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Commission

MONITORING THE SDGs AT THE REGIONAL LEVEL IN EU

REGIONS2030 PILOT PROJECT
FINAL REPORT

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ABSTRACT

The Final Report of the REGIONS2030 project analyses the results of the participation of 10 European Regions in the pilot project "REGIONS2030: monitoring the SDGs in the EU regions - filling the data gaps" (published by the Joint Research Centre - JRC of the European Commission on September 1, 2022, with the support of the European Parliament) and their proposals to develop and improve the framework of indicators for the regional monitoring of the Sustainable Development Goals (SDGs) of the 2030 Agenda.

The Report illustrates the methodological approach and the data analysis for developing a regional monitoring indicator set for the SDGs, useful in the European framework for all European regions.

Based on the analysis of the indicators proposed by the JRC about the SDG Targets, the ten Regions (North Aegean, Western Macedonia, Navarra, Andalucia, Piemonte, Puglia, Pomorskie, Centro, Nord-Vest, and Manisa, Afyonkarahisar, Kutahya, Usak – T33) selected a set of available, functional, and additional indicators, in coherence with regional needs and priorities, also concerning the regional (and national) monitoring system.

Thanks to the valuable work carried out by the regions in collaboration with the JRC and the regions' suggestions, the Final Report presents the final set of indicators proposed to monitor the achievement of the SDGs at the regional level in Europe.

The availability of a coherent and comprehensive monitoring framework with a related set of indicators like the SDGs is critical to designing better place-based policies to foster sustainable development.

FOREWORD

On September 1, 2022, the European Commission's Joint Research Centre (JRC) published the pilot project "REGIONS2030: monitoring the SDGs in the EU regions - filling the data gaps", with an invitation addressed to the Regions of the Member States.

The JRC has developed the REGIONS2030 project with the support of the European Parliament, building on existing work done in the framework of the cooperation with relevant Commission services on the localisation of the SDGs and their local monitoring (URBAN2030), as well as on the establishment and annual review of the EU SDGs indicator set and report carried out by Eurostat. The REGIONS2030 project will be carried out, inter alia, through the involvement of up to 10 European regions that have a strong ambition to monitor the achievement of the SDGs and are willing to explore the synergies between SDGs monitoring, policy-making and sustainable regional development.

The 10 regions participating in the project are: North Aegean (Greece), Western Macedonia (Greece), Navarra (Spain), Andalucia (Spain), Piemonte (Italy), Puglia (Italy), Pomorskie (Poland), Centro (Portugal), Nord-Vest (Romania) and Manisa, Afyonkarahisar, Kutahya, Usak (Turkey).

The work of the 10 regions concluded in June 2023. Each of the 10 regions developed a technical report and presented the results in a technical meeting (June 2023) attended by the JRC project team, and the experts from the 10 regions along with their respective regional representatives. By the end of 2023, two experts from the pilot regions, appointed by the JRC, authors of this text (Draft Report), will analyze the 10 technical reports, the indicators analyzed and proposed by the regions, and will draft the Final Report and the final dataset.

This work will contribute to define the final consolidated methodology and the resulting set of indicators at NUTS2 level that will be recommended to be used in the whole of the EU for monitoring the SDGs.

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EXECUTIVE SUMMARY

This Report highlights the results of the pilot project “Regions2030: monitoring the SDGs in the EU regions - filling the data gaps”. Based on the analysis carried out by the 10 pilot regions of the project - North Aegean (Greece), Western Macedonia (Greece), Navarra (Spain), Andalucia (Spain), Piemonte (Italy), Puglia (Italy), Pomorskie (Poland), Centro (Portugal), Nord-Vest (Romania) and Manisa, Afyonkarahisar, Kutahya, Usak (Turkey) - this report selects and proposes a set of indicators for tracking the SDGs at the regional level. The chosen indicators come with detailed information on their definition, availability, and relevance.

POLICY CONTEXT

The Sustainable Development Goals are a universal call to action to end poverty, protect the planet and improve the lives and prospects of everyone, everywhere. The 17 Goals were adopted by all UN Member States in 2015, as part of the 2030 Agenda for Sustainable Development which set out a 15-year plan to achieve the Goals.

The European Union (EU) has played a crucial role both setting and implementing the SDGs. It has committed to deliver on the 2030 Agenda through the integration of sustainable principles into its internal and external policies, as outlined in the Towards a Sustainable Europe by 2030 reflection paper, the European Green Deal and the European Commission's political priorities and work programme. In order to assess advancements toward these goals, EU Member States generate voluntary national reviews, aligning with UN guidelines.

While the UN framework for SDGs is predominantly country-based, efforts to localise the SDGs are ongoing, recognizing the critical role that subnational entities, regions, municipalities, and local communities play in achieving sustainable development goals. A shared system to monitor SDGs regionally is necessary to ensure that they are translated into meaningful local strategies across Europe.

KEY CONCLUSIONS

Based on JRC's initial proposal containing a set of 83 indicators for SDG monitoring at regional level and as a result of the aggregated analysis of the reports carried out by the 10 regions participating in the project, more than 200 indicators have been identified that could be used for regional SDG monitoring.

A detailed analysis of all these indicators (definitions, scope, availability, harmonization), as well as their data sources (supranational, national and/or local) and their typology (official or experimental) has led to a selection of 116 indicators that are proposed as a common set of indicators to monitor all SDGs at regional level in Europe.

MAIN FINDINGS

Accurate and reliable data at the local level is essential to monitor progress towards the SDGs and to make informed decisions to help achieve the goals. One of the challenges we face when analyzing the SDGs at the regional level is the availability of multiple sources of information and the harmonisation and homogeneity of data. Supranational sources such as Eurostat should be prioritized. Local-level data may be scarce or unavailable, making it challenging to obtain a comprehensive understanding of the SDGs situation in a specific area. Addressing the lack of local statistical capacity requires a concerted effort from local and national governments. The suggested list of indicators aims to provide a broad framework for monitoring the Sustainable Development Goals (SDGs) in diverse regions. However, the interpretation and relevance assigned to each indicator are influenced by regional diversity. Differences in geography, governance and technology, among others, make it dangerous to rely on generalized knowledge for progress in achieving the SDGs in a given region.

