultural Land: An Overview of Drivers and Consequences." *CAB Reviews: Perspectives in Agriculture, Veterinary Science, Nutrition and Natural Resources* 2 (57): 1–14.

Benjaminsen, Lars. 2017. *Hjemløshed i Danmark 2017. National Kortlægning. VIVE - Viden Til Velfærd - Det Nationale Forsknings- Og Analysecenter for Velgærd*.

———. 2018. "Housing First in Denmark: An Analysis of the Coverage Rate among Homeless People and Types of Shelter Users." *Social Inclusion* 6 (3 Vulnerable and Disadvantaged Groups On the Margins of the Welfare State): 327–36. *https://doi.org/10.17645/si.v6i3.1539*.

Berg A.E., Hartig T., Staats H. Van den. 2007. "Preference for Nature in Urbanized Societies: Stress, Restoration, and the Pursuit of Sustainability." *Journal of Social Issues* 63 (1): 79–96.

Bettin, Giulia, Andrea F. Presbitero, and Nikola L. Spatafora. 2017. "Remittances and Vulnerability in Developing Countries." *World Bank Economic Review* 31 (1): 1–23. *https://doi.org/10.1093/wber/lhv053*.

Bhattacharjee, Sagnik. 2019. "Vienna. Heat Vulnerability Maps." Wien.

Blasko, Zsuzsa, Artur Pokropek, and Joanna Sikora. 2018. "Science Careeer Plans of Adolescents : Patterns, Trends and Gender Divides." *https://doi.org/10.2760/251627*.

Bódis, Katalin, Ioannis Kougias, Arnulf Jäger-Waldau, N. Taylor, and Sándor Szabó. 2019. "A High-Resolution Geospatial Assessment of the Rooftop Solar Photovoltaic Potential in the European Union." *Renewable and Sustainable*

Energy Reviews 114 (October). *https://doi.org/10.1016/j.rser.2019.109309*.

Bolt, Gideon. 2009. "Combating Residential Segregation of Ethnic Minorities in European Cities." *Journal of Housing and the Built Environment* 24 (4): 397–405. *https://doi.org/10.1007/s10901-009-9163-z*.

Boschma, RA. 2005. "Social Capital and Regional Development: An Empirical Analysis of the Third Italy." In *Learning from Clusters*, Springer.

Boulant, Justine, Monica Brezzi, and Paolo Veneri. 2016. "Income Levels And Inequality in Metropolitan Areas: A Comparative Approach in OECD Countries," 1–38. *https://doi.org/10.1108/10610421011068559*.

Burke, C. Shawn, Eduardo Salas, Kimberly Smith-Jentsch, and Michael A. Rosen. 2012. *What a Waste. A Global Review of Solid Waste Management.* Edited by Daniel Hoornweg and Perinaz Bhada-Tata. Washington, DC: World Bank. *https://doi.org/10.1201/9781315593173-4*.

Busch-Geertsema, Volker, Lars Benjaminsen, Masa Fillpovic Hrast, and Nicholas Pleace. 2014. "Extent and Profile of Homelessness in European Member States." *European Observatory on Homelessness* 4 (December): 120.C40. 2019. "C40." 2019. *https://www.c40.org/*.

C

Card, David, Christian Dustmann, and Ian Preston. 2012. "Immigration, Wages, and Compositional Amenities." *Journal of the European Economic Association* 10 (1): 78–119. *https://doi.org/10.1111/j.1542-4774.2011.01051.x*.

Cardoso, Ana Rute, Annalisa Loviglio, and Lavinia Piemontese. 2016. "Misperceptions of Unemployment and Individual Labor Market Outcomes." *IZA Journal of Labor Policy* 5 (1). *https://doi.org/10.1186/s40173-016-0069-6*.

Cavalli, Laura, and Luca Farnia. 2018. "Per Un'Italia Sostenibile: L'SDSN Italia SDGs City Index." Milano.

Charron, Nicholas, Lewis Dijkstra, and Victor Lapuente. 2015. *Mapping the Regional Divide in Europe: A Measure for Assessing Quality of Government in 206 European Regions. Social Indicators Research.* Vol. 122. *https://doi.org/10.1007/s11205-014-0702-y*.

Chvalkovská, Jana, and Jiří Working Skuhrovec. 2010. "Measuring Transparency in Public Spending: Case of Czech Public e-Procurement Information System." IES *Working Paper*.

Cohn, Molly J., and Saul P. Jackman. 2011. "A Comparison of Aspatial and Spatial Measures of Segregation." *Transactions in GIS* 15 (SUPPL. 1): 47–66. *https://doi.org/10.1111/j.1467-9671.2011.01271.x*.

Coley, R.L., W.C. Sullivan, and F. E. Kuo. 1997. "Where Does Community Grow? The Social Context Created by Nature in Urban Public Housing." *Environment and Behavaviour*.

Committee of Ministers. 2010. "Recommendation CM/Rec(2010)5 of the Committee of Ministers to Member States on Measures to Combat Discrimination

on Grounds of Sexual Orientation or Gender Identity." 2010. *https://www.coe.int/en/web/sogi/rec-2010-5*.

Committee on Women's Rights and Gender Equality. 2016. "REPORT on the Situation of Women Refugees and Asylum Seekers in the EU (2015/2325(INI)) A8-0024/2016." *Representation*. *https://doi.org/10.1080/00344897208656356*.

Copernicus. n.d. "Metadata: Tree Cover Density 2015." *https://land.copernicus.eu/pan-european/high-resolution-layers/forests/tree-cover-density/status-maps/2015?tab=metadata*.

Council of Europe. 2018. "Safe at School: Education Sector Responses to Violence Based on Sexual Orientation, Gender Identity/Expression or Sex Characteristics in Europe." Vol. 2018. *https://doi.org/10.12968/indn.2005.1.4.73944*.

———. 2019. "Discrimination and Intolerance." 2019. *https://www.coe.int/en/web/compass/discrimination-and-intolerance*.

Council of European Municipalities and Regions (CEMR). 2019. "Council of European Municipalities and Regions (CEMR)." 2019. *https://www.ccre.org/*.

Coyle, Diane. 2015. GDP: *A Brief but Affectionate History-Revised and Expanded Edition*. Princeton.

Cutler, David M., Edward L. Glaeser, and Jacob L. Vigdor. 2008. "When Are Ghettos Bad? Lessons from Immigrant Segregation in the United States." *Journal of Urban Economics* 63 (3): 759–74. *https://doi.org/10.1016/j.jue.2007.08.003*.

D

Daams, M. N., F. J. Sijtsma, and P. Veneri. 2019. "Mixed Monetary and Non-Monetary Valuation of Attractive Urban Green Space: A Case Study Using Amsterdam House Prices." *Ecological Economics* 166.

Daams, M. N., F. J. Sijtsma, and A. J. Van der Vlist. 2016. "The Effect of Natural Space on Nearby Property Prices: Accounting for Perceived Attractiveness." *Land Economics* 92 (3): 389–410.

Deininger, Niki, Yasu Lu, Jason Griess, and Robert Santamaria. 2019. "Cities Taking the Lead on the Sustainable Development Goals." Brookings Institution.

Denti, Daria. 2019a. "Coming out of the Woods. Do Neary Support Services Influence the Propensity to Report Sexual Violence?" *Forthcoming*.

———. 2019b. "Looking Aheadin Anger. The Effect of Foreign Migration on Youth Resentment in England." *Forthcoming*.

Denti, Daria, and Alessandra Faggian. 2018. "Where Do Angry Birds Tweets? Mapping the Italian Geography of Hate."

DG MOVE. 2018. "COMMON ACCIDENT DATA SET. Reference Guide. Version 3.7 - November 2018," no. February: 1–134.

DG REGIO. 2015. "Measuring Access to Public Transport in European Cities

- Regional Policy - European Commission." 2015. *https://ec.europa.eu/regional_policy/en/information/publications/working-papers/2015/measuring-access-to-public-transport-in-european-cities*.

———. 2016. *Quality of Life in European Cities* 2015. FLASH EUROBAROMETER 419. Luxembourg: Publications Office of the European Union.

———. 2018. "Population without Green Urban Areas in Their Neighbourhood."

———. 2019. "Public Transport Service Frequency." 2019. *https://ec.europa.eu/regional_policy/mapapps/public_transport/service_frequency.html*.

DG SANTE. n.d. "Overview | Public Health." Accessed December 12, 2019. *https://ec.europa.eu/health/tobacco/overview_en*.

Dijkstra, Lewis, Hugo Poelman, and Linde Ackermans. 2018. "Road Transport Europe Performance In Europe Introducing a New Accessibility Framework [WP 01/2019]." Luxembourg: Publications Office of the European Union.

Dipartimento per gli affari interni e territoriali. 2019. "Amministratori Locali in Carica. Open-Data." 2019. *https://dait.interno.gov.it/elezioni/open-data/amministratori-locali-carica*.

Directorate-General for Environment (European Commission). 2018. "From Waste to Resources. What's in It for You?"

Duflo, Esther, and Abhijit Banerjee. 2011. *Poor Economics: A Radical Rethinking of the Way to Fight Global Poverty.* PublicAffairs

Duncan, O. D., and B. Duncan. 1955. "A Methodological Analysis of Segregation Indexes." *American Sociological Review* 20 (2): 210–17.

Dustmann, C., Fasani, F., Frattini, T., Minale, L., & Schönberg, U. d Uta Schonberg. 2017. "On the Economics and Politics of Refugee Migration." *Economic Policy* 32 (91): 497–550.

E

"E-PRTR." n.d. Accessed November 28, 2019. *https://prtr.eea.europa.eu/#/home*.

EC. 2006. "Directive 2006/7/EC of the European Parliament and of the Council of 15 February 2006 Concerning the Management of Bathing Water Quality and Repealing Directive 76/160/EEC." *Official Journal of the European Union* L 064 (1882): 37–51.

———. 2007. "Regulation No 715/2007 of the European Parliament and of the Council of 20 June 2007 on Type Approval of Motor Vehicles with Respect to Emissions from Light Passenger and Commercial Vehicles (Euro 5 and Euro 6) and on Access to Vehicle Repair and Maintena."

———. 2008a. "Integrated Pollution and Prevention Control Directive (IPPC 2008/1/ EC)."

———. 2008b. "Waste Framework Directive (2008/98/EC)."

———. 2014. "Community-Led Local Development. Cohesion Policy 2014-2020."

———. 2018. “Urban Poverty.” 2018. *https://ec.europa.eu/futurium/en/urban-poverty*.

———. 2019. “EU Budget: Commission Proposes a New Fund to Invest in the Maritime Economy and Support Fishing Communities.” 2019. *https://ec.europa.eu/commission/presscorner/detail/en/IP_18_4104*.

EC, and EEA. n.d. “European Climate Adaptation Platform Climate-ADAPT.” Accessed December 13, 2019. *https://climate-adapt.eea.europa.eu/about*.

Edin, Per Anders, Peter Fredriksson, and Olof Åslund. 2003. “Ethnic Enclaves and the Economic Success of Immigrants — Evidence from a Natural Experiment.” *Quarterly Journal of Economics* 118 (1): 329–57. *https://doi.org/10.1162/00335530360535225*.

EEA. n.d. “Air Quality E-Reporting (AQ e-Reporting).” Accessed December 11, 2019. *https://www.eea.europa.eu/data-and-maps/data/aqereporting-8#tab-figures-produced*.

———. 2014a. “Global and European Temperature.” 2014. *https://www.eea.europa.eu/data-and-maps/indicators/global-and-european-temperature/global-and-european-temperature-assessment-8*.

———. 2014b. “Water Use in Europe — Quantity and Quality Face Big Challenges.” 2014. *https://www.eea.europa.eu/signals/signals-2018-content-list/articles/water-use-in-europe-2014*.

———. 2015a. “European Bathing Water Quality in 2014.” *European Environment Agency Reports*, no. 1: 1–32. *https://doi.org/10.2800/1804*.

———. 2015b. *State of Europe’s Seas*. EEA Report No 2/2015.

———. 2016a. *European Water Policies and Human Health Combining Reported Environmental Information*.

———. 2016b. “River Floods.” 2016. *https://www.eea.europa.eu/data-and-maps/indicators/river-floods-2/assessment*.

———. 2017. “Climate Change, Impacts and Vulnerability in Europe 2016 An Indicator-Based Report.” Luxembourg: Publications Office of the European Union.

———. 2018a. *Air Quality in Europe — 2018 Report*. *https://doi.org/10.2800/777411*.

———. 2018b. “Economic Losses from Climate-Related Extremes in Europe.” 2018. *https://www.eea.europa.eu/data-and-maps/indicators/direct-losses-from-weather-disasters-3/assessment-2*.

———. 2019a. “Europe’s Seas and Coasts.” 2019. *https://www.eea.europa.eu/themes/water/europes-seas-and-coasts*.

———. 2019b. “Waterbase - UWWTD: Urban Waste Water Treatment Directive – Reported Data — European Environment Agency.” 2019. *https://www.eea.europa.eu/data-and-maps/data/waterbase-uwwtd-urban-waste-water-treatment-directive-6#tab-derived-datasets*.

———. 2019c. "Workbook: Agglomerations." 2019. *https://tableau.discomap.eea.europa.eu/t/Wateronline/views/Agglomerations/BigCities?%253Aembed=y&%253AshowShareOptions=true&%253Adisplay_count=no&%253AshowVizHome=no&aggCode=ES13280790001013&:isGuestRedirectFromVizportal=y&:embed=y*.