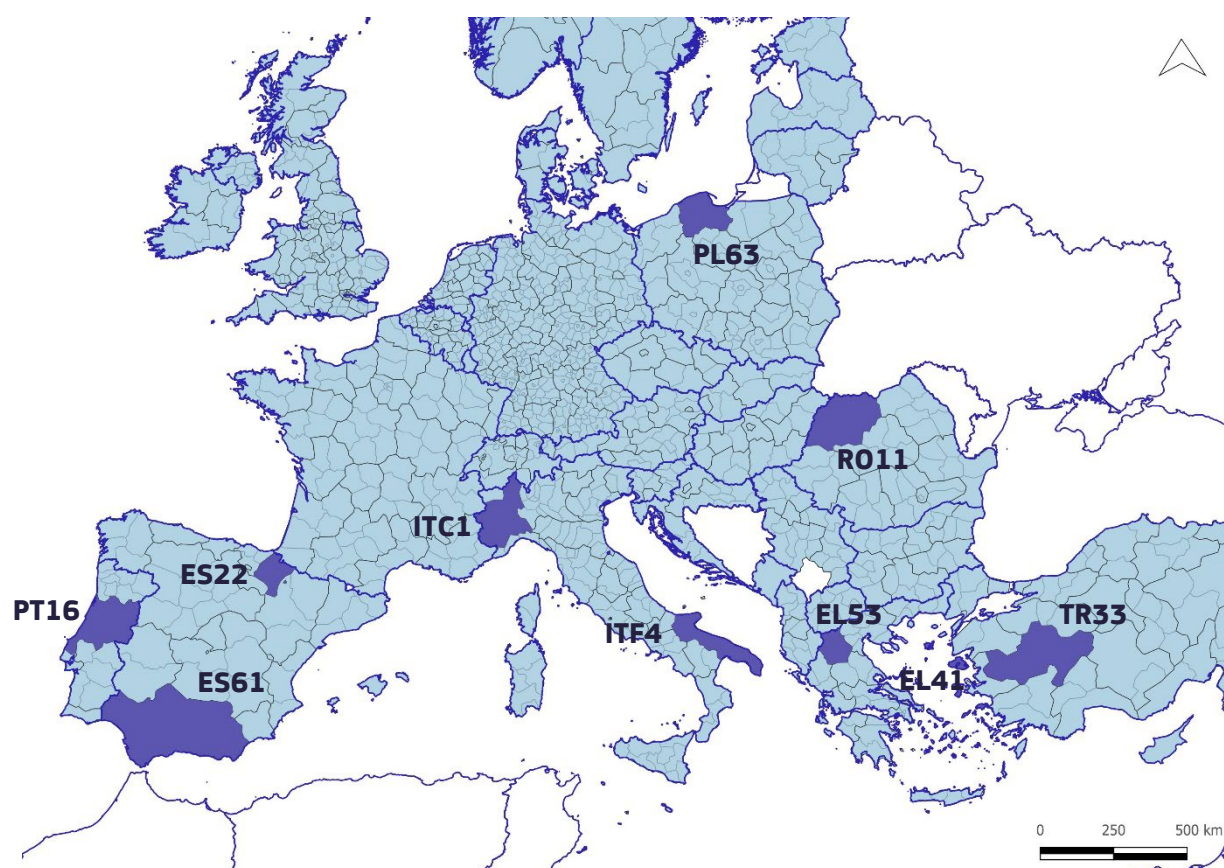
QUICK GUIDE

This report is organized as follows. The first chapter outlines the process undertaken in the development of this report within Project REGIONS2030. The second chapter compiles information on the studies conducted in the 10 participating regions regarding the indicators from the initial JRC's set of indicators and the difficulties encountered in the process. Chapter 3 analyzes the pros and cons of the proposals put forth by the regions to expand and/or modify the initial set of indicators. Chapter 4 presents the final selection of indicators, providing detailed information on each and the reasons for their inclusion in the final set. Finally, chapters 5, 6, and 7 present challenges, recommendations, and conclusions, respectively.

1. INTRODUCTION

This Report highlights the results of the REGIONS2030 project, taking into account the work carried out by the ten pilot regions of the project – North Aegean (Greece), Western Macedonia (Greece), Navarra (Spain), Andalucia (Spain), Piemonte (Italy), Puglia (Italy), Pomorskie (Poland), Centro (Portugal), Nord-Vest (Romania) and Manisa, Afyonkarahisar, Kutahya, Usak (Turkey) – and outlines the proposed approach and methodology, to develop, test, analyse, and improve a framework of indicators for monitoring the SDGs at the regional level in Europe.

Figure 1 - The 10 pilot regions of the REGIONS 2030 project



North Aegean (Greece) – EL41, Western Macedonia (Greece) – EL53, Navarra (Spain) – ES22, Andalucia (Spain) – ES61
 Piemonte (Italy) – ITC1, Puglia (Italy) – ITF4, Pomorskie (Poland) – PL63, Centro (Portugal) – PT16, Nord-Vest (Romania) – RO11
 Manisa, Afyonkarahisar, Kutahya, Usak (Turkey) – TR33

Source: authors' own elaboration

The Report aims to synthesize the findings to identify common themes, suggestions, expected outcomes and challenges across the pilot regions, to assess the proposed indicators, methodologies and working approach presented in the technical reports, and evaluate their effectiveness in monitoring SDG progress at the regional level.

The Final Report will provide valuable suggestions to monitor sustainable development at the regional level at the European level as a valuable resource for SDG practitioners and policymakers, supporting the EU's commitment to monitoring sustainable development indicators.

1.1 The REGIONS 2030 project

The Pilot Project "REGIONS2030: Monitoring the SDGs in the EU regions - Filling the data gaps", supported by the European Parliament, is developed by the Joint Research Centre (JRC) in collaboration with ESTAT and DG REGIO, and it is part of the JRC activities on the Localisation of the SDGs.

The pilot project has been proposed in 2021 and approved by the EC in 2022.

The REGIONS2030 Pilot Project has involved 10 European regions, which share a solid ambition to monitor the achievement of the SDGs and are willing to explore the synergies of SDGs monitoring, policy-making and sustainable regional development.

The participating regions worked (between December 2022 and May 2023) with experts and partners to develop, test and improve a framework of indicators for monitoring the achievement of the SDGs at the regional level. They contributed to defining the method and identifying the relevant indicators at the NUTS2 level, which will eventually be used in the whole of the EU. Where relevant, regions proposed additional customised indicators to reflect different contexts. The overall aim is to cover all SDGs and the majority of the 169 targets.

The pilot project has two main objectives:

1. Engaging EU regions in the monitoring process of the Sustainable Development Goals (SDGs) – to provide a framework for regional authorities to monitor the SDGs in their territory and to support and enhance regional statistical capacities in the collection of data, the monitoring, and the evaluation process.
2. Increase local ownership of the SDGs and openness and transparency in achieved results – to provide tailored training to regional authorities for the proper collection and analysis of data, to ensure their quality, and to make all the data available to the public.

The project will conclude in December 2023 with four expected results:

- To have defined and tested a harmonised set of indicators for EU regions to monitor the achievement of the Sustainable Development Goals (SDGs);
- To have increased the knowledge and capacities of EU regions on monitoring and reporting of the SDGs;
- To have engaged EU regions in a participative process of localising the SDGs;
- To have improved the regional data and knowledge base to support the EU's regional and urban policy.