EEC. 1991. "Council Directive 91/271/EEC of 21 May 1991 Concerning Urban Waste-Water Treatment." 1991. *https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31991L0271*.

EPAL - Empresa Portuguesa das Águas Livres. 2019. "WATER OPTIMIZATION FOR NETWORK EFFICIENCY." 2019. *https://www.epal.pt/EPAL/en/menu/products-and-services/wone*.

ESPAD. 2015. ESPAD *Report 2015*. *https://doi.org/10.2810/86718*.

EU. 2009. "EU Cooperation in Education and Training (ET 2020)." 2009. *https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=LEGISSUM:ef0016*.

———. 2010. "Directive on Industrial Emissions. IED 2010/75/ EU."

EUROCITIES. 2019. "EUROCITIES 2019 Engagement on SDGs."

European Commission. Directorate-General for Economic and Financial Affairs. 2019. *European Economic Forecast : Summer 2019 (Interim)*. Vol. 8014. *https://doi.org/10.2765/725153*.

European Commission/EACEA/Eurydice/Cedefop. 2014. *Tackling Early Leaving from Education and Training in Europe: Strategies, Policies and Measures*. Luxembourg: Publications Office of the European Union.

European Commission/EACEA/Eurydice. 2019. *Key Data on Early Childhood Education and Care in Europe – 2019 Edition. Eurydice Report. Luxembourg: Publications Office of the European Union*. *https://doi.org/10.4324/9781315768700-2*.

European Commission. n.d. "Role of Cities and Regions | Internal Market, Industry, Entrepreneurship and SMEs." Accessed December 6, 2019. *https://ec.europa.eu/growth/industry/policy/digital-transformation/role-cities-regions_en*.

———. 1998. "Drinking Water Directive (98/83/EC)."

———. 2010. "Communication from the Commission Europe 2020 A Strategy for Smart, Sustainable and Inclusive Growth COM(2010) 2020 Final."

———. 2012. "A Blueprint to Safeguard Europe's Water Resources COM(2012)673."

———. 2015. "A European Agenda on Migration. Commission Communication, COM(2015) 240 Final."

———. 2016. "Urban Agenda for the EU 'Pact of Amsterdam.'" Amsterdam, The Netherlands.

———. 2017a. *My Region, My Europe, Our Future. Seventh Report on Economic, Social and Territorial Cohesion*. Edited by Lewis Dijkstra. Luxembourg: Publications Office of the European Union. *https://doi.org/10.2776/176864*.

———. 2017b. “Progress Report on the Implementation of the European Disability Strategy. SWD(2017) 29 Final.”

———. 2017c. “State of the Union 2017 – Industrial Policy Strategy: Investing in a Smart, Innovative and Sustainable Industry | Internal Market, Industry, Entrepreneurship and SMEs.” 2017. *https://ec.europa.eu/growth/content/state-union-2017-–-industrial-policy-strategy-investing-smart-innovative-and-sustainable_en*.

———. 2017d. “Strategic Report 2017 on the Implementation of the European Structural and Investment Funds.” *Com(2017)* 755.

———. 2018a. “A Clean Planet for All. A European Strategic Long-Term Vision for a Prosperous, Modern, Competitive and Climate Neutral Economy. COM(2018) 773 Final.” 2018. *https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52018DC0773&from=EN*.

———. 2018b. “Communication from the Commission to the European Parliament, The Council, The European Economic and Social Committee and The Committee of the Regions a European Strategy for Plastics in a Circular Economy COM/2018/028 Final.” 2018. *https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1516265440535&uri=COM:2018:28:FIN*.

———. 2018c. “Proposal for a Directive of the European Parliament and of the Council on the Quality of Water Intended for Human Consumption (Recast) COM/2017/0753 Final - 2017/0332 (COD).” 2018. *https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52017PC0753&from=EN*.

———. 2018d. “Single Market Scoreboard,” 1–8.

———. 2019a. “Cultural and Creative Cities Monitor | Knowledge for Policy.” 2019. *https://ec.europa.eu/knowledge4policy/online-resource/cultural-creative-cities-monitor_en*.

———. 2019b. “Disaster Risk Management Knowledge Centre (DRMKC) Overview.” 2019. *https://drmkc.jrc.ec.europa.eu/risk-data-hub/*.

———. 2019c. “Education and Training.” 2019. *https://ec.europa.eu/regional_policy/en/policy/themes/education-training/*.

———. 2019d. *Employment and Social Developments in Europe 2019. Sustainable Growth for All: Choices for the Future of Social Europe*.

———. 2019e. “European Disability Strategy 2010-2020 - Employment, Social Affairs & Inclusion [Web Page].” 2019. *https://ec.europa.eu/social/main.jsp?catId=1484&langId=en*.

———. 2019f. “European Policy Cooperation (ET 2020 Framework).” 2019. *https://ec.europa.eu/education/policies/european-policy-cooperation/et2020-framework_en*.

———. 2019g. “Horizon Europe - the next Research and Innovation Framework Programme.” 2019. *https://ec.europa.eu/info/horizon-europe-next-research-and-innovation-framework-programme_en*.

———. 2019h. *Key Figures on Europe* 2011. Europe. *https://doi.org/10.2785/6232*.

———. 2019i. *Reflection Paper - Towards a Sustainable Europe By 2030. COM(2019)22 of 30 January 2019*. European Union. *https://doi.org/10.2775/676251*.

———. 2019j. "The European Green Deal. COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE EUROPEAN COUNCIL, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS (COM(2019) 640 Final COMMUNICATION)."

———. 2019k. "Urban Agenda for the EU." 2019. *https://ec.europa.eu/futurium/en/urban-agenda*.

———. 2019l. "Urban Mobility Package | Mobility and Transport." 2019. *https://ec.europa.eu/transport/themes/clean-transport-urban-transport/urban-mobility/urban-mobility-package_en*.

European Commission against Racism and Intolerance (ECRI). 2018. "COMPILATION OF ECRI'S GENERAL POLICY RECOMMENDATIONS." Strasbourg.

European Committee of the Regions - Commission for European Policy. 2019. *A Territorial Approach for the Implementation of the SDGs in the EU – The Role of the European Committee of the Regions*. Edited by François Levarlet, Michele Alessandrini, and Pietro Celotti. European Union. *https://doi.org/10.2863/11396*.

European Communities / OECD. 2008. Eurostat-OECD Manual on Business Demography Statistics. *Eurostat-OECD Manual on Business Demography Statistics*. Luxembourg: office for official publications of the European Communities. *https://doi.org/10.1787/9789264041882-en*.

European Innovation Partnerships (EIP). 2019. "EIP Water." 2019. *https://www.eip-water.eu/*.

European Institute for Gender Equality. 2014. *Estimating Estimating the the Costs Costs of of Violence Violence in in the the European European Union Union Report Report*. *https://doi.org/10.2839/79629*.

European Parliament. 2000. "DIRECTIVE 2000/60/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 October 2000 Establishing a Framework for Community Action in the Field of Water Policy THE," 35-.

———. 2018. "The Role of EU Regions and Cities in Implementing the COP 21 Paris Agreement on Climate Change [P8_TA(2018)0068]."

European Union. 2012. "Treaty on European Union and the Treaty on the Functioning of the European Union (Official Journal C 326 , 26/10/2012 P. 0001 - 0390)." *Official Journal C 326 , 26/10/2012 P. 0001 - 0390*;

———. 2016. "Council Recommendation of 19 December 2016 on Upskilling Pathways: New Opportunities for Adults."

———. 2019. "Public Tendering Rules in the EU - Your Europe." 2019. *https://*

europa.eu/youreurope/business/selling-in-eu/public-contracts/public-tendering-rules/index_en.htm.

European Union Agency for Fundamental Rights. 2019. *Implementing the Sustainable Development Goals in the EU: A Matter of Human and Fundamental Rights*. Luxembourg: Publications Office of the European Union. *https://doi.org/10.2811/624376*.

European Union, and UN-Habitat. 2016. "The State of European Cities Report - Regional Policy - European Commission." Luxembourg. *https://doi.org/10.2776/770065*.

Eurostat. 2016. "Urban Europe. Statistics on Cities, Towns and Suburbs." Publications office of the European Union Luxembourg.

EUROSTAT. n.d. "Glossary: Body Mass Index (BMI)." Accessed December 13, 2019. *https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Body_mass_index_(BMI)*.

———. n.d. "Glossary: Utilised Agricultural Area (UAA)." *https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Utilised_agricultural_area_(UAA)*.

———. 2013a. "Agri-Environmental Indicator - Risk of Land Abandonment." 2013. *https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Archive:Agri-environmental_indicator_-_risk_of_land_abandonment&oldid=190872*.

———. 2013b. *Household Composition, Poverty and Hardship across Europe*.

———. 2014a. *Living Conditions in Europe*. Luxembourg: Publications Office of the European Union.

———. 2014b. "Tobacco Consumption Statistics." 2014. *https://ec.europa.eu/eurostat/statistics-explained/index.php/Tobacco_consumption_statistics*.

———. 2014c. "Working Paper with the Description of the 'Income and Living Conditions Dataset,'" no. 10602.

———. 2015. "Overweight and Obesity - BMI Statistics." 2015. *https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Overweight_and_obesity_-_BMI_statistics*.

———. 2017a. *Methodological Manual on City Statistics, 2017 Edition*. *https://doi.org/10.2785/765198*.

———. 2017b. "Small Area Estimation (SAE) for City Statistics: Part I."

———. 2017c. *Sustainable Development in the European Union - Monitoring Report on Progress towards the SDGs in an EU Context*. *https://doi.org/10.2785/237722*.

———. 2017d. "Water Statistics - Statistics Explained." 2017. *https://ec.europa.eu/eurostat/statistics-explained/index.php/Water_statistics#Water_uses*.

———. 2018a. *Living Conditions in Europe*.

———. 2018b. "Methodological Manual on Territorial Typologies. 2018 Edition.," 132. *https://doi.org/10.2785/930137*.

———. 2019a. "Adult Learning Statistics." 2019. *https://ec.europa.eu/eurostat/statistics-explained/index.php/Adult_learning_statistics#Providers_of_non-formal_education_and_training_activities*.

———. 2019b. "Assessing Sustainable Development in the European Union. Monitoring Report on Progress towards the SDGs in an EU Context. 2019 Edition." Edited by Simon Johannes Bley. Luxembourg: Publications Office of the European Union. *https://doi.org/10.9774/gleaf.3062.2001.wi.00007*.

———. 2019c. "Educational Attainment Statistics." 2019. *https://ec.europa.eu/eurostat/statistics-explained/index.php/Educational_attainment_statistics#Level_of_educational_attainment_by_age*.

———. 2019d. "Electricity and Heat Statistics." 2019. *https://ec.europa.eu/eurostat/statistics-explained/index.php/Electricity_and_heat_statistics#Consumption_of_electricity_and_derived_heat*.

———. 2019e. "Eurostat Regional Yearbook 2019 Edition."

———. 2019f. "Local Administrative Units (LAU) - Eurostat." 2019. *https://ec.europa.eu/eurostat/web/nuts/local-administrative-units*.

———. 2019g. "Precarious Employment by Sex, Age and NACE Rev. 1.1 Activity."

———. 2019h. "Road Accident Fatalities - Statistics by Type of Vehicle." 2019. *https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Road_accident_fatalities_-_statistics_by_type_of_vehicle*.

Euskadi Basque Country. 2017. I *Agenda Euskadi Basque Country 2030 Monitoring Report* 2017.

———. 2018. 2nd *Monitoring Report. Agenda Euskadi Basque Country 2030*.

F

FARNET. 2016. "FARNET: The European Fisheries Areas Network | FARNET." 2016. *https://webgate.ec.europa.eu/fpfis/cms/farnet2/about/at-a-glance/farnet_en*.

Fishkin, James S., Robert C. Luskin, and Alice Siu. 2014. "Europolis and the European Public Sphere: Empirical Explorations of a Counterfactual Ideal." *European Union Politics* 15 (3): 328–51. *https://doi.org/10.1177/1465116514531507*.

Florczyk, A J, M Melchiorri, C Corbane, M Schiavina, M Maffenini, M Pesaresi, P Politis, et al. 2019. *Description of the GHS Urban Centre Database 2015, Public Release 2019, Version 1.0*. Luxembourg: Publications Office of the European Union. *https://doi.org/10.2760/037310*.

FRA. 2017a. *Second European Union Minorities and Discrimination Survey (EU-MIDIS II): Main Results*. *https://doi.org/10.2811/902610*.

———. 2017b. "Together in the EU. Promoting the Participation of Migrants

and Their Descendants." *Luxembourg: Publications Office of the European Union*. *https://doi.org/10.2811/80928*.

Fratesi, Ugo, Marco Percoco, and Paola Proietti. 2019. "Who Welcomes Them? Determinants of the Spatial Distribution of Asylum Seekers in Italy." *Regional Studies* 53 (1): 118–30. *https://doi.org/10.1080/00343404.2018.1525487*.

Fuller, R. A., and K. J. Gaston. 2009. "The Scaling of Green Space Coverage in European Cities." *Biology Letters* 5 (3): 352–55.

Fuller, R.A., K.N. Irvine, P. Devine-Wright, P.H. Warren, and Gaston K.J. 2007. "Psychological Benefits of Green Space Increase with Biodiversity." *Biology Letters*.