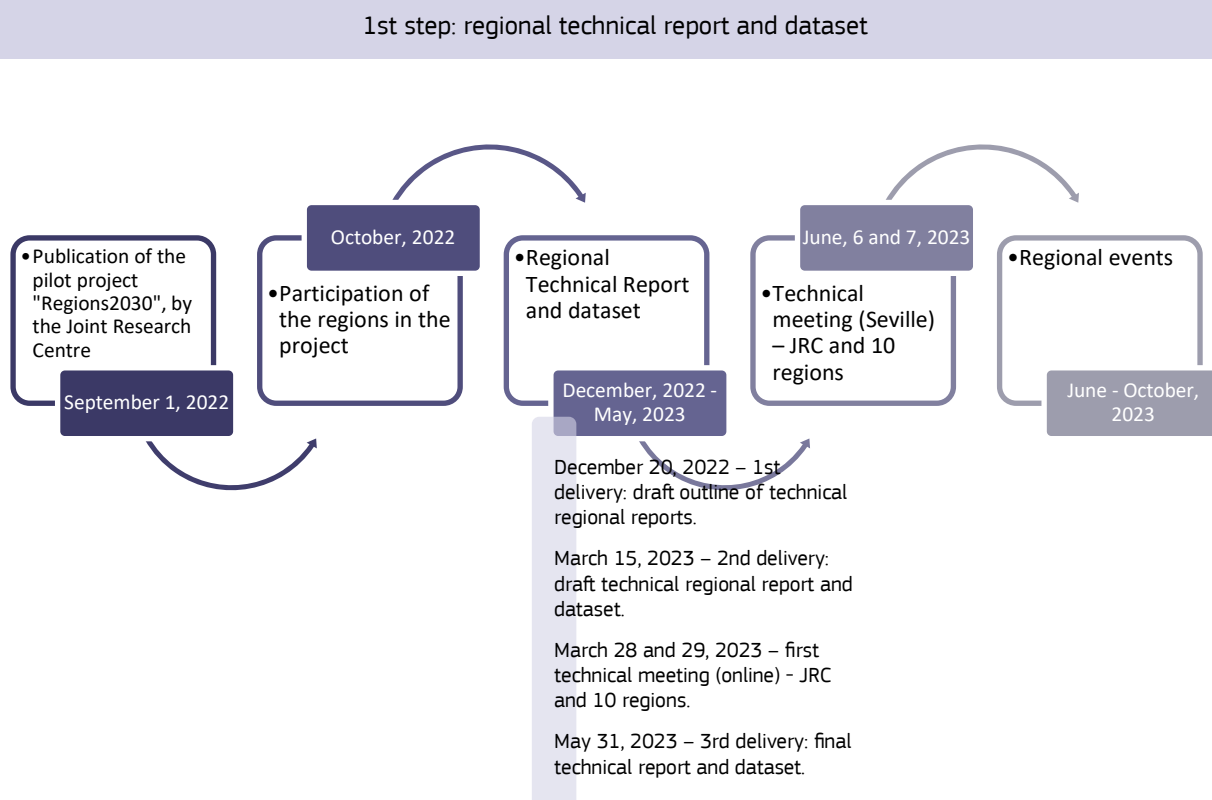
1.1.1 The 10 Pilot Regions

A brief description of the 10 regions that participated in the project and a brief mention of the institutional context in relation to the Sustainable Development Strategies and the monitoring systems of the sustainability goals are presented in Annex 1.

1.1.2 The process of the project

The project started on September 1, 2022 with the publication of the pilot project "Regions2030: monitoring the SDGs in the EU regions - filling the data gaps", by the Joint Research Centre (JRC) of the European Commission. An invitation was extended to the regions of the Member States. By October, 2022 the regions had expressed interest in participating in the project. In December, experts, with the support of the regions, initiated the analysis of the indicators, and by May 31, 2023 they had concluded the 10 technical reports. The regions presented the project's results in Seville during the 2nd technical meeting in June, 2023.

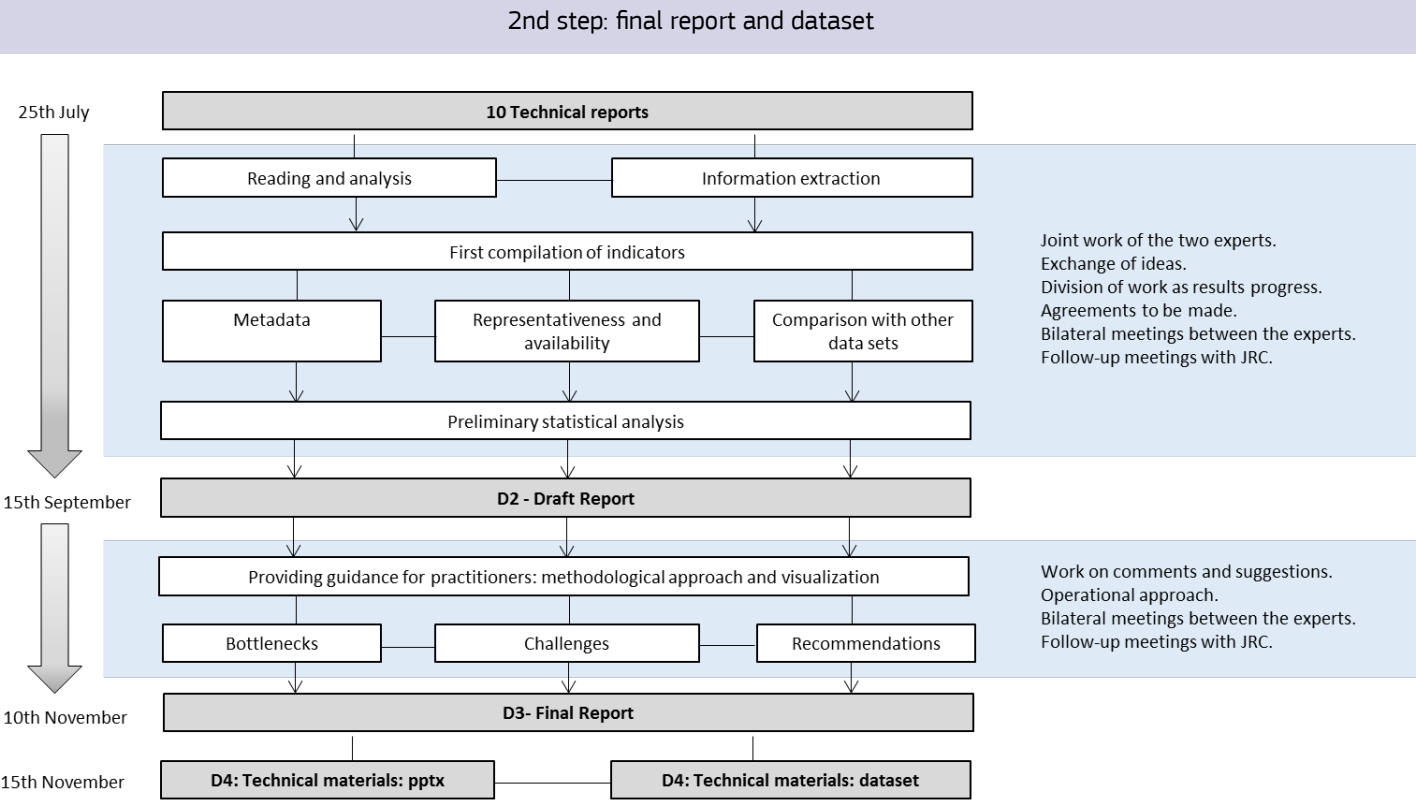
Figure 2 - First step of the project process



Source: authors' own elaboration

In July 2022, two out of the ten regional experts were hired to continue working with the JRC on drafting the final report. These two experts analyzed the ten technical reports, assessed potential similarities or discrepancies in the results between the analyses of indicators proposed by the JRC and the suggestions for new or alternative indicators, the challenges, and helpful recommendations for future regional analyses in Europe. The delivery of the final report was submitted in November 2023.

Figure 3 - Second step of the project process



Source: authors' own elaboration

2. TOWARDS A CONSOLIDATED INDICATORS SET FOR MONITORING THE SDGs AT REGIONAL LEVEL

2.1 Approach and methodology: from the JRC indicator set to the 10 piloted indicator sets

The analyses, developed by the 10 regions, started from the JRC study about a “Methodological approach for the creation of an SDG regional monitoring indicator set”.

The JRC proposed (at the end of 2022) a dataset that includes 83 indicators, covering the entirety of the 17 SDGs and 52 (out of 169) SDG targets of the 2030 Agenda.

Table 1 - Indicators per SDG in the set

SDG	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	TOT
N. SDG Targets	3	3	4	5	4	2	3	6	2	2	4	3	1	2	2	2	4	52
N. of indicators	4	4	5	7	7	4	4	10	5	2	9	3	4	3	4	4	4	83

Source: JRC 2022

This dataset - **83 indicators proposed by the JRC** - has been tested by pilot regions, which verified its **availability** (at the regional level), quality and data accuracy. In cases where indicators were not measurable or data was unavailable at the regional level, the regions suggested replacing the indicators proposed by the JRC with alternative ones and identified potentially **additional indicators**, deemed useful in relation to SDG targets, territorial characteristics, regional needs, etc.

Table 2 - Total number of indicators analyzed by the regions

Tot indicators	JRC dataset	North Aegean (Greece)	Western Macedonia	Navarra (Spain)	Andalucía (Spain)	Piemonte (Italy)	Puglia (Italy)	Pomorskie (Poland)	Centro (Portugal)	Nord-Vest (Romania)	TR33 (Turkey)
Available indicators from JRC dataset	83	62	62	70	80	75	81	60	71	49	44
Additional indicators		3	7	9	36	45	14	21	29	27	22
Tot indicators	83	65	69	79	116	120	95	81	100	76	66

Source: authors' own elaboration

The tables below show the number of analyzed indicators available at the regional level for each SDG: from the JRC proposal (Table 3) and from the regions' proposals (Table 4 and Table 5).

Table 3 - Available indicators at the regional level from the JRC proposal for each SDG of the 2030Agenda

JRC dataset		North Aegean (Greece)	Western Macedonia (Greece)	Navarra (Spain)	Andalucía (Spain)	Piemonte (Italy)	Puglia (Italy)	Pomorskie (Poland)	Centro (Portugal)	Nord-Vest (Romania)	TR33 (Turkey)
SDG	N.indicators	N. of available indicators (available from JRC dataset or alternative from regional dataset)									
1	4	3	4	4	4	4	4	3	4	3	1
2	4	3	3	4	4	4	4	3	3	2	2
3	5	5	5	5	5	5	5	5	4	4	4
4	7	7	6	7	7	7	7	7	7	5	7
5	7	5	4	7	7	6	7	4	7	4	3
6	4	2	2	2	4	4	4	2	4	1	2
7	4	1	2	3	4	2	3	2	3	0	1
8	10	10	10	9	10	10	10	9	8	8	7
9	5	4	4	5	5	5	5	5	5	4	2
10	2	1	2	2	2	2	2	2	1	0	2
11	9	8	8	7	6	9	9	7	6	5	7
12	3	1	1	1	3	2	3	1	2	0	0
13	4	4	3	4	4	4	4	2	4	3	3
14	3	1	0	0	3	0	3	0	3	0	0
15	4	3	4	4	4	4	4	3	4	4	0
16	4	3	3	2	4	4	4	3	3	3	1
17	4	1	1	4	4	3	3	2	3	3	2
TOT	83	62	62	70	80	75	81	60	71	49	44

Source: authors' own elaboration

In the first case, for the analysis of indicators proposed by the JRC., each region checked the availability of data at the regional level, from European sources or from national/regional sources. Some regions chose to prioritize European sources when the data was available, while other regions preferred to prioritize national/regional sources when available (even if the data was available from European sources). For indicators not available from European or national/regional sources, regions proposed alternative indicators when possible.

As reported in the following table, each region has analyzed:

North Aegean, 62 available indicators from the JRC proposed dataset that covered 40 SDG targets: 40 indicators have available data from European sources, 16 indicators have available data from national/regional or other sources and 6 indicators are replaced by an alternative indicator.

Western Macedonia, 62 available indicators from the JRC proposed dataset that covered 41 SDG targets: 38 indicators have available data from European sources, 13 indicators have available data from national/regional or other sources and 11 indicators are replaced by an alternative indicator.

Navarra, 70 available indicators from the JRC proposed dataset that covered 47 SDG targets: 36 indicators have available data from European sources, 28 indicators have available data from national/regional or other sources and 6 indicators are replaced by an alternative indicator.

Andalucía, 80 available indicators from the JRC proposed dataset that covered 52 SDG targets: 7 indicators have available data from European sources, 66 indicators have available data from national/regional or other sources and 7 indicators are replaced by an alternative indicator.

Piemonte, 75 available indicators from the JRC proposed dataset that covered 47 SDG targets: 46 indicators have available data from European sources, 16 indicators have available data from national/regional or other sources and 13 indicators are replaced by an alternative indicator.

Puglia, 81 available indicators from the JRC proposed dataset that covered 51 SDG targets: 39 indicators have available data from European sources, 27 indicators have available data from national/regional or other sources and 15 indicators are replaced by an alternative indicator.

Pomorskie, 60 available indicators from the JRC proposed dataset that covered 41 SDG targets: 22 indicators have available data from European sources, 38 indicators have available data from national/regional or other sources (no alternative indicators).

Centro, 71 available indicators from the JRC proposed dataset that covered 48 SDG targets: 18 indicators have available data from European sources, 52 indicators have available data from national/regional or other sources and 1 indicator is replaced by an alternative indicator.

Nord-Vest, 49 available indicators from the JRC proposed dataset that covered 32 SDG targets: 40 indicators have available data from European sources, 9 indicators have available data from national/regional or other sources.

Manisa, Afyonkarahisar, Kutahya, Usak, 44 available indicators from the JRC proposed dataset that covered 32 SDG targets: 29 indicators have available data from European sources, 6 indicators have available data from national/regional or other sources and 9 indicators are replaced by an alternative indicator.

A detailed table with the individual indicators available at the regional level is to be found in Annex 2.