Fung, Archon, and Mark E. Warren. 2011. "The Participedia Project: An *Introduction." International Public Management Journal* 14 (3): 341–62. *https://doi.org/10.1080/10967494.2011.618309*.

G

Gawlik, B.M., P. Easton, S. Koop, K. Van Leeuwen, and R. Elelman, eds. 2017. *Urban Water Atlas For Europe. Luxembourg. Luxembourg*: Publications Office of the European Union. *https://doi.org/10.2788/114518*.

Giles-Corti, Billie, Anne Vernez-Moudon, Rodrigo Reis, Gavin Turrell, Andrew L. Dannenberg, Hannah Badland, Sarah Foster, et al. 2016. "City Planning and Population Health: A Global Challenge." *The Lancet* 388 (10062): 2912–24. *https://doi.org/10.1016/S0140-6736(16)30066-6*.

Gini, Corrado. 1912. *Variabilità e Mutabilità*. Rome: Libreria Eredi Virgilio Veschi.

Giuliano, Paola, and Nathan Nunn. 2013. "The Transmission of Democracy: From the Village to the Nation-State." National Bureau of Economic Research.

Glaeser, Edward L., Matt Resseger, and Kristina Tobio. 2009. "Inequality in Cities." *Journal of Regional Science* 49 (4): 617–46. *https://doi.org/10.1111/j.1467-9787.2009.00627.x*.

Glaeser, Edward L., et al. *What is social capital? The determinants of trust and trustworthiness*. No. w7216. National bureau of economic research, 1999.

Global Covenant of Mayors. 2018. "Global Covenant of Mayors Common Reporting Framework," 1–36.

Global Task Force of Local and Regional Governments. 2016. "Roadmap for localizing the SDGs: implementation and monitoring at subnational level," 44.

———. 2018. "Towards the Localization of the SDGs. Local and Regional Governments' Report to the 2018 HLPF."

Gomez-Salvador, Ramon, Alberto Musso, Marc Stocker, and Jarkko Turunen. 2006. "Labour Productivity Developments in the Euro Area." ECB Occasional Paper.

Gonzalez Aparicio, Iratxe, Thomas Huld, Francesco Careri, Fabio Monforti, and Andreas Zucker. 2017. *EMHIRES Dataset - Part II: Solar Power Generation.*

European Meteorological Derived HIgh Resolution RES Generation Time Series for Present and Future Scenarios. Part II: PV Generation Using the PVGIS Model. *https://doi.org/10.2760/044693*.

Guerra, Gerardo, and Daniel John Zizzo. 2004. "Trust Responsiveness and Beliefs." *Journal of Economic Behavior and Organization* 55 (1): 25–30. *https://doi.org/10.1016/j.jebo.2003.03.003*.

Guiso, L., Sapienza, P., & Zingales, L. 2004. "The Role of Social Capital in Financial Development." *American Economic Review* 94 (3): 526–56.

H

Hallenatte, Stephane, Adrien Vong-Schilb, Mook Bangalore, and Julie Rozenberg. 2017. "Unbreakable. Building the Resilience of the Poor in the Face of Natural Disasters." Wold Bank Group.

Helliwell, John F. 2001. "Social Capital, the Economy and Well-Being." *The Review of Economic Performance and Social Progress* 1: 43–60.

Herck, Bart Van, Valentijn Vanoeteren, and Katrin Janssen. 2019. "Local Indicators for the 2030 Agenda (Sustainable Development Goals)." Brussels: VVSG vzw (Association of Flemish Cities and Municipalities).

Hooghe, Marc. 2018. "Trust and Elections." In *The Oxford Handbook of Social and Political Trust*.

Housing Europe. 2019. "The State of Housing in the EU 2019."

I

IEA. 2016. *Energy Technology Perspectives* 2016. Paris: IEA.

IHME. 2013. *The Global Burden of Disease: Generating Evidence, Guiding Policy – European Union and European Free Trade Association Regional Edition*.

ILO. 2019. Time to Act for SDG 8: *Integrating Decent Work, Sustained Growth and Environmental Integrity*. Geneva: International Labour Office.

IPCC. 2006. 2006 IPCC *Guidelines for National Greenhouse Gas Inventories*. Edited by Simon Eggelston, Leandro Buendia, Kyoko Miwa, Todd Ngara, and Kiyoto Tanabe.

———. 2018. "Summary for Policymakers." In *Global Warming of 1.5°C. An IPCC Special Report on the Impacts of Global Warming of 1.5°C above Pre-Industrial Levels and Related*, edited by V. Masson-Delmotte, P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, et al., 1–21.

Ivanova, Diana, Gibran Vita, Kjartan Steen-Olsen, Konstantin Stadler, Patricia C Melo, Richard Wood, and Edgar G Hertwich. 2017. "Mapping the Carbon Footprint of EU Regions." *Environmental Research Letters* 12 (5): 54013.

J

Jacobs-Crisioni, Chris, and Eric Koomen. 2017. "Population Growth, Accessibility Spillovers and Persistent Borders: Historical Growth in West-European

Municipalities." *Journal of Transport Geography* 62 (May): 80–91. *https://doi.org/10.1016/j.jtrangeo.2017.05.008*.

James D. Wright, Joel A. Devine. 1992. "Counting the Homeless: The Census Bureau's 'S-Night' in Five U.S. Cities." *Evaluation Review* 16 (4): 355–64.

Joint Research Centre. 2019. *Migration in EU Rural Areas*. *https://doi.org/10.2760/544298*.

JRC. 2019a. "Cultural and Creative Cities Monitor." 2019. https://composite-indicators.jrc.ec.europa.eu/cultural-creative-cities-monitor/.

———. 2019b. "STRAT-Board: Territorial and Urban Strategies Dashboard." 2019. *https://urban.jrc.ec.europa.eu/strat-board/#/where*.

K

Kerr, William R. 2014. "Income Inequality and Social Preferences for Redistribution and Compensation Differentials." *Journal of Monetary Economics* 66: 62–78. *https://doi.org/10.1016/j.jmoneco.2014.03.002*.

Kish, L. 1991. "A Taxonomy of Elusive Populations." *Journal of Official Statistics* 7 (3): 339–347. *https://doi.org/10.1111/j.0081-1750.2004.00152.x*.

Kiss, Monika. 2017. "Digital Skills in the EU Labour Market." *https://doi.org/10.2861/451320*.

Knack, Paul J. Zak and Stephen. 2001. "Trust and growth." The *Economic Journal*, 1, 295–321.

Knack, S. 2001. "Trust, Assocational Life, and Economic Performance."

Kompil, Mert, Jean-Philippe Aurambout, Ricardo Ribeiro Barranco, Ana Barbosa, Chris Jacobs-Crisioni, Enrico Pisoni, Grazia Zulia, et al. 2015. *European Cities: Territorial Analysis of Characteristics and Trends. An Application of the LUISA Modelling Platform (EU Reference Scenario 2013 - Updated Configuration 2014*). European Union. *https://doi.org/10.2788/737963*.

Kopels, S., & Paceley, M. S. 2012. "Reducing Bullying toward LGBTQ Youths in Schools." *School Social Work Journal* 37 (1): 96–111.

Kraay, Aart, and David McKenzie. 2014. "Do Poverty Traps Exist? Assessing the Evidence." *Journal of Economic Perspectives* 28 (3): 127–48. https://doi.org/10.1257/jep.28.3.127.

L

Lafortune, Guillaume, and Kees Zoeteman. 2019. "2019 SDG Index and Dashboards Report. European Cities. Prototype."

Leeuwen, Cornelis J. van, Jos Frijns, Annemarie van Wezel, and Frans H.M. van de Ven. 2012. "City Blueprints: 24 Indicators to Assess the Sustainability of the Urban Water Cycle." *Water Resources Management* 26 (8): 2177–97. *https://doi.org/10.1007/s11269-012-0009-1*.

Lefebvre, Antoine, Pierre Antoine Picand, and Christophe Sannier. 2015. "Mapping Tree Cover in European Cities: Comparison of Classification Algorithms

for an Operational Production Framework." 2015 *Joint Urban Remote Sensing Event*, JURSE 2015, no. June. *https://doi.org/10.1109/JURSE.2015.7120511*.

Levitt, Peggy. 1998. "Social Remittances: Migration Driven Local-Level Forms of Cultural Diffusion." *International Migration Review* 32 (4): 926–48.

Lewis, E., and G. Peri. 2015. "Immigration and the Economy of Cities and Regions." *Handbook of Regional and Urban Economics* 5: 625–85.

Liedekerke, Marc Van, Gundula Prokop, Sabine Rabl-berger, and Mark Kibblewhite. 2014. "Progress in the Management of Contaminated Sites in Europe." *https://doi.org/10.2788/4658*.

Lindstedt, Catharina, and Daniel Naurin. 2010. "Transparency Is Not Enough: Making Transparency Effective in Reducing Corruption." *International Political Science Review* 31 (3): 301–22. *https://doi.org/10.1177/0192512110377602*.

Lloyd, D., S. Newell, and U. C Dietrich. 2004. "Health Inequity: A Review of the Literature." *Sallie Newell*. Lismore, NSW.

Lunaria. 2019a. "Words Are Stones." *http://www.cronachediordinariorazzismo.org/international-report*

———. 2019b. "Words That Hurt." *https://doi.org/10.1016/S0140-6736(65)91925-2*.

Lung, Tobias, Carlo Lavalle, Roland Hiederer, Alessandro Dosio, and Laurens M. Bouwer. 2013. "A Multi-Hazard Regional Level Impact Assessment for Europe Combining Indicators of Climatic and Non-Climatic Change." *Global Environmental Change* 23 (2): 522–36. *https://doi.org/10.1016/j.gloenvcha.2012.11.009*.

M

Mainzer, Kai, Karoline Fath, Russell Mckenna, Julian Stengel, Wolf Fichtner, and Frank Schultmann. 2014. "A High-Resolution Determination of the Technical Potential for Residential-Roof-Mounted Photovoltaic Systems in Germany." *Solar Energy* 105 (July): 715–31. *https://doi.org/10.1016/j.solener.2014.04.015*.

Majcen, D., L. C.M. Itard, and H. Visscher. 2013. "Theoretical vs. Actual Energy Consumption of Labelled Dwellings in the Netherlands: Discrepancies and Policy Implications." *Energy Policy* 54 (March): 125–36. *https://doi.org/10.1016/j.enpol.2012.11.008*.

Maria-José Aldanas, Sarah Coupechoux, Manuel Domergue, Ruth Owen, Freek Spinnewijn, and Marc Uhry. 2017. "Second Overview of Housing Exclusion in Europe 2017," 1–67.

Mashhoodi, Bardia, Dominic Stead, and Arjan van Timmeren. 2019. "Local and National Determinants of Household Energy Consumption in the Netherlands." *GeoJournal*, January. *https://doi.org/10.1007/s10708-018-09967-9*.

Massey, Douglas S. 2012. "Reflections on the Dimensions of Segregation." *Social Forces* 91 (1): 39–43. *https://doi.org/10.1093/sf/sos118*.

McGranahan, Gordon, Daniel Schensul, and Gayatri Singh. 2016. "Inclusive Ur-

banization: Can the 2030 Agenda Be Delivered without It?" *Environment and Urbanization* 28 (1): 13–34. *https://doi.org/10.1177/0956247815627522*.

Mirabella, Nadia, Karen Allacker, and Serenella Sala. 2019. "Current Trends and Limitations of Life Cycle Assessment Applied to the Urban Scale: Critical Analysis and Review of Selected Literature." *International Journal of Life Cycle Assessment* 24 (7): 1174–93. *https://doi.org/10.1007/s11367-018-1467-3*.

Mitchell, Don. 1961. *The Right to the City*.

Montalto, V., C. J. Tacao Moura, V. Alberti, F. Panella, and M. Saisana. 2019. *The Cultural and Creative Cities Monitor: 2019 Edition*. Luxembourg: Publications Office of the European Union. *https://doi.org/10.2760/58643*.

Montenegro Navarro, Naomi, and Jan Jonker. 2018. "Circular City Governance - An Explorative Research Study into Current Barriers and Governance Practices in Circular City Transitions in Europe," no. April.

Moran, Daniel, Keiichiro Kanemoto, Magnus Jiborn, Richard Wood, Johannes Tobben, and Karen C Seto. 2018. "Carbon Footprints of 13 000 Cities." *Environmental Research Letters* 13 (6): 064041. *https://doi.org/10.1088/1748-9326/aac72a*.

Morris, Jonathan, David Allinson, John Harrison, and Kevin J. Lomas. 2016. "Benchmarking and Tracking Domestic Gas and Electricity Consumption at the Local Authority Level." *Energy Efficiency* 9 (3): 723–43. *https://doi.org/10.1007/s12053-015-9393-8*.

Munroe, Darla K, Derek B van Berkel, Peter H Verburg, and Jeffrey L Olson. 2013. "Alternative Trajectories of Land Abandonment: Causes, Consequences and Research Challenges." *Current Opinion in Environmental Sustainability* 5 (5): 471–76.

Musterd, Sako. 2005. "Social and Ethnic Segregation in Europe: Levels, Causes, and Effects." *Journal of Urban Affairs* 27 (3): 331–48. *https://doi.org/10.1111/j.0735-2166.2005.00239.x*.

N

Nannicini, Tommaso, Andrea Stella, Guido Tabellini, and Ugo Troiano. 2013. "Social Capital and Political Accountability." *American Economic Journal: Economic Policy* 5 (2): 222–50. *https://doi.org/10.1257/pol.5.2.222*.

Natale, Fabrizio, Marco Scipioni, and Alfredo Alessandrini. 2018. "Spatial Segregation of Migrants in EU Cities." In *Divided Cities*, edited by OECD, OECD, 75–110.

National Food Agency. n.d. "National Food Agency." Accessed December 13, 2019. *https://www.livsmedelsverket.se/en/?AspxAutoDetectCookieSupport=1*.

National Health Service. 2015. "Health and Wellbeing of 15-Year-Olds in England - Main Findings from the What About YOUth? Survey 2014 - NHS Digital." Health and Wellbeing of 15-Year-Olds in England. 2015. *https://digital.nhs.uk/data-and-information/publications/statistical/health-and-wellbeing-of-15-year-olds-in-england/main-findings---2014*.

National Institute for Health and Welfare – Finland. 2019. "School Health Survey Results 2019." 2019. *https://thl.fi/fi/web/lapset-nuoret-ja-perheet/-/kuntakohtaiset-kouluterveyskyselyn-tulokset-ovat-saatavissa?redirect=https%3A%2F%2Fthl.fi%2Ffi%2Fweb%2Flapset-nuoret-ja-perheet%2Ftutkimustuloksia%3Fp_p_id%3D101_INSTANCE_uVR16xxUhcjy%26p_p_lifecycle%3D0%26*.

Niven, James, Alessandra Faggian, and Kanchana N. Ruwanpura. 2013. "Exploring 'Underachievement' Among Highly Educated Young British-Bangladeshi Women." *Feminist Economics* 19 (1): 111–36. *https://doi.org/10.1080/13545701.2012.748985*.

Norlén, H., E. Papadimitriou, and L. Dijkstra. 2019. *The Regional Gender Equality Monitor*. Luxemburg: Publications Office of the European Union. *https://doi.org/10.2760/472693*.

O

Observatori Metropolità de l'Habitatge de Barcelona. 2018. "L'habitatge a La Metrópoli de Barcelona 2018. Sistema d'indicadors," 55.

———. 2019. "La Oferta y La Demanda de Alquileres En El Área Metropolitana."

OECD. 2013. *OECD Regions at a Glance* 2013. *Oecd*. *https://doi.org/10.1787/reg_glance-2013-en*.

———. 2016a. "Making Cities Work for All. Data and Actions for Inclusive Growth." *OECD Publishing. Paris*. *https://doi.org/10.1787/9789264263260-en*.

———. 2016b. *Preventing Corruption in Public Procurement*.

———. 2018a. *A Broken Social Elevator? How to Promote Social Mobility. A Broken Social Elevator? How to Promote Social Mobility*. *https://doi.org/10.1787/9789264301085-en*.

———. 2018b. Divided Cities - *Understanding Intra-Urban Inequalities*. Paris: Organization for Economic Cooperation and Development.

———. 2018c. *OECD Regions and Cities at a Glance* 2018.

———. 2018d. *Working Together for Local Integration of Migrants and Refugees. Working Together for Local Integration of Migrants and Refugees*. Paris: OECD Publishing. *https://doi.org/10.1787/ca4d491e-en*.

———. 2019. *Under Pressure: The Squeezed Middle Class - Overview and Findings*.

Official Journal of the European Union. n.d. "Consolidated Versions of the Treaty on European Union and the Treaty on the Functioning of the European Union." *https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:12012E/TXT*.

Oosterhof, Pytrik Dieuwke. 2018. "Localizing the SDGs to Accelerate Implementation of the 2030 Agenda." *Asian Development Bank*, no. 33.

OSCE - ODIHR. 2019. “What Is Hate Crime.” 2019. *http://hatecrime.osce.org/what-hate-crime*.

Oslo. 2019. “Reopening Waterways - Best Practices - Oslo Kommune.” 2019. *https://www.oslo.kommune.no/politics-and-administration/green-oslo/best-practices/reopening-waterways/*.

P

Paceley, Megan S., and Karen Flynn. 2012. “Media Representations of Bullying Toward Queer Youth: Gender, Race, and Age Discrepancies.” *Journal of LGBT Youth* 9 (4): 340–56. *https://doi.org/10.1080/19361653.2012.714187*.

Perpiña Castillo, C., B. Kavalov, V. Diogo, C. Jacobs-Crisioni, F. Batista e Silva, and C. Lavalle. 2018. “Agricultural Land Abandonment in the EU within 2015-2030. JRC113718.” European Commission.

Persson, T., & Tabellini, G. 1994. “Is Inequality Harmful for Growth?” *The American Economic Review*, 600–621.

Pesaresi, Martino, Melchiorri Michele, Siragusa Alice, and Kemper Thomas. 2016. *Atlas of the Human Planet Mapping Human Edited By*. Edited by Martino Pesaresi, Melchiorri Michele, Siragusa Alice, and Kemper Thomas. *https://doi.org/10.2788/889483*.

Petty, James. 2016. “The London Spikes Controversy: Homelessness, Urban Securitisation and the Question of ‘Hostile Architecture.’” *International Journal for Crime, Justice and Social Democracy* 5 (1): 67–81. *https://doi.org/10.5204/ijcjsd.v5i1.286*.

Piga, G., and T. Tatrai. 2016. *Public Procurement Policy*.

Pirastu, Roberta, Pietro Comba, Ivano Iavarone, Amerigo Zona, Susanna Conti, Giada Minelli, Valerio Manno, et al. 2014. “Environment and Health in Contaminated Sites: The Case of Taranto, Italy.” *Journal Of Environmental and Public Health*.

Poelman, Hugo. 2018. “A Walk to the Park? Assessing Access to Green Areas in Europe’s Cities. Update Using Completed Copernicus Urban Atlas Data.” *European Commision Regional and Urban Policy*.

Poelman, Hugo, and Lewis Dijkstra. 2015. “Measuring Access to Public Transport in European Cities.” *Regional Working Paper* 2015 wp01/2015: 1–20.

Poljanšek, K., M. Marin Ferrer, T. De Groeve, and I. Clark, eds. 2017. *Science for Disaster Risk Management 2017: Knowing Better and Losing Less*. Luxembourg: Publications Office of the European Union,. *https://doi.org/10.2788/842809*.

Portes, Alejandro. 1998. “Social Capital: Its Origins and Applications in Modern Sociology.” *Annual Review of Sociology* 24 (1): 1–24. *https://doi.org/10.1146/annurev.soc.24.1.1*.

PRISM Project. 2015. “Hate Crime and Hate Speech in Europe: Comprehensive Analysis of International Law Principles, EU-Wide Study and National Assessments.”

Profeta, Paola, and Eleanor Woodhouse. 2018. "Do Electoral Rules Matter for Female Representation ?," no. June.

Proietti, Paola. 2014. "Segregazione Etnica e Criminalita' in Italia." *Mondi Migranti*.

Proietti, Paola, and Paolo Veneri. 2019. "The Location of Hosted Asylum Seekers in OECD Regions and Cities." *Journal of Refugee Studies*. *https://doi.org/10.1093/jrs/fez001*.

Public Health England. n.d. "Percentage of Adults (Aged 18+) Classified as Overweight or Obese." Accessed December 13, 2019. *https://fingertips.phe.org.uk/search/adult overweight#page/3/gid/1/pat/6/par/E12000004/ati/201/are/E06000015/iid/93088/age/168/sex/4*.

———. 2017. "The Wellbeing of 15 Year-Olds: Further Analysis of the 2014 What About YOUth? Survey."

R

Reardon, S. F., and D. O'Sullivan. 2004. "Measures of Spatial Segregation." *Sociological Methodology* 34 (1): 121–62.

Reardon, Sean F., and Glenn Firebaugh. 2002. "Measures of Multigroup Segregation." *Sociological Methodology* 32: 33–67. https://doi.org/10.1111/1467-9531.00110.

Robinson, Joseph P., and Dorothy L. Espelage. 2012. "Bullying Explains Only Part of LGBTQ-Heterosexual Risk Disparities: Implications for Policy and Practice." *Educational Researcher* 41 (8): 309–19. *https://doi.org/10.3102/0013189X12457023*.

Rothstein, Bo, Nicholas Charron, and Victor Lapuente. 2013. *Quality of Government and Corruption from a European Perspective: A Comparative Study on the Quality of Government in EU Regions*. Edward Elg.

Rouse, J. W., R. H. Haas, J. A. Schell, and D. W. Deering. 1973. "Monitoring Vegetation Systems in the Great Plains with ERTS, Third." ERTS Symposium, NASA SP-351 I. 1973.

S

Sabo, Filip, Christina Corbane, Panagiotis Politis, and Thomas Kemper. 2019. *The European Settlement Map 2019 Release*. Luxembourg: Publications Office of the European Union. *https://doi.org/10.2760/41305*.

Sachs, J., G. Schmidt-Traub, C. Kroll, G. Lafortune, and G. Fuller. 2019. "Sustainable Development Report 2019." New York.

Salvi Del Pero, Angelica, Willem Adema, and Valeria Ferraro. 2016. "Policies To Promote Access To Good-Quality Affordable Housing." OECD Social, *Employment and Migration Working Papers*.

Sánchez de Madariaga, Inés, Javier García López, and Rafaele Sisto. 2018. *Los Objetivos de Desarrollo Sostenible En 100 Ciudades Españolas*. Madrid: Red

Española para el Desarrollo Sostenible (REDS).

Sant'Egidio. n.d. "Where: The Guides." *https://www.santegidio.org/pageID/30144/langID/en/Where-the-Guides.html*.

Schelling, T. C. 1971. "Dynamic Models of Segregation." *Journal of Methematical Sociology* 1 (2).

Schiavina, Marcello, Michele Melchiorri, Christina Corbane, Aneta J Florczyk, Sergio Freire, Martino Pesaresi, and Thomas Kemper. 2019. "Multi-Scale Estimation of Land Use Efficiency (SDG 11.3.1) across 25 Years Using Global Open and Free Data." *Sustainability* 11 (5674): 1–25. *https://doi.org/10.3390/su11205674*.

Seymour Sudman, Monroe G. Sirken, Charles D. Cowan. 1988. "Sampling Rare and Elusive Population." *Science* 240 (4855): 991–96.

Smith, G. 2009. *Democratic Innovations: Designing Institutions for Citizen Participatio*n. Cambridge University Press

Søren, K., and C. Jo. 2010. "The Prevalence of Overweight and Obesity among Danish School Children." *Obesity Reviews* 11 (7): 489–91. *https://doi.org/10.1111/j.1467-789X.2010.00732.x*.

Spada, P., Copello, K., Allegretti, G. Secchi, M., Cordeiro, L. and Fonseca, V. 2018. "EMPATIA. Enabling Multichannel Participipation through ICT Adaptations. Final Report."

Storcksdieck, Stefan, Sandra Caldeira, Charmaine Gauci, Antoinette Calleja, and Artur Furtado. 2017. "Public Procurement : A Policy Tool to Promote Healthier Food Environments and Choices towards healthier environments : the role of food product," 649–54.

Sundström, Aksel, and Lena Wängnerud. 2014. "Corruption as an Obstacle to Women's Political Representation: Evidence from Local Councils in 18 European Countries." *Party Politics* 22 (3): 354–69. *https://doi.org/10.1177/1354068814549339*.

T

The City of New York. 2018. "Voluntary Local Review: New York City's Implementation of the 2030 Agenda for Sustainable Development." *Voluntary Local Review: New York City's Implementation of the 2030 Agenda for Sustainable Development*. New York.

———. 2019. "Voluntary Local Review 2019: New York City's Implementation of the 2030 Agenda for Sustainable Development."

The Housing Partnership. 2018. "The Housing Partnership Action Plan."

The Nobel Peace Prize. 2012. *https://www.nobelprize.org/prizes/peace/2012/summary/* "

The World Bank. 2014. "Migrants' Remittances from Italy. International Remittances and Access to Financial Services for Migrants in Turin, Italy A Greenback 2.0 Report."

Tintori, Guido, Alfredo Alessandrini, and Fabrizio Natale. 2018. *Diversity, Residential Segregation, Concentration of Migrants: A Comparison across EU Cities. Findings from the Data Challenge on Integration of Migrants in Cities (D4I). JRC Technical Reports*.

Toomey, Russell B., Caitlin Ryan, Rafael M. Diaz, Noel A. Card, and Stephen T. Russell. 2010. "Gender-Nonconforming Lesbian, Gay, Bisexual, and Transgender Youth: School Victimization and Young Adult Psychosocial Adjustment." *Developmental Psychology* 46 (6): 1580–89. *https://doi.org/10.1037/a0020705*.

U

UN-Habitat. 2018a. "Developing Public Space and Land Values in Cities and Neighbourhoods."

———. 2018b. *Metadata on SDGs Indicator* 11.2.1. Nairobi: United Nations Human Settlement Programme (UN-Habitat).

———. 2018c. *Metadata on SDGs Indicator* 11.7.1. Nairobi: United Nations Human Settlement Programme (UN-Habitat).

———. 2018d. SDG *Indicator 11.1.1 Training Module: Adequate Housing and Slum Upgrading*. Nairobi: United Nations Human Settlement Programme (UN-Habitat).

———. 2018e. SDG *Indicator 11.3.1 Training Module: Land Use Efficiency*. Nairobi: United Nations Human Settlement Programme (UN-Habitat).