Table 4 - Alternative indicators proposed by the regions

FIT for PURPOSE indicators without available data at the regional level (NUTS2) > Alternative Indicators			
n.	SDG	JRC Indicators	Alternative indicators
2	1	Affected people due to disasters	Population exposed to at least one forest fire (W. Macedonia) Population exposed to the risk of floods and landslides (Piemonte, Puglia) Affected people due to natural disasters (Andalucia)
3	1	Material and social deprivation	Severe material and social deprivation (Navarra) Severe material deprivation (Navarra, Piemonte, Puglia)
6	2	Organic farming: areas with different crops	Share of utilised agricultural area (UAA) cultivated with organic crops (Piemonte) Production area (T33)
9	3	Deaths due to Covid-19	Patients cared for in mental health centres (Navarra) Death rate due to communicable diseases (Centro)
10	3	Self reported unmet needs for medical examination	Satisfaction with health services (family doctors and public hospital services) (Piemonte)
14	4	Women 30-34 years old with higher education level	Female 30-34 and Universities and Other Higher Educational Institutions (T33)
20	4	Distribution of pupils and students enrolled in general and vocational programmes	Participation rate in education and training (last 4 weeks) (W. Macedonia)
22	5	Victims of violence against women	Number of domestic violence incidents (North Aegean)
24	5	Inactive population rate due to caregiving responsibilities	Inactive population due to personal or family reasons (North Aegean) Unemployment rate of women (W. Macedonia) Ratio of employment rate for women aged 25-49 with at least one child aged 0-5 to the employment rate of women 25-49 years without children, multiplied by 100 (Puglia) Population not in labour force (1000) due to domestic work (Female/ 15-64 ages) (T33)
25	5	Women in parliament and government	Parliamentary General Election - Number of female candidates (T33)

27	5	Gender gap in part-time employment incidence	Gender gap for the employment rate (North Aegean)
28	6	Water bodies that exceed a standardized quality rating	Percentage of water bodies achieving the ecological quality objective (high or good) out of the total number of surface water bodies (rivers and lakes) (Piemonte)
29	6	Groundwater that exceed a standardized quality rating	Groundwater monitoring (Piemonte)
30	6	Population served by safely managed drinking water supply services	Efficiency of drinking water distribution networks (Piemonte) Percentage of households who report irregularities in water supply (Puglia) Drinking water networks and water treatment plants: Rate of population served by water supply network in total municipal population (%) (T33) Proportion of population served by National drinking water system coverage (Andalucia)
31	6	Population connected to wastewater with at least secondary treatment	Urban waste water system with secondary or advanced treatment (Piemonte, Puglia) Population connected to urban wastewater collection system (North Aegean) Municipal wastewater statistics : Rate of municipal population served by sewerage system in total municipal population (%) (T33)
33	7	Electricity production that comes from renewable sources	Installed power that comes from renewable energy sources (W. Macedonia)
35	7	People affected by energy poverty	Consumers' satisfaction about the Electricity providers' services (Puglia)
39	8	Firm creation	Number of firms (W. Macedonia)
41	8	GDP at current market prices	GDP at constant prices or volume (Navarra)
42	8	GVA at basic prices	GVA per worker at constant prices or volume (Navarra)
44	8	Compensation of employees	Compensation of employees as a percentage of GDP (Navarra)
46	9	GVA of the industry with respect to the GVA of the total sectors (current price)	Added value of manufacturing industry to total economy (Piemonte)
49	9	Employment in high-technology manufacturing as a percentage of total manufacturing employment	Personnel on high-tech knowledge-intensive service as a percentage of total services employment (W. Macedonia)
51	10	Unemployment of people with disabilities	Disability employment gap (W. Macedonia) Employees with disabilities (Piemonte) Net Entry rate in the job market of people with disabilities (Puglia)
52	10	Gini index of disposable income (after taxes and transfers)	S80/S20 income distribution (W. Macedonia) Gini coefficient by equivalised household disposable income: Gini coefficient (T33) Disposable income (North Aegean)
53	11	Households expenses dedicated to housing costs	Sorted and mixed household and commercial waste generation per inhabitant (Navarra)
54	11	Transport performance	Household expenses dedicated to public transport means to total (W. Macedonia) Seats/ km offered by the local public transport service (Puglia)
57	11	Difference between built-up area growth rate and population growth rate	Artificial Surfaces (W. Macedonia) Soil sealing per capita (Piemonte) Marginal land consumption (Puglia) Built-up area per capita (Andalucia)
59	11	PM2.5 Emissions	Air pollution in PM2.5 (average level in $\mu\text{g}/\text{m}^3$ experienced by the population) (T33)
60	11	Household and commercial waste generation per inhabitant	Municipal waste statistics : Rate of population receiving waste services in total population (%) and in total municipal population (%) (T33)
62	12	Carbon footprint	CO2 equ per capita (Piemonte) Domestic material consumption (Puglia)
63	12	Food waste	Regional Food Waste (Puglia) Household food waste (Andalucia) BioWaste (North Aegean)

69	14	Estuarine with high/very high water quality	Beached marine waste (Puglia)
70	14	Protected coastal area as a percentage of total coastal area	Protected marine areas (Puglia) Surface area of marine sites designated under Natura 2000 (Andalucia)
71	14	Coastal areas with good/very good water quality	Coastal bathing waters (Puglia)
72	15	Terrestrial protected areas as a percentage of total area	Area of terrestrial sites designated under Natura 2000 (Andalucia)
74	15	Land Abandonment	Burnt forest surface (tree cover and scrub area) as a proportion of total forest surface (Andalucia)
76	16	Transparency index	Index on transparency, participation and collaboration in cohesion policies (Piemonte) Composite index of service accessibility (Puglia)
83	17	Individuals who used the internet for interaction with public authorities	Households with internet access (W. Macedonia)

Source: authors' own elaboration

Finally, the proposal for additional indicators, which are analyzed in Chapter 3, are presented below.

Table 5 - Additional indicators from the regions' proposals for each SDG of the 2030 Agenda

ADD. IND.	North Aegean (Greece)	Western Macedonia (Greece)	Navarra (Spain)	Andalucia (Spain)	Piemonte (Italy)	Puglia (Italy)	Pomorskie (Poland)	Centro (Portugal)	Nord-Vest (Romania)	TR33 (Turkey)
SDG	N. of additional indicators (from the regional datasets)									
1			1	2	3			2		3
2	1		1	3	1				6	2
3	1			5	1		1	7		5
4			1		6	2	4	2	7	1
5					1		1	1		1
6					2	1	1	1	5	2
7		1		1	4	1	1	1		
8		2	1	2	4	1	2	5	2	
9			1	4	3	1	3	1	1	8
10			2	2	2			1		
11			2	2	3		4	2	6	
12		2		2	8	4	2	1		
13				4	2	1	1			
14				2			1	2		
15	1			1	1	1		1		
16		1		4	4	1		2		
17	1	1		2		1				
TOT	3	7	9	36	45	14	21	29	27	22

Source: authors' own elaboration

Figure 4 - Summary of the available and additional indicators for each region



Source: authors' own elaboration

2.1.1 SDG Targets

Considering that the 83 indicators proposed by the JRC cover 52 SDG targets and considering the indicators analyzed that are relevant for the regions (*Fit for purpose and alternative indicators*), below the 52 targets covered by the indicators used (at the regional level) by the 10 regions are described.

Table 6 - SDG targets covered by the indicators used for each SDG

SDG	SDG targets	North Aegean (Greece)	W.Macedonia (Greece)	Navarra (Spain)	Andalucía (Spain)	Piemonte (Italy)	Puglia (Italy)	Pomorskie (Poland)	Centro (Portugal)	Nord-Vest (Romania)	T33 (Turkey)
1	1.1 (extreme poverty)	1	1	1	1	1	1	1	1	1	
1	1.2 (reduce poverty)	2	2	2	2	2	2	2	2	2	
1	1.5 (exposure to vulnerability)		1	1	1	1	1		1		1
2	2.2 (end malnutrition)			1	1	1	1	1	1		
2	2.3 (agricultural productivity)	2	2	2	2	2	2	2	1	2	1
2	2.4 (sustainable food production)	1	1	1	1	1	1		1		1
3	3.2 (preventable death of newborns)	1	1	1	1	1	1	1	1	1	1
3	3.3 (epidemics and diseases)	1	1	1	1	1	1	1	1		1
3	3.8 (universal health coverage)	1	1	1	1	1	1	1	1	1	1
3	3.c (health financing and recruitment)	2	2	2	2	2	2	2	1	2	1
4	4.1 (primary and secondary education)	1	1	1	1	1	1	1	1	1	1
4	4.2 (access to early childhood education)	1	1	1	1	1	1	1	1	1	1
4	4.3 (vocational and tertiary education)	3	2	3	3	3	3	3	3	2	3
4	4.5 (gender and other disparities in education), 4.6 (youth and adult literacy)	1	1	1	1	1	1	1	1		1
4	4.6 (youth and adult literacy)	1	1	1	1	1	1	1	1	1	1
5	5.1 (gender discrimination)	1	1	1	1	1	1	1	1	1	
5	5.2 (gender violence)	1		2	2	2	2		2		
5	5.4 (unpaid work)	2	1	2	2	1	2	1	2	1	2
5	5.5 (women participation and leadership)	1	2	2	2	2	2	2	2	2	1
6	6.1 (universal access to water)			1	1	1	1	1	1		1
6	6.3 (water quality)	2	2	1	3	3	3	1	3	1	1
7	7.1 (access to energy)	1	1	1	1		1		1		
7	7.2 (share of renewable energy)		1	1	2	1	1	1	1		1
7	7.3 (energy efficiency)			1	1	1	1	1	1		
8	8.1 (economic growth)	1	1	1	1	1	1	1	1	1	1
8	8.2 (economic productivity)	1	1	1	1	1	1	1		1	1
8	8.3 (job creation)	1	1		1	1	1		1	1	
8	8.5 (productive employment)	5	5	5	5	5	5	5	4	4	4
8	8.6 (youth not in employment, education or training)	1	1	1	1	1	1	1	1		1
8	8.8 (labour rights)	1	1	1	1	1	1	1	1	1	
9	9.2 (sustainable industrialization)	1	1	1	1	1	1	1	1	1	
9	9.5 (promote innovation)	3	3	4	4	4	4	4	4	3	2
10	10.2 (inclusion irrespective of status)		1	1	1	1	1	1			1

10	10.4 (greater equality)	1	1	1	1	1	1	1	1		1
11	11.1 (access to housing)	1	1	1	1	1	1	1	1		1
11	11.2 (access to transport systems)	4	4	2	2	4	4	3	2	3	3
11	11.3 (sustainable urbanization)	1	1	2	1	2	2	1	1	1	1
11	11.6 (environmental impact)	2	2	2	2	2	2	2	2	1	2
12	12.2 (management of natural resources)				1	1	1		1		
12	12.3 (reduce food waste)	1			1		1				
12	12.4 (chemical management)		1	1	1	1	1	1	1		
13	13.2 (climate change measures into policy)	4	3	4	4	4	4	2	4	3	3
14	14.1 (reduce marine pollution)				1		1		1		
14	14.5 (coastal and marine areas)	1			2		2		2		
15	15.1 (restoration of ecosystems)	2	2	2	2	2	2	1	2	2	
15	15.5 (degradation of habitats)	1	2	2	2	2	2	2	2	2	
16	16.5 (reduce corruption)	1	1	1	1	1	1	1	1	1	
16	16.6 (effective institutions)	2	2	1	3	3	3	2	2	2	1
17	17.12 (imports from least developed countries)			1	1	1	1		1		
17	17.2 (development assistance commitments)			1	1					1	1
17	17.6 (regional and international cooperation)			1	1	1	1	1	1	1	1
17	17.8 (enabling technology)	1	1	1	1	1	1	1	1	1	
ToT indicators (83 JRC)		62	62	70	80	75	81	60	71	49	44
ToT targets (52 JRC)		40	41	47	52	47	51	41	48	32	32

Source: authors' own elaboration

In general, the used indicators cover all the analysed SDG targets (52, associated with the 83 indicators proposed by the JRC). However, the most significant challenges are observed for targets:

- 12.2 management of natural resources,
- 12.3 reduce food waste,
- 14.1 reduce marine pollution,
- 14.5 coastal and marine areas,
- 17.2 development assistance commitments,

for which it was considerably complex to associate available indicators at the regional level.

In total, the indicators analyzed by the regions cover a maximum of between 32 and 52 targets, with a different distribution per target.

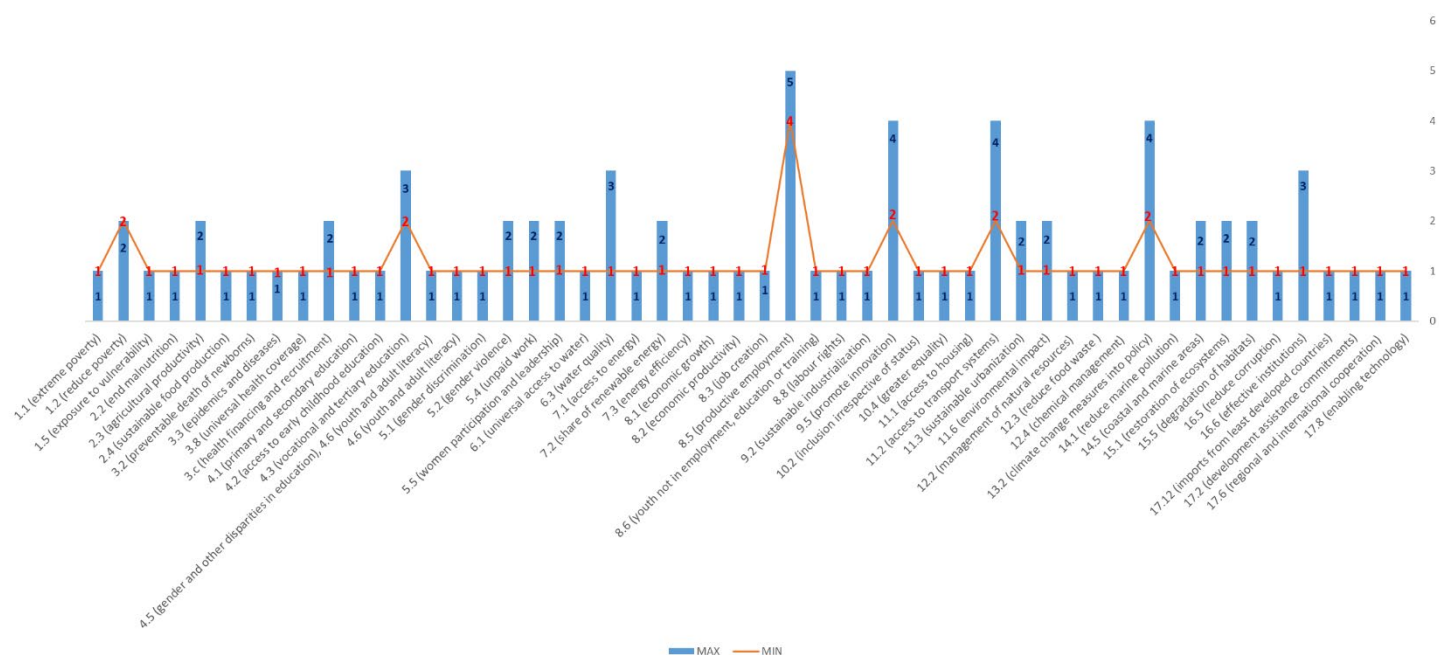
The maximum number of indicators per target is 5 and the minimum 1.