———. 2018f. "Urban Resilience Hub." 2018. *http://urbanresiliencehub.org/*.

UN Development Group. 2014. *Localizing the Post-2015 Developmet Agenda: Dialogues on Implementation*. New York.

UNDESA. 2013. "Adolescent Fertility since the International Conference on Population and Development (ICPD) in Cairo." *Economic & Social Affairs*, 2–21. https://doi.org/ST/ESA/SER.A/337.

UNDESA 2018. *Handbook for the Preparation of Voluntary National Reviews. The 2019 Edition*. New York: United Nations.

———. 2019. *Disability and Development Report 2018. Realizing the Sustainable Development Goals by, for and with Persons with Disabilities*. *https://doi.org/10.18356/a0b1b1d1-en*.

UNDSD, and UNDESA. 2018. "Handbook for the Preparation of Voluntary National Reviews. The 2018 Edition." New York.

UNECE. 2006. "Guidelines on Social Housing. Principles and Examples." *Update*. Geneve.

———. 2015. "Handbook on Measuring Quality of Employment A Statistical Framework."

UNESCO Institute of Statistics. 2019. *SDG 4 Data Book. GLOBAL EDUCATION INDICATORS 2019*.

UNISDR. 2015. "Sendai Framework for Disaster Risk Reduction 2015 - 2030."

Office for Disaster Risk Reduction.

———. 2017a. “Technical Guidance for Monitoring and Reporting on Progress in Achieving the Global Targets of the Sendai Framework for Disaster Risk Reduction Collection of Technical Notes on Data and Methodology,” no. December.

———. 2017b. “The TEN Essentials for Making Cities Resilient - Toolkit - Beta Version: Campaign.” 2017. *https://www.unisdr.org/campaign/resilientcities/toolkit/article/the-ten-essentials-for-making-cities-resilient*.

United Nation General Assembly. 1994. “Fundamental Principles of Official Statistics.” *Official Records of the Economic and Social Council*.

———. 2019. “‘Gearing up for a Decade of Action and Delivery for Sustainable Development’. Resolution Adopted by the General Assembly on 15 October 2019 [without Reference to a Main Committee (A/74/L.2)].”

United Nations. 1995. *Report of the International Conference on Population and Development. A/CONF.171/13/Rev.1. Ageing International*. New York.

———. 2000. “United Nations Millennium Declaration: Resolution Adapted by the General Assembly A/RES/55/2.” *General Assembly*, no. September: 9.

———. 2006. “Convention on the Rights of Persons with Disabilities [A/RES/61/106].” 2006. *https://www.un.org/development/desa/disabilities/resources/general-assembly/convention-on-the-rights-of-persons-with-disabilities-ares61106.html*.

———. 2015a. “Addis Ababa Action Agenda of the Third International Conference on Financing for Development.” *Conference Report* 53 (9): 1689–99. *https://doi.org/10.1017/CBO9781107415324.004*.

———. 2015b. “Social Housing in the UNECE Region,” 168.

———. 2015c. *Transforming Our World: The 2030 Agenda for Sustainable Development. A/RES/70/1*.

———. 2016. “New Urban Agenda. Resolution Adopted by the General Assembly on 23 December 2016 A/RES/71/256.”

———. 2019. “Local 2030.” 2019. *https://sustainabledevelopment.un.org/hlpf/2019/local2030*.

———. 2019b. *The Sustainable Development Goals Report 2019. New York: United Nations Publications*.

United Nations Development Group. 2016. *Guidelines To Support Country Reporting on the Sustainable Development Goals*.

Urban LEDS. 2019. “Urban LEDS.” 2019. *https://urban-leds.org/?id=107*.

Urban Poverty Partnership (UPP). 2018. “Urban Poverty Partnership Final Action Plan.” Brussels.

Urban Water Agenda 2030. 2019. “Urban Water Agenda 2030.” 2019. *https://urbanwateragenda2030.eu/home/*.

V

Vandecasteele, I., Baranzelli C. , Siragusa A, and Aurambout J. P. (eds.). 2019. *The Future of Cities – Opportunities, Challenges and the Way Forward*. Luxembourg: Publications Office of the European Union. *https://doi.org/10.2760/375209*.

Voltes-Dorta, Augusto, Juan Luis Jiménez, and Ancor Suárez-Alemán. 2014. "An Initial Investigation into the Impact of Tourism on Local Budgets: Acomparative Analysis of Spanish Municipalities." *Tourism Management* 45: 124–33. *https://doi.org/10.1016/j.tourman.2014.02.016*.

W

Walto, V. Rao; M. 2004. *Culture and Public Action*. Washington, DC: The International Bank for Reconstruction and Development. The Wold bank.

Wang, Peijie, and Peijie Wang. 2009. "Balance of Payments and International Investment Positions." *The Economics of Foreign Exchange and Global Finance*. *https://doi.org/10.1007/978-3-642-00100-0_4*.

Weinand, Jann M, Russell McKenna, and Kai Mainzer. 2019. "Spatial High-Resolution Socio-Energetic Data for Municipal Energy System Analyses." *Scientific Data* 6 (1): 243. *https://doi.org/10.1038/s41597-019-0233-0*.

Węziak-Białowolska, Dorota, and Lewis Dijkstra. 2015. "Trust, Local Governance and Quality of Public Service in EU Regions and Cities." *JRC Sci Policy Rep*.

Wiesböck, Laura, Anna Wanka, Elisabeth Anne-Sophie Mayrhuber, Brigitte Allex, Franz Kolland, Hans Peter Hutter, Peter Wallner, Arne Arnberger, Renate Eder, and Ruth Kutalek. 2016. "Heat Vulnerability, Poverty and Health Inequalities in Urban Migrant Communities: A Pilot Study from Vienna." In *Climate Change and Health*, 389–401. Springer.

Wilikens, Marc, Marion Dewar, Funda Celikel Esser, Peter Benczur, Francesca Campolongo, Peter Harasztosi, Stylianos Karagiannis, et al. 2017. "What Makes a Fair Society? Insights and Evidence," no. KJ-07-16-182-EN-N: 52. *https://doi.org/10.2760/861535*.

Woolcock, Michael. 2001. "The Place of Social Capital in Understanding Social and Economic Outcomes." *Canadian Journal of Policy Research* 2 (1): 1–35.

World Bank. 2010. "Cities and Climate Change an Urgent Agenda." *Urban Development and Local Government* 10: 279. https://doi.org/10.1787/9789264091375-en.

———. 2016. *Making Politics Work for Development: Harnessing Transparency and Citizen Engagement*. World Bank Group.

World Bank Group. 2015. "Migrants' Remittances from the United Kingdom. International Remittances and Access to Financial Services for Migrants in London, UK. A Greenback 2.0 Report."

World Health Organization;, and UN-Habitat. 2010. *Hidden Cities: Unmasking*

and Overcoming Health Inequities in Urban Settings. Geneva: World Health Organization.

WRI C40 & ICLEI. 2014. "Global Protocol for Community-Scale Greenhouse Gas Emission Inventories: An Accounting and Reporting Standard for Cities."

List of ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
ANAC	Autorità Nazionale Anti Corruzione (Italy) National Authority Against Corruption
APS	Annual Population Survey
AROPE	At Risk of Poverty or social Exclusion
BCI	Blue City Index
BMI	Body Mass Index
C3 Index	Cultural and Creative Cities Index
CAP	Common Agricultural Policy
CARE	Community Road Accident database
CBF	City Blueprint Framework
CEAS	Common European Asylum System
CEF	Connecting Europe Facility
CEMR	Council of European Municipalities and Regions
CF	Carbon Footprint
CH^4	Methane
CLLD	Community-Led Local Development
CO^2	Carbon Dioxide
CoE	Council of Europe
CoR	European Committee of the Regions
D4I	Data Challenge on Integration of Migrants in Cities
DEGURBA	Degree of Urbanisation
DG	Directorate-General (of the European Commission)
DG ENV	Directorate-General for Environment
DG MOVE	Directorate-General for Mobility and Transport
DG REGIO	Directorate-General for Regional and Urban Policy
DG SANTE	Directorate-General for Health and Food Safety
DRM	Disaster Risk Management
DRMKC	Disaster Risk Management Knowledge Centre
DRR	Disaster Risk Reduction
EC	European Commission
ECEC	Early Childhood Education and Care
ECI	Energy Consumption Index
ECMT	European Conference of Ministers of Transport

ECOSOC	United Nations Economic and Social Council
ECRI	European Commission against Racism and Intolerance
EEA	European Environment Agency
EEC	European Economic Community
EFSI	European Fund for Strategic Investment
EFTA	European Free Trade Association
EIGE	European Institute for Gender Equality
EIP	European Innovation Partnerships
ELET	Early Leavers from Education and Training
EM-DAT	Emergency Events Database
EMCDDA	European Monitoring Centre for Drugs and Drug Addiction
EMFF	European Maritime and Fisheries Fund
E-PRTR	European Pollutant Release and Transfer Register
EPAL	Empresa Portuguesa das Águas Livres
EPER	European Pollutant Emission Register
EQI	European Quality of Government Index
ERDF	European Regional Development Fund
ESAW	European Statistics on Accidents at Work
ESF	European Social Fund
ESI	European Structural Investment
ESIF	European Structural and Investment Funds
ESPAD	European School Survey Project on Alcohol and Other Drugs
ETER	European Tertiary Education Register
ETHOS	European Typology of Homelessness and Housing Exclusion
EU	European Union
EU-SILC	European Statistics on Income and Living Conditions
FARNET	The European Fisheries Areas Network
FDI	Foreign Direct Investments
FEANTSA	European Federation of National Organisations Working with the Homeless
FLAGs	Fisheries Local Action Groups
FRA	Fundamental Right Agency
FUA	Functional Urban Area
GCF	Governance Capacity Framework
GCoM	Global Covenant of Mayors
GDP	Gross Domestic Product
GGMCF	Gridded Global Model of City Footprints
GHG	Greenhouse gas
GHSL	Global Human Settlement Layer

GIS	Geographic information system
GPC	Global Protocol for Community-Scale Greenhouse Gas Emission Inventories
HA	Hectare
HEI	Higher Education Institutions
HFCs	Hydrofluorocarbons
HIV	Human Immunodeficiency Virus
HLPF	High-level Political Forum (on Sustainable Development)
IACSB	Inquérito ao Ambiente - Caracterização do Saneamento Básico
ICT	Information and Communication Technologies
IEA	International Energy Agency
IHME	Institute for Health Metrics and Evaluation
ILO	International Labour Organisation
IPCC	Intergovernmental Panel on Climate Change
ISCED	International Standard Classification of Education
IWA	International Water Association
IWRM	Integrated Water Resource Management
KWh	Kilowatt-hours
JRC	Joint Research Centre
LAU	Local Administrative Unit
LGBTQ	Lesbian, Gay, Bisexual, Transgender, and Queer (or Questioning)
LIM	Labour Input Method
LRAs	Local and Regional Authorities
LSOAs	Lower Super Output Areas
LUE	Land Use Efficiency
LUISA	Land Use-based Integrated Sustainability Assessment
LUR	Land Use Regression
LVRs	Local Voluntary Reviews
MDGs	Millennium Development Goals
MSFD	Marine Strategy Framework Directive
MWh	Megawatt-hours
NatCatSERVICE	Natural Catastrophe know-how for risk management and research
NDVI	Normalised Difference Vegetation Index
NEET	Not in Education, Employment or Training
NF_3	Nitrogen Trifluoride
NGOs	Non-Governmental Organisations
N_2O	Nitrous oxide
NO_2	Nitrogen Dioxide
nrg4SD	Network of Regional Governments for Sustainable Development

NSDS	National Sustainable Development Strategy
NSO	National Statistical Office
ODA	Official Development Assistance
ODIHR	Office for Democratic Institutions and Human Rights
OECD	Organisation for Economic Co-operation and Development
OOF	Other Official Flows
OSCAD	Osservatorio per la Sicurezza Contro gli Atti Discriminatori (Italy)
OSCE	Organisation for Security and Co-operation in Europe
PB	Participatory Budget
PFCs	Perfluorocarbons
PhD	Doctor of Philosophy
PISA	Programme for International Student Assessment
PPP	Purchasing Power Parity
PV	PhotoVoltaic
RBD	River Basin District
R&D	Research & Development
SDGs	Sustainable Development Goals
SES	Socioeconomic Status
SF_6	Sulfur Hexafluoride
SIMBA	Sistema de Indicadores del Àrea Metropolitana de Barcelona
SMR	Standardized mortality ratio
SOGIESC	Sexual Orientation, Gender Identity and Expression, and Sex Characteristics
STEM	Science, Technology, Engineering and Mathematics
TCDC	Tree Coverage Density Change
TED	Tenders Electronic Daily
TPF	Trends and Pressures Framework
TWh	Terawatt-hours
UAA	Utilised Agricultural Area
UCLG	United Cities and Local Governments
UDW	Undeclared Work
UDP	Urban Data Platform
UMP	Urban Mobility Package
UN	United Nations
UN-HABITAT	United Nations Human Settlements Programme
UNAR	Unità Nazionale Anti-Discriminazione - National Anti-Discrimination Agency
UNCRPD	UN Convention on the Rights of Persons with Disabilities
UNDESA	United Nations Department of Economic and Social Affairs
UNDRR	UN Office for Disaster Risk Reduction