The target with the most indicators available is 8.5 (productive employment) with a maximum number of 5 indicators and a minimum of 4.

Three targets are covered by 4 indicators maximum (9.5 promote innovation, 11.2 access to transport systems, 13.2 climate change measures into policy), and three target by 3 indicators maximum (4.3 vocational and tertiary education, 6.3 water quality, 16.6 (effective institutions).

In general, the other targets are covered by 1 or maximum 2 indicators.

Figure 5 - Maximum and minimum number of indicators per target



Source: authors' own elaboration

2.2 Compilation of indicators: from the 10 piloted indicator sets to the first consolidated indicator set

In Annex 3, the indicators used by the regions are described. These indicators stem from the JRC's proposal. For indicators considered "fit for the purpose", in some cases, regions have used the indicators proposed by the JRC, utilizing the European sources recommended by the JRC. In other cases, even though they used the JRC's proposed indicator, regions chose to utilize data available from national or regional sources. In yet other instances, indicators were substituted with alternative ones. Lastly, there are cases of indicators considered valid but lacking available data. Annex 3 provides key metadata for the indicators used by the regions for each analyzed target.

3. PROPOSAL OF ADDITIONAL INDICATORS

The REGIONS2030 pilot project aims to co-design and co-develop an indicator set to monitor the SDGs at European Regions. Based on a preliminary selection of SDG-related indicators (Vega Rapún et al. 2022), ten European regions have participated in the Regions2030 pilot project and have produced technical reports on SDG monitoring. These reports served different purposes. First, the aim was to study the suitability of these indicators for monitoring the different SDG targets. Second, it also sought to identify gaps in this SDG monitoring and propose indicators to fill them. Third, this was complemented by an analysis of all these indicators in the corresponding region and the identification of challenges and recommendations.

There are now ten technical reports available, one for each region: North Aegean (Strogylopoulos, 2023) and Western Macedonia (Koutsomarkos, 2023) in Greece; Navarra (Osés-Eraso, 2023) and Andalucía (Quintanilla Cabañero, 2023) in Spain; Piemonte (Lella, 2023) and Puglia (Armenise, 2023) in Italy; Pomorskie (Mrozowska, 2023) in Poland; Centro (Abreu, 2023) in Portugal; Nord-Vest (Pop, 2023) in Romania; and Manisa, Afyonkarahisar, Kutahya, Usak (TR33) (Türker, 2023) in Turkey. The analysis presented here is based on the indicator proposals made in these ten reports, either to fill gaps or to replace and/or complement the indicators initially proposed.

Table 5, presented above, contains the proposals for alternative indicators made by the different regions in their reports. These indicators together with new proposals made by the regions are analysed in this chapter. It expands and modifies the classification made by the regions and discusses the main pros and cons of all the indicators that differ from the initial JRC proposals. Departing from the proposals of the regions and deepening in their scope, suitability and relevance, we set a new classification in different subgroups. The proposals are classified as:

- Replacement for a proposed indicator. Identification of indicators which are not available or not considered suitable for the target stated in the initial proposal and which could therefore be replaced by other indicators.
- Complement to a proposed indicator. Identification of indicators that, although available, could be complemented with others to provide further or more precise information on the target to be monitored, giving rise to complementary indicators.
- Specific measure for a proposed indicator. Identification of indicators from the initial proposal whose definition was unclear or whose unit of measurement was not considered appropriate, leading to more specific indicators that serve to measure the initial proposal.
- New indicator. Mainly, identification of gaps in SDG targets that were not covered in the initial set of indicators, leading to the proposal of new indicators.

Table 9 summarises the number of proposals found according to this classification. The last column contains the number of indicators in the initial proposal (Vega-Rapun et al, 2022). The other columns contain the numbers corresponding to the new proposals. In total, 223 proposals have been identified, 112 of which correspond to new indicators. The remaining 111 proposals correspond to replacements (16), complements (39) or specific measures of indicators from the original proposal (56). The SDGs with the most proposals are SDG8 (Decent work and economic growth) and SDG11 (Sustainable cities and communities). The SDGs with the fewest proposals are SDG15 (Life on land) and SDG17 (Partnerships for the goals).

All of these proposals are broken down and detailed below for each of the SDGs. For each of the new proposals it is indicated which region(s) is/are making the proposal. We are faced with a large number of new proposals, which, added to the initial proposal, lead to a wide and varied number of indicators. In this compilation, we incorporate some comments and appreciations that will help us to identify challenges, extract recommendations and open the way towards the development of the final list of indicators.¹

¹ We should keep in mind the recommendation of the EPAH (Energy Poverty Advisory Hub) for the diagnosis of energy poverty at the municipal level, given the wide number of indicators that they identify: "Municipalities can use the 56 indicators as if they were products in a shop. Shop responsibly and select only in the ones you need and can afford to maintain since indicators show their real value the second time you gather information for them and you see the progress of your efforts". If, finally, the list of indicators for monitoring the SDGs at

Table 7 - Summary of new proposals

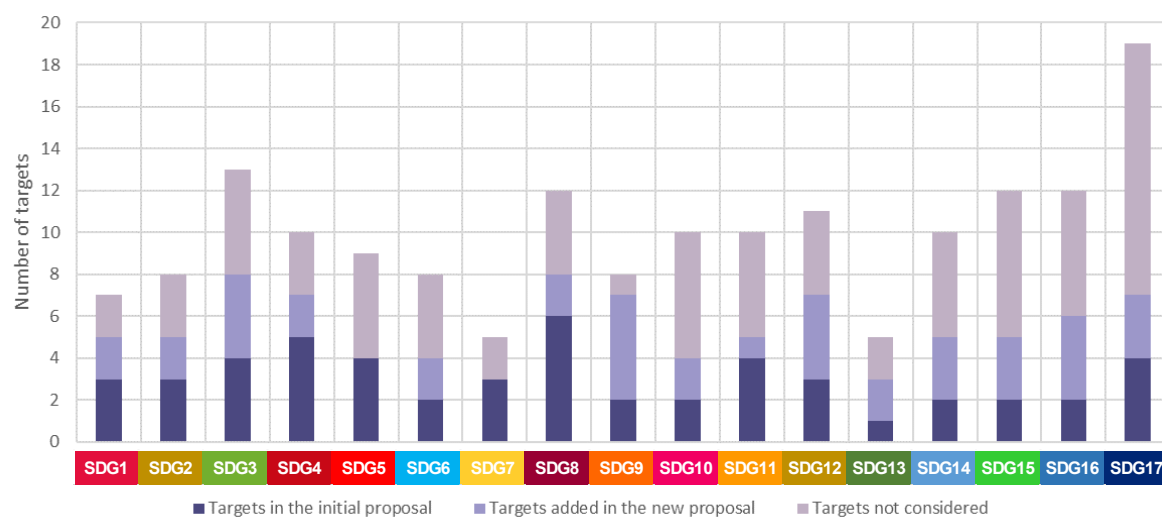
	Replacement	Complement	Specific measure	New indicator	Total	Initial proposal
SDG1	1	0	6	8	15	4
SDG2	0	6	3	3	12	4
SDG3	1	1	6	10	18	5
SDG4	0	2	3	9	14	7
SDG5	0	2	4	5	11	7
SDG6	1	0	9	6	16	4
SDG7	0	4	6	4	14	4
SDG8	5	8	3	10	26	10
SDG9	0	2	0	10	12	5
SDG10	0	4	0	4	8	2
SDG11	4	6	11	5	26	9
SDG12	2	0	1	12	15	3
SDG13	0	3	0	4	7	4
SDG14	0	0	3	5	8	3
SDG15	0	0	0	5	5	4
SDG16	1	1	1	8	11	4
SDG17	1	0	0	4	5	4
Aggregate	16	39	56	112	223	83