UNECE	United Nations Economic Commission for Europe
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNFCCC	United Nations Framework Convention on Climate Change
UNHCR	United Nations High Commissioner for Refugees
UNISDR	Former name of UNDRR
UNSDSN	United Nations Sustainable Development Solutions Network
Urban-LEDS	Urban Low Emission Development Strategies
US	The United States
USD	US Dollar
UWWT	Urban Waste Water Treatment
UWWTD	Urban Waste Water Treatment Directive
VLR	Voluntary Local Review
VNR	Voluntary National Review
WAY?	What About Youth? Survey
WHO	World Health Organisation

Country names and their **ABBREVIATIONS**

AUT	Austria
BEL	Belgium
BGR	Bulgaria
CHE	Switzerland
CZE	Czech Republic
CYP	Cyprus
DEU	Germany
DNK	Denmark
ESP	Spain
EST	Estonia
FIN	Finland
FRA	France
GBR	United Kingdom
GRC	Greece
HRV	Croatia
HUN	Hungary
IRL	Ireland
ISL	Iceland
ITA	Italy
LTU	Lithuania
LUX	Luxemburg
LVA	Latvia
MLT	Malta
NLD	Netherlands
NOR	Norway
POL	Poland
PRT	Portugal
ROU	Romania
SVK	Slovak Republic
SVN	Slovenia
SWE	Sweden

ANNEX 1
LIST OF PROPOSED INDICATORS

SDG	INDICATOR	TYPE	SOURCE	COVERAGE	AVAILABILITY
1.	> People at risk of income poverty after social transfers	official	Eurostat, City Statistics database	EU-28	100 cities and greater cities in 2016
	> People living in households with very low work intensity	official	Eurostat, City Statistics database	EU-28	100 cities and greater cities in 2016
	> Lone parent private households	official	Eurostat, City Statistics database	EU-28	450 cities and greater cities in 2016
	> Households in social housing	official	Eurostat, City statistics database	EU-28	100 cities and greater cities in 2016
	> Homeless people	experimental	VIVE - The Danish Center for Social Science Research	Denmark	København, Frederiksberg, Aarhus, Odense, Aalborg
2.	> Adults overweight	official	Public Health England	United Kingdom	all British municipalities
	> Organic food purchased for schools	official	Swedish Food Agency	Sweden	232 Swedish municipalities
	> Soup kitchens for people who cannot afford food	experimental	Sant'Egidio	ITA, ESP, POL	10 cities in Poland, Spain and Italy
3.	> Infant mortality	official	Eurostat, City Statistics database	EU-28	300 cities and greater cities in 2018
	> Adolescent births	official	Eurostat, City Statistics database	EU-28	300 cities and greater cities in 2017
	> Deaths in Road Accidents	official	Eurostat, City Statistics database	EU-28	400 cities and greater cities in 2018
	> Daily smokers in 1st and 2nd year of upper secondary school	official	National Institute for Health and Welfaredatabase	Finland	all Finish cities
4.	> Children 0-4 in day care or school	official	Eurostat, City Statistics database	EU-28	400 cities and greater cities in 2016
	> Adults with less then primary, primary and lower secondary education	official	Eurostat, City Statistics database	EU-28	250 cities and greater cities in 2016
	> Students in higher education by gender	official	Eurostat, City Statistics database	EU-28	600 cities and greater cities in 2016
	> Non-native speaking students graduating from upper secondary schools	official	Helsinki Region Infoshare	Helsinki	Helsinki
5.	> Gender employment gap	official	Eurostat, City Statistics database	EU-28	600 cities and greater cities in 2016
	> Average satisfaction with life by sexual identity for 15-year-old children	official	Health and Social Care Information Centre	United Kingdom	all British counties
	> Formal complaints for episodes of violence against women	official	Delegación del Gobierno para la Violencia de Género	Spain	all Partidos Judiciales
	> Female hospitalization for assault	official	Statistics Denmark StatBank	Denmark	all Danish municipalities
	> Seats held by women in municipal governments	official	Italian Ministry of the Interior	Italy	all Italian municipalities
6.	> Wastewater safely treated	official	European Environmental Agency	EU-28	all agglomerations
	> Drinking water consumption	official	Budapest Waterworks	Budapest	Budapest

	> Recycled water used for open spaces	official	Madrid Official Statistics	Madrid	Madrid
	> Blue City Index	experimental	Joint Research Centre	27 countries	45 cities and regions
7.	> New buildings	experimental	Joint Research Centre	EU-28	700 cities
	> Technical Photovoltaic Potential	experimental	Weinand et al. 2019	Germany	11,131 German municipalities
	> Energy consumption per capita	experimental	Mashhoodi, Stead, and van Timmeren 2019	The Netherlands	2,462 Dutch neighbourhoods
	> Energy consumption index	experimental	Morris et al. 2016	England	32,482 Lower Super Output Areas in England
8.	> Unemployment rate	official	Eurostat, City Statistics database	EU-28	600 cities and greater cities in 2016
	> Accidents at Work	official	National governments	EU-28	all NUTS3 regions
	> Perception about the job market	experimental	DG REGIO and EUROSTAT, Eurobarometer	EU-28 plus others	83 cities
	> GDP per capita	experimental	Organisation for Economic Co-operation and Development (OECD)	OECD countries	250 FUAs
	> Labour productivity	experimental	Organisation for Economic Co-operation and Development (OECD)Co-operation and Development (OECD)	OECD countries	250 FUAs
9.	> Journeys to work by public transport	official	Eurostat, City Statistics database	EU-28	400 cities and greater cities in 2011
	> Enterprises in Industry, construction and services	official	EUROSTAT, General and Regional Statistics	EU-28	140 metropolitan regions
	> Start-ups over 1,000 inhabitants	experimental	Private provider (StartupEuropemap.eu)	Amsterdam, Berlin, Rome, and Rotterdam. For all cities Ruhr and in LT and UK	30 cities
	> City trasport performance	experimental	Joint Research Centre	EU-28 plus others	800 cities
10.	> Unemployed people with disabilities	official	Statistics Poland	Poland	66 Polish cities with district status and 314 Powiat
	> Gini index	experimental	Organisation for Economic Co-operation and Development (OECD)	AUT, BEL, FRA, ITA, NOR, PRT, SWE	20 FUAs
	> Graduates by field and gender	experimental	European Tertiary Education Register	EU-28 plus others	2,970 individual Higher Education Institutions
	> Population with migrant background	experimental	Joint Research Centre	FRA, NLD, ITA, PRT, GBR, DEU, IRL, ESP	all cities
	> Hosted asylum seekers	experimental	Proietti, Veneri 2019	LUX, FIN, FRA, NLD, NOR and SWE	all municipalities
11.	> Housing cost overburden rate	official	Sistema d'Indicadors Metropolitans de Barcelona (SIMBA)	Barcelona	Barcelona
	> Bicycle traffic	official	Vienna City Administration	Wien	Wien
	> Access to public transport	experimental	DG REGIO	EU-28	about 400 cities and greater cities

	> Built-up area per capita	experimental	Joint Research Centre	global	10,000 urban centres
	> Population without green urban areas in their neighbourhood	experimental	DG REGIO	EU-28	about 800 cities and greater cities
	> Population exposed to NO2 concentration	experimental	Joint Research Centre	EU-28	800 cities
	> Cultural Creative Cities Index	experimental	Joint Research Centre	EU-28 plus others	190 cities and greater cities
12.	> Local recycling rates	official	PORDATA	Portugal	all Portugese municipalities
	> Urban waste per capita	official	PORDATA	Portugal	all Portugese municipalities
	> Pollutants from industrial facilities	official	E-PRTR	EU-28 plus others	30,000 industrial facilities in Europe
	> Local tourism intensity	experimental	Joint Research Centre	EU-28	all NUTS3 regions
13.	> People affected by disasters	official	Emergency Events Database (EM-DAT)	global	municipalities affected by disasters
	> Greenhouse gas emissions	official	Global Covenant of Mayors	global	signatory municipalities
	> Urban Flood Risk	experimental	Joint Research Centre	EU-28	800 cities
	> Heat vulnerability	experimental	Econten - Stadt Wien	Wien	Wien
14.	> Bathing sites with excellent water quality	official	European Environmental Agency	EU-28 plus others	22,000 coastal beaches and inland sites
	> Participation of local governments in Community-Led Local Development (CLLD) projects	official	European Fisheries Areas Network (FARNET)	20 EU countries	357 projects
15.	> Urban greenness	experimental	Joint Research Centre	EU-28	all urban centres
	> Land Abandoment	experimental	Joint Research Centre	EU-28 plus others	1350 NUTS3 regions
	> Tree Cover Density	experimental	European Environment Agency – Copernicus service	EU-28	grid map
16.	> Murders and violent deaths	official	Eurostat, City Statistics database	EU-28	550 cities and greater cities in 2016
	> Level of trust toward other people in the city	official	DG REGIO and EUROSTAT, Eurobarometer	EU-28 plus others	83 cities
	> Satisfaction with the administrative services of the city	official	DG REGIO and EUROSTAT, Eurobarometer	EU-28 plus others	83 cities
	> Transparency of the public administration	official	Italian National Authority Against Corruption (ANAC)	Italy	all Italian municipalities
	> Voter turnout in municipal elections	official	Ministry of the Interior - Hellenic Republic	Greece	all Greek municipalities
	> Municipal Participatory Budgeting	official	Camara municipal de Lisboa	Lisboa	Lisboa
17.	> Remittances as a proportion of GDP	official	Bank of Italy	Italy	all NUTS3
	> VLR indicators from official statistics	official	-	-	-

ANNEX 2
GLOSSARY

Glossary

Aquaculture: refers to the farming of aquatic organisms, such as fish, molluscs, crustaceans and plants for human use or consumption, under controlled conditions. Aquaculture implies some form of intervention in the natural rearing process to enhance production, including regular stocking, feeding and protection from predators. Farming also implies individual or corporate ownership of, or contractual rights to, the stock being cultivated.

Adult learning: Adult learning refers to learning activities after the end of initial education and is a vital component of the EU's lifelong learning policy. The main indicator to measure adult learning is the participation rate in education and training, which covers participation in formal and non-formal education and training.

Aggregation: Statistics for related categories can be grouped together or aggregated in order to provide a broader picture.

Big data: Information assets characterised by a high volume, velocity and variety to require specific technology and analytical methods for its transformation into value. Volume refers to enormous amounts of data, velocity–very high speed of the data coming in, variety refers to the many sources, and types of data both structured and unstructured.

Biodiversity: refers to the number, variety and variability of living organisms, including mankind, within a given area.

Built-up area: Area covered by enclosed constructions above ground intended as or used for sheltering humans, animals, things or for the production of economic goods, and referring to any structure constructed or erected on its site. No permanency condition is imposed, allowing also for refugee camps, informal settlements, slums and other temporary settlements and shelter to be included within the concept of a built-up area.

Cohesion policy: Covers all the programmes supported by the following Funds: the European Social Fund (ESF), the European Regional Development Fund (ERDF) and the Cohesion Fund (CF).

Commuting zone: A commuting zone contains the surrounding travel-to-work areas of a city where at least 15% of employed residents are working in the city.

Deflator: is a figure expressing the change in prices over a period of time for a product or a basket of products, which is used to 'deflate' (price adjust) a measure of value changes for the same period (for example the sales of this product or basket), thus removing the price increases or decreases and leaving only volume changes.

Digital divide: refers to the distinction between those who have internet access and are able to make use of new services offered on the World Wide Web, and those who are excluded from these services.

Digital literacy: refers to the skills required to achieve digital competence, the confident and critical use of information and communication technology (ICT) for work, leisure, learning and communication. Digital literacy is underpinned by basic technical use of computers and the Internet.

Enterprise: is an organisational unit producing goods or services which has a certain degree of autonomy in decision-making. An enterprise can carry out more than one economic activity and it can be situated at more than one location. An enterprise may consist out of one or more legal units.

European Structural Investment Funds: a financial tool set up to implement the EU's regional policy. It is composed of five separate EU funds: European Regional Development Fund, European Social Fund, Cohesion Fund, European Agricultural Fund for Rural Development, and the European Maritime and Fisheries Fund.

Fertility rate (total): is defined as the mean number of children who would be born to a woman during her lifetime, if she were to spend her childbearing years conforming to the age-specific fertility rates, that have been measured in a given year. The age-specific fertility rate or the fertility rate by age of mother is the number of births to mothers of age x proportional to the average female population of age x.

Foreign direct investment (FDI): is an international investment within the balance of payment accounts. Essentially, a resident entity in one economy seeks to obtain a lasting interest in an enterprise resident in another economy. A lasting interest implies the existence of a long-term relationship between the direct investor and the enterprise, and an investor's significant influence on the management of the enterprise.

Frequency: refers to the rate at which something happens or is repeated. If a time series has a constant time interval between its observations, this interval determines the frequency of the time series (e.g. monthly, quarterly, yearly). Frequency is closely associated with "Periodicity", to form a single entity referred to as "frequency and periodicity". While frequency pertains to the time interval between the observations of a time series, periodicity refers to the frequency of the compilation of data.

Government (gross) debt: it is also known as public debt. It is the nominal (face) value of total gross debt outstanding at the end of the year and consolidated between and within the government subsectors. It is defined as including outstanding stocks of liabilities in the financial instruments currency and deposits, debt securities and loans at the end of the reference period.

Horizon 2020 (H2020): is the 8th Framework Programme implemented by the European Commission to fund research, technological development and innovation.

Household (social statistics): A household, in the context of surveys on social conditions or income such as EU-SILC, is defined as a housekeeping unit or, operationally, as a social unit: having common arrangements; sharing house old expenses or daily needs; in a shared common residence. A household includes either one person living alone or a group of people, not necessarily related, living at the same address with common housekeeping, i.e. sharing at least one meal per day or sharing a living or sitting room.

Life Cycle Assessments (LCA): A technique to assess environmental impacts associated with all the stages of a product's life from raw material extraction through materials processing, manufacture, distribution, use, repair and maintenance, and disposal or recycling.

Life expectancy at birth: The mean number of years a new-born child can expect to live if subjected throughout his/her life to the current mortality conditions.

Organic farming: is a way of agricultural production which uses organic production methods and places the highest emphasis on environmental and wildlife protection and, with regard to livestock production, on animal welfare considerations. Organic production involves holistic production management systems for crops and livestock, emphasizing on-farm management practices over off-farm inputs. This is accomplished by avoiding, or largely reducing, the use of synthetic chemicals such as fertilisers, pesticides, (fungicides, herbicides, insecticides), additives and veterinary medicinal products, replacing them, wherever possible, with cultural, biological and mechanical methods.

Overcrowding rate: the percentage of the population living in an overcrowded household. A person is considered as living in an overcrowded household if the household does not have at its disposal a minimum number of rooms equal to: one room for the household; one room per couple in the household; one room for each single person aged 18 or more; one room per pair of single people of the same gender between 12 and 17 years of age; one room for each single person between 12 and 17 years of age and not included in the previous category; one room per pair of children under 12 years of age.

Periodicity: see Frequency.

Population density: ratio between inhabitants and area. It is usually expressed in inhabitants per square kilometre or inhabitants per hectare.

Population grid: A grid map with cells having values equal to the living or resident population.

Reference period: the time period for which statistical results are collected or calculated and to which, as a result, these values refer. The time period may be either a calendar year (reference year), a fiscal year, a semester, a quarter, a month and even

a day. The reference period should be distinguished from the publication time, the period or point in time at which the statistical data are published.

Renewable energy sources: are energy sources that replenish themselves naturally. Renewable energy sources in energy statistics include the following: hydropower; tide, wave, ocean energy; geothermal energy; wind energy; solar energy; ambient heat bio fuels; renewable municipal waste.

Segregation: In the context of this publication, segregation refers to an unequal distribution of different social groups in the urban space. Segregation can occur based on occupation, income and education, as well as on gender and ethnicity.

Smart cities: a place where traditional networks and services are made more efficient with the use of digital and telecommunication technologies, for the benefit of its inhabitants and businesses.

Social transfers: Social transfers cover the social help given by central, state or local institutional units. They include: old-age (retirement) and survivors' (widows' and widowers') pensions; unemployment benefits; family-related benefits; sickness and invalidity benefits; education-related benefits; housing allowances; social assistance and other possible benefits.

Statistical indicator: is a summary measure related to a key issue or phenomenon and derived from a series of observed facts. Indicators can be used to reveal relative positions or show positive or negative change. By themselves, indicators do not necessarily contain all aspects of development or change, but they hugely contribute to explaining them. They allow comparisons over time between, for instance, countries and regions, and in this way assist in gathering 'evidence' for decision making.

Timeliness: Related to indicators, it refers to the time gap between the collection and the publication of the indicator or the statistics.

Vocational education and training: is the training in skills and teaching of knowledge related to a specific trade, occupation or vocation in which the student or employee wishes to participate. Vocational education may be undertaken at an educational institution, as part of secondary or tertiary education, or may be part of initial training during employment.

Regions and Cities definitions

City: A city is a local administrative unit (LAU) where the majority of the population lives in an urban centre of at least 50,000 inhabitants.

Coastal areas: Local areas that are bordering or close to a coastline. A coastline is defined as the line where land and water surfaces meet (border each other). Due to the existence of several measures (for example, the mean or median tides, high- or low-tides), the European Commission has adopted the harmonised use of the mean high tide (EC, 1999) in order to delineate EU coastlines.

(New) Degree of urbanisation (DEGURBA): The New Degree of Urbanisation is a settlement classification adopted by the European Union for statistical purposes that indicates the character of an area. Based on the share of local population living in urban clusters and in urban centres, it classifies Local Administrative Units (LAU or communes) into three types of area: Cities (densely populated areas), Towns and suburbs (intermediate density areas), Rural areas (thinly populated areas).

Functional Urban Area (FUA): The functional urban area consists of a city plus its commuting zone.

Greater cities: An approximation of the urban centres when this stretches far beyond the administrative city boundaries.

Intermediate region: intermediate regions form part of the urban-rural typology, they are NUTS level 3 regions where more than 50% and up to 80% of the population live in urban clusters.

Local administrative unit (LAU) or Municipality: are used to divide up the territory of the EU for the purpose of providing statistics at a local level. They are low-level administrative divisions of a country below that of a province, region or state. Not all countries classify their locally governed areas in the same way and LAUs may refer to a range of different administrative units, including munic-

ipalities, communes, parishes or wards. Statistics for LAUs may be used to establish local typologies including the degree of urbanisation (cities; towns and suburbs; rural areas); functional urban areas (cities and their surrounding commuting zones); coastal areas (coastal and non-coastal areas).

Local government: consists of government units having a local sphere of competence (with the possible exception of social security units). Local governments typically provide a wide range of services to local residents, some of which may be financed out of grants from higher levels of government. Statistics for local government cover a wide variety of governmental units, such as counties, municipalities, cities, towns, townships, boroughs, school districts, and water or sanitation districts. Often local government units with different functional responsibilities have authority over the same geographic areas.

Metro Regions: The metropolitan typology is applied at the level of NUTS level 3 regions and identifies metropolitan regions in the European Union (EU). These regions are defined as urban agglomerations (NUTS level 3 regions or groups of NUTS level 3 regions) where at least 50% of the population lives inside a functional urban area (FUA) that is composed of at least 250,000 inhabitants.

Nomenclature of territorial units for statistics (NUTS): is a geographical nomenclature subdividing the economic territory of the European Union (EU) into regions at three different levels (NUTS 1, 2 and 3 respectively, moving from larger to smaller territorial units). Above NUTS 1, there is the 'national' level of the Member States. The NUTS is based on Regulation (EC) No 1059/2003 of the European Parliament and of the Council of 26 May 2003 on the establishment of a common classification of territorial units for statistics (NUTS), which is regularly updated.

Predominantly rural region: predominantly rural regions form part of the urban-rural typology, they are NUTS level 3 regions where at least 50% of the population live in rural grid cells.

Predominantly urban region: predominantly urban regions form part of the urban-rural typology, they are NUTS level 3 regions where more than 80% of the population live in urban clusters.

Rural area: Municipalities where more than 50% of the population lives in rural grid cells, as used in the degree of urbanisation.

Town and suburbs: Municipalities where 50% of the population lives in urban clusters and it is not a city, as used in the degree of urbanisation.

Urban area: The sum of city, towns and suburbs.

Urban centre: A cluster of contiguous grid cells of 1 km^2 (*https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Contiguous_grid_cells*) with a density of at least 1,500 inhabitants per km^2 and a minimum population of 50,000.

Urban-rural typology: the urban-rural typology is applied to NUTS level 3 regions: it identifies three types of region based on the share of the rural population, namely, predominantly rural regions, intermediate regions and predominantly urban regions.

Member States and Geographic Grouping

EU-28: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom.

Baltic States: Estonia, Latvia and Lithuania.

Central and Eastern Member States: Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia.

Nordic countries: Denmark, Finland, Iceland, Norway, and Sweden.

Southern Member States: Cyprus, Greece, Italy, Malta, Portugal and Spain.

Western Member States: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and the United Kingdom

ANNEX 3
SDGs AND RELATED TARGETS

GOAL 1.

POVERTY IN ALL ITS FORMS EVERYWHERE EVERYWHEREINDIVIDUAL HIGHER EDUCATION INSTITUTIONS

- 1.1 By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than $1.25 a day
- 1.2 By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions
- 1.3 Implement nationally appropriate social protection systems and measures for all, including floors, and by 2030 achieve substantial coverage of the poor and the vulnerable
- 1.4 By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance
- 1.5 By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters
- 1.a Ensure significant mobilization of resources from a variety of sources, including through enhanced development cooperation, in order to provide adequate and predictable means for developing countries, in particular least developed countries, to implement programmes and policies to end poverty in all its dimensions
- 1.b Create sound policy frameworks at the national, regional and international levels, based on pro-poor and gender-sensitive development strategies, to support accelerated investment in poverty eradication actions

GOAL 2.

END HUNGER, ACHIEVE FOOD SECURITY AND IMPROVED NUTRITION AND PROMOTE SUSTAINABLE AGRICULTURE EVERYWHEREINDIVIDUAL HIGHER EDUCATION INSTITUTIONS

- 2.1 By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round
- 2.2 By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, prgnant and lactating women and older persons
- 2.3 By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment
- 2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality
- 2.5 By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed
- 2.a Increase investment, including through enhanced international cooperation, in rural infrastructure, agricultural research and extension services, technology development and plant and livestock gene banks in order to

enhance agricultural productive capacity in developing countries, in particular least developed countries

- 2.b Correct and prevent trade restrictions and distortions in world agricultural markets, including through the parallel elimination of all forms of agricultural export subsidies and all export measures with equivalent effect, in accordance with the mandate of the Doha Development Round
- 2.c Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility

GOAL 3. ENSURE HEALTHY LIVES AND PROMOTE WELL-BEING FOR ALL AT ALL AGESEVERYWHEREINDIVIDUAL HIGHER EDUCATION INSTITUTIONS

- 3.1 By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births
- 3.2 By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births
- 3.3 By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases
- 3.4 By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being
- 3.5 Strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol
- 3.6 By 2020, halve the number of global deaths and injuries from road traffic accidents
- 3.7 By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes
- 3.8 Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all
- 3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination
- 3.a Strengthen the implementation of the World Health Organization Framework Convention on Tobacco Control in all countries, as appropriate
- 3.b Support the research and development of vaccines and medicines for the communicable and non-communicable diseases that primarily affect developing countries, provide access to affordable essential medicines and vaccines, in accordance with the Doha Declaration on the TRIPS Agreement and Public Health, which affirms the right of developing countries to use to the full the provisions in the Agreement on Trade-Related Aspects of Intellectual Property Rights regarding flexibilities to protect public health, and, in particular, provide access to medicines for all
- 3.c Substantially increase health financing and the recruitment, development, training and retention of the health workforce in developing countries, especially in least developed countries and small island developing States
- 3.d Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks

GOAL 4. ENSURE INCLUSIVE AND EQUITABLE QUALITY EDUCATION AND PROMOTE LIFELONG LEARNING OPPORTUNITIES FOR ALL

- 4.1 By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes
- 4.2 By 2030, ensure that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education
- 4.3 By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university
- 4.4 By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship
- 4.5 By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations
- 4.6 By 2030, ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy
- 4.7 By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development
- 4.7 By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development
- 4.a Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all
- 4.b By 2020, substantially expand globally the number of scholarships available to developing countries, in particular least developed countries, small island developing States and African countries, for enrolment in higher education, including vocational training and information and communications technology, technical, engineering and scientific programmes, in developed countries and other developing countries
- 4.c By 2030, substantially increase the supply of qualified teachers, including through international cooperation for teacher training in developing countries, especially least developed countries and small island developing States

GOAL 5. ACHIEVE GENDER EQUALITY AND EMPOWER ALL WOMEN AND GIRLSEVERYWHEREINDIVIDUAL HIGHER EDUCATION INSTITUTIONS

- 5.1 End all forms of discrimination against all women and girls everywhere
- 5.2 Eliminate all forms of violence against all women and girls in the public and private spheres, including trafficking and sexual and other types of exploitation
- 5.3 Eliminate all harmful practices, such as child, early and forced marriage and female genital mutilation
- 5.4 Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate

- 5.5 Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life
- 5.6 Ensure universal access to sexual and reproductive health and reproductive rights as agreed in accordance with the Programme of Action of the International Conference on Population and Development and the Beijing Platform for Action and the outcome documents of their review conferences
- 5.a Undertake reforms to give women equal rights to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources, in accordance with national laws
- 5.b Enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of women
- 5.c Adopt and strengthen sound policies and enforceable legislation for the promotion of gender equality and the empowerment of all women and girls at all levels

GOAL 6. ENSURE AVAILABILITY AND SUSTAINABLE MANAGEMENT OF WATER AND SANITATION FOR ALL

- 6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all
- 6.2 By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations
- 6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally
- 6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity
- 6.5 By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate
- 6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes
- 6.a By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies
- 6.b Support and strengthen the participation of local communities in improving water and sanitation management

GOAL 7. ENSURE ACCESS TO AFFORDABLE, RELIABLE, SUSTAINABLE AND MODERN ENERGY FOR ALL

- 7.1 By 2030, ensure universal access to affordable, reliable and modern energy services
- 7.2 By 2030, increase substantially the share of renewable energy in the global energy mix
- 7.3 By 2030, double the global rate of improvement in energy efficiency
- 7.a By 2030, enhance international cooperation to facilitate access to clean energy research and technology,

including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology

- 7.b By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States and landlocked developing countries, in accordance with their respective programmes of support

GOAL 8. PROMOTE SUSTAINED, INCLUSIVE AND SUSTAINABLE ECONOMIC GROWTH, FULL AND PRODUCTIVE EMPLOYMENT AND DECENT WORK FOR ALL

- 8.1 Sustain per capita economic growth in accordance with national circumstances and, in particular, at least 7 per cent gross domestic product growth per annum in the least developed countries
- 8.2 Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labour-intensive sectors
- 8.3 Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services
- 8.4 Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-Year Framework of Programmes on Sustainable Consumption and Production, with developed countries taking the lead
- 8.5 By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value
- 8.6 By 2020, substantially reduce the proportion of youth not in employment, education or training
- 8.7 Take immediate and effective measures to eradicate forced labour, end modern slavery and human trafficking and secure the prohibition and elimination of the worst forms of child labour, including recruitment and use of child soldiers, and by 2025 end child labour in all its forms
- 8.8 Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment
- 8.9 By 2030, devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products
- 8.10 Strengthen the capacity of domestic financial institutions to encourage and expand access to banking, insurance and financial services for all
- 8.a Increase Aid for Trade support for developing countries, in particular least developed countries, including through the Enhanced Integrated Framework for Trade-related Technical Assistance to Least Developed Countries
- 8.b By 2020, develop and operationalize a global strategy for youth employment and implement the Global Jobs Pact of the International Labour Organization

GOAL 9. BUILD RESILIENT INFRASTRUCTURE, PROMOTE INCLUSIVE AND SUSTAINABLE INDUSTRIALIZATION AND FOSTER INNOVATION

- 9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all

- 9.2 Promote inclusive and sustainable industrialization and, by 2030, significantly raise industry's share of employment and gross domestic product, in line with national circumstances, and double its share in least developed countries
- 9.3 Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets
- 9.4 By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities
- 9.5 Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending
- 9.a Facilitate sustainable and resilient infrastructure development in developing countries through enhanced financial, technological and technical support to African countries, least developed countries, landlocked developing countries and small island developing States
- 9.b Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for, inter alia, industrial diversification and value addition to commodities
- 9.c Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020

GOAL 10. REDUCE INEQUALITY WITHIN AND AMONG COUNTRIES

- 10.1 By 2030, progressively achieve and sustain income growth of the bottom 40 per cent of the population at a rate higher than the national average
- 10.2 By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status
- 10.3 Ensure equal opportunity and reduce inequalities of outcome, including by eliminating discriminatory laws, policies and practices and promoting appropriate legislation, policies and action in this regard
- 10.4 Adopt policies, especially fiscal, wage and social protection policies, and progressively achieve greater equality
- 10.5 Improve the regulation and monitoring of global financial markets and institutions and strengthen the implementation of such regulations
- 10.6 Ensure enhanced representation and voice for developing countries in decision-making in global international economic and financial institutions in order to deliver more effective, credible, accountable and legitimate institutions
- 10.7 Facilitate orderly, safe, regular and responsible migration and mobility of people, including through the implementation of planned and well-managed migration policies
- 10.a Implement the principle of special and differential treatment for developing countries, in particular least developed countries, in accordance with World Trade Organization agreements
- 10.b Encourage official development assistance and financial flows, including foreign direct investment, to States where the need is greatest, in particular least developed countries, African countries, small island developing States and landlocked developing countries, in accordance with their national plans and programmes
- 10.c By 2030, reduce to less than 3 per cent the transaction costs of migrant remittances and eliminate remittance corridors with costs higher than 5 per cent

GOAL 11.

MAKE CITIES AND HUMAN SETTLEMENTS INCLUSIVE, SAFE, RESILIENT AND SUSTAINABLE

- 11.1 By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums
- 11.2 By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons
- 11.3 By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries
- 11.4 Strengthen efforts to protect and safeguard the world's cultural and natural heritage
- 11.5 By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations
- 11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management
- 11.7 By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities
- 11.a Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning
- 11.b By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015–2030, holistic disaster risk management at all levels
- 11.c Support least developed countries, including through financial and technical assistance, in building sustainable and resilient buildings utilizing local materials

GOAL 12.

ENSURE SUSTAINABLE CONSUMPTION AND PRODUCTION PATTERNS

- 12.1 Implement the 10-Year Framework of Programmes on Sustainable Consumption and Production Patterns, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries
- 12.2 By 2030, achieve the sustainable management and efficient use of natural resources
- 12.3 By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses
- 12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment
- 12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse
- 12.6 Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle
- 12.7 Promote public procurement practices that are sustainable, in accordance with national policies and priorities

- 12.8 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature
- 12.a Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production
- 12.b Develop and implement tools to monitor sustainable development impacts for sustainable tourism that creates jobs and promotes local culture and products
- 12.c Rationalize inefficient fossil-fuel subsidies that encourage wasteful consumption by removing market distortions, in accordance with national circumstances, including by restructuring taxation and phasing out those harmful subsidies, where they exist, to reflect their environmental impacts, taking fully into account the specific needs and conditions of developing countries and minimizing the possible adverse impacts on their development in a manner that protects the poor and the affected communities

GOAL 13. TAKE URGENT ACTION TO COMBAT CLIMATE CHANGE AND ITS IMPACTS[2]

- 13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries
- 13.2 Integrate climate change measures into national policies, strategies and planning
- 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning
- 13.a Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change to a goal of mobilizing jointly $100 billion annually by 2020 from all sources to address the needs of developing countries in the context of meaningful mitigation actions and transparency on implementation and fully operationalize the Green Climate Fund through its capitalization as soon as possible
- 13.b Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities

GOAL 14. CONSERVE AND SUSTAINABLY USE THE OCEANS, SEAS AND MARINE RESOURCES FOR SUSTAINABLE DEVELOPMENT

- 14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution
- 14.2 By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans
- 14.3 Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels
- 14.4 By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics
- 14.5 By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information

- 14.6 By 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated fishing and refrain from introducing new such subsidies, recognizing that appropriate and effective special and differential treatment for developing and least developed countries should be an integral part of the World Trade Organization fisheries subsidies negotiation[3]
- 14.7 By 2030, increase the economic benefits to small island developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism
- 14.a Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular small island developing States and least developed countries
- 14.b Provide access for small-scale artisanal fishers to marine resources and markets
- 14.c Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in the United Nations Convention on the Law of the Sea, which provides the legal framework for the conservation and sustainable use of oceans and their resources, as recalled in paragraph 158 of "The future we want"

GOAL 15. PROTECT, RESTORE AND PROMOTE SUSTAINABLE USE OF TERRESTRIAL ECOSYSTEMS, SUSTAINABLY MANAGE FORESTS, COMBAT DESERTIFICATION, AND HALT AND REVERSE LAND DEGRADATION AND HALT BIODIVERSITY LOSS

- 15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements
- 15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally
- 15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world
- 15.4 By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development
- 15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species
- 15.6 Promote fair and equitable sharing of the benefits arising from the utilization of genetic resources and promote appropriate access to such resources, as internationally agreed
- 15.7 Take urgent action to end poaching and trafficking of protected species of flora and fauna and address both demand and supply of illegal wildlife products
- 15.8 By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species
- 15.9 By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts
- 15.a Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems
- 15.b Mobilize significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation
- 15.c Enhance global support for efforts to combat poaching and trafficking of protected species, including by increasing the capacity of local communities to pursue sustainable livelihood opportunities

GOAL 16.

PROMOTE PEACEFUL AND INCLUSIVE SOCIETIES FOR SUSTAINABLE DEVELOPMENT, PROVIDE ACCESS TO JUSTICE FOR ALL AND BUILD EFFECTIVE, ACCOUNTABLE AND INCLUSIVE INSTITUTIONS AT ALL LEVELS

- 16.1 Significantly reduce all forms of violence and related death rates everywhere
- 16.2 End abuse, exploitation, trafficking and all forms of violence against and torture of children
- 16.3 Promote the rule of law at the national and international levels and ensure equal access to justice for all
- 16.4 By 2030, significantly reduce illicit financial and arms flows, strengthen the recovery and return of stolen assets and combat all forms of organized crime
- 16.5 Substantially reduce corruption and bribery in all their forms
- 16.6 Develop effective, accountable and transparent institutions at all levels
- 16.7 Ensure responsive, inclusive, participatory and representative decision-making at all levels
- 16.8 Broaden and strengthen the participation of developing countries in the institutions of global governance
- 16.9 By 2030, provide legal identity for all, including birth registration
- 16.10 Ensure public access to information and protect fundamental freedoms, in accordance with national legislation and international agreements
- 16.a Strengthen relevant national institutions, including through international cooperation, for building capacity at all levels, in particular in developing countries, to prevent violence and combat terrorism and crime
- 16.b Promote and enforce non-discriminatory laws and policies for sustainable development

GOAL 17.

STRENGTHEN THE MEANS OF IMPLEMENTATION AND REVITALIZE THE GLOBAL PARTNERSHIP FOR SUSTAINABLE DEVELOPMENT

- 17.1 Strengthen domestic resource mobilization, including through international support to developing countries, to improve domestic capacity for tax and other revenue collection
- 17.2 Developed countries to implement fully their official development assistance commitments, including the commitment by many developed countries to achieve the target of 0.7 per cent of gross national income for official development assistance (ODA/GNI) to developing countries and 0.15 to 0.20 per cent of ODA/GNI to least developed countries; ODA providers are encouraged to consider setting a target to provide at least 0.20 per cent of ODA/GNI to least developed countries
- 17.3 Mobilize additional financial resources for developing countries from multiple sources
- 17.4 Assist developing countries in attaining long-term debt sustainability through coordinated policies aimed at fostering debt financing, debt relief and debt restructuring, as appropriate, and address the external debt of highly indebted poor countries to reduce debt distress
- 17.5 Adopt and implement investment promotion regimes for least developed countries

Technology

- 17.6 Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge-sharing on mutually agreed terms, including through improved coordination among existing mechanisms, in particular at the United Nations level, and through a global technology facilitation mechanism

- 17.7 Promote the development, transfer, dissemination and diffusion of environmentally sound technologies to developing countries on favourable terms, including on concessional and preferential terms, as mutually agreed
- 17.8 Fully operationalize the technology bank and science, technology and innovation capacity-building mechanism for least developed countries by 2017 and enhance the use of enabling technology, in particular information and communications technology

CAPACITY-BUILDING

- 17.9 Enhance international support for implementing effective and targeted capacity-building in developing countries to support national plans to implement all the Sustainable Development Goals, including through North-South, South-South and triangular cooperation

TRADE

- 17.10 Promote a universal, rules-based, open, non-discriminatory and equitable multilateral trading system under the World Trade Organization, including through the conclusion of negotiations under its Doha Development Agenda
- 17.11 Significantly increase the exports of developing countries, in particular with a view to doubling the least developed countries' share of global exports by 2020
- 17.12 Realize timely implementation of duty-free and quota-free market access on a lasting basis for all least developed countries, consistent with World Trade Organization decisions, including by ensuring that preferential rules of origin applicable to imports from least developed countries are transparent and simple, and contribute to facilitating market access

SYSTEMIC ISSUES

Policy and institutional coherence

- 17.13 Enhance global macroeconomic stability, including through policy coordination and policy coherence
- 17.14 Enhance policy coherence for sustainable development
- 17.15 Respect each country's policy space and leadership to establish and implement policies for poverty eradication and sustainable development

Multi-stakeholder partnerships

- 17.16 Enhance the Global Partnership for Sustainable Development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the Sustainable Development Goals in all countries, in particular developing countries
- 17.17 Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships

Data, monitoring and accountability

- 17.18 By 2020, enhance capacity-building support to developing countries, including for least developed countries and small island developing States, to increase significantly the availability of high-quality, timely and reliable data disaggregated by income, gender, age, race, ethnicity, migratory status, disability, geographic location and other characteristics relevant in national contexts
- 17.19 By 2030, build on existing initiatives to develop measurements of progress on sustainable development that complement gross domestic product, and support statistical capacity-building in developing countries

List of TABLES AND BOXES

GETTING IN TOUCH WITH THE EU

IN PERSON

All over the European Union there are hundreds of Europe Direct information centres. You can find the address of the centre nearest you at: ***https://europa.eu/european-union/contact_en***

ON THE PHONE OR BY EMAIL

Europe Direct is a service that answers your questions about the European Union. You can contact this service:

- by freephone: **00 800 6 7 8 9 10 11** (certain operators may charge for these calls),
- at the following standard number: **+32 22999696**, or
- by electronic mail via: ***https://europa.eu/european-union/contact_en***

FINDING INFORMATION ABOUT THE EU

ONLINE

Information about the European Union in all the official languages of the EU is available on the Europa website at: ***https://europa.eu/european-union/index_en***

EU PUBLICATIONS

You can download or order free and priced EU publications from EU Bookshop at: ***https://publications.europa.eu/en/publications***. Multiple copies of free publications may be obtained by contacting Europe Direct or your local information centre (see ***https://europa.eu/european-union/contact_en***).

KJ-NA-30067-EN-N

The European Commission's science and knowledge service

Joint Research Centre

JRC Mission

As the science and knowledge service of the European Commission, the Joint Research Centre's mission is to support EU policies with independent evidence throughout the whole policy cycle.

EU Science Hub

ec.europa.eu/jrc

@EU_ScienceHub

EU Science Hub - Joint Research Centre

EU Science, Research and Innovation

EU Science Hub

Publications Office of the European Union

ISBN 978-92-76-15403-7
doi:10.2760/670387