Source: authors' own elaboration

It is worth noting that, among all the indicator proposals made in the reports from the regions, 72 of them are proposals that cover SDG targets that were not included in the initial proposal. The new proposals cover a total of 41 targets that were not included in the initial proposal. Figure 6 shows the number of targets considered in the initial proposal done by JRC, the number of targets added with the new proposals of the regions and the number of targets not addressed, broken down by SDG.

regional level is very broad, this advice can be important to give flexibility to the regions and facilitate a correct monitoring of the path towards sustainability.

Figure 6 - SDG targets addressed in the proposals of indicators



Source: Authors' own elaboration

Annex 4 presents and discusses additional indicators proposed by each of the region per SDG.

4. THE FINAL DATASET

4.1 Compilation of indicators: the final consolidated indicator set

The REGIONS 2030 project aims to identify a set of indicators for monitoring the SDGs at the regional level, applicable to all regions in Europe. The results described in this chapter stem from what was proposed by the JRC - 83 indicators selected in the initial proposal - and suggested - 223 indicators in total - by the 10 regions involved in the project: Northern Aegean and Western Macedonia in Greece; Navarra and Andalusia in Spain; Piemonte and Puglia in Italy; Pomorskie in Poland; Centro in Portugal; Nord-Vest in Romania; and Manisa, Afyonkarahisar, Kutahya, Usak (TR33) in Turkey.

The analysis presented here is based on the indicator analysis and proposals made from the pilot regions, in ten technical reports (Northern Aegean - Strogilopoulos, 2023, and Western Macedonia - Koutsomarkos, 2023; Navarra - Osés-Eraso, 2023, and Andalusia - Quintanilla Cabañero, 2023; Piemonte - Lella, 2023, and Puglia - Armenise, 2023; Pomorskie - Mrozowska, 2023; Centro - Abreu, 2023; Nord-Vest - Pop, 2023; and Manisa, Afyonkarahisar, Kutahya, Usak -Türker, 2023), which, first of all, distinguished between indicators considered “fit or not fit for purpose” from the initial proposal of the JRC (*Chapter 2*).

In the second phase, the indicators suggested by the regions as alternatives or additions for monitoring the SDG targets were analyzed. Some of selected targets were already covered by indicators proposed by the JRC, while new targets were also addressed. This process aimed to fill gaps and replace and/or complement initially proposed indicators. In total, 223 suggestions were identified, of which 112 referred to new indicators. The remaining 111 suggestions involved replacements (16), complements (39), or specific measures of indicators in the original proposal (56) (*Chapter 3*).

To arrive at the final dataset, the 83 initial indicators were first analyzed, specifically seeking to understand the reasons why regions excluded certain indicators. For the indicators deemed useful by the regions and the authors of this report, the motivations for retaining these indicators in the final dataset were reconstructed (mostly related to the coherence of indicators with the targets and their relevance in the European context, etc.). Subsequently, the 223 suggestions from the regions were analyzed. Some of the 83 initial indicators were replaced or better defined in relation to the new proposals (referring to the list of 111 region suggestions), deemed more consistent with the objectives of this project. The 112 additional indicators proposed by the regions were then analyzed; those consistent with the targets, better aligned with sustainability objectives, and relevant at the European level were incorporated into the final dataset. With these indicators, an additional 23 targets were covered.

Chapter 4 contains the final proposal of indicators, derived from the analyses of regions based on the JRC proposal (83 indicators) and the proposals from individual regions. The indicators are described in relation to the SDG and reference targets, and for each of them, the following information is provided: reference to the initial JRC proposal (if the indicator from the initial proposal was retained), indicator description, reasons for including the indicator in the final dataset, and key metadata. Additionally, for each SDG, a summary table is provided with the indicators from the final dataset proposal, in relation to the initial JRC proposal and the indicators proposed by the United Nations as part of the monitoring framework for the 2030 Agenda's SDGs.

At the end of this chapter, the number of indicators used, derived from both the JRC proposal and the regional proposals, is summarized, along with the covered targets. This includes targets already covered in the JRC proposal and new targets covered by additional indicators derived from the regional proposals.

4.1.1 SDG 1 – No poverty

Table 8 summarizes the final indicator set to monitor SDG1, *End poverty in all its forms everywhere*, in comparison with the initial indicator set proposed by JRC (Vega-Rapún et al., 2022). It also relates the final indicators with the UN global indicator framework (UN, 2015). The rest of the section gives, for each indicator, a definition, reasons/arguments for the choice and a small table with metadata.

Table 8 – SDG1: Final data set

SDG	Target	Final proposal	Initial JRC proposal	UN framework
1	1.1 (extreme poverty)	Severe material and social deprivation rate	Material and social deprivation	1.1.1 Proportion of the population living below the international poverty line
1	1.2 (reduce poverty)	Persons living in households with very low work intensity	Persons living in households with very low work intensity	1.2.2 Proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions
		Persons at risk of poverty or social exclusion (AROE)	Persons at risk of poverty or social exclusion	1.2.2 Proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions
1	1.5 (exposure to vulnerability)	Population exposed to disasters	Affected people due to disasters	1.5.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population

Source: Authors' own elaboration



SDG Target 1.1 EXTREME POVERTY

By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than \$1.25 a day.

Indicator for final dataset: Severe material and social deprivation rate²

Original indicator (from JRC): Material and social deprivation

Definition: The severe material and social deprivation rate (SMSD) is an EU-SILC indicator that shows an enforced lack of necessary and desirable items to lead an adequate life. It is defined as the proportion of the population experiencing an enforced lack of at least 7 out of 13 deprivation items (7 related to the household and 6 related to the individual).

List of items at household level: (i) Capacity to face unexpected expenses, (ii) Capacity to afford paying for one week annual holiday away from home, (iii) Capacity to being confronted with payment arrears (on mortgage or rental payments, utility bills, hire purchase instalments or other loan payments), (iv) Capacity to afford a meal with meat, chicken, fish or vegetarian equivalent every second day, (v) Ability to keep home adequately warm, (vi) Have access to a car/van for personal use, (vii) Replacing worn-out furniture.

List of items at individual level: (i) Having internet connection, (ii) Replacing worn-out clothes by some new ones, (iii) Having two pairs of properly fitting shoes (including a pair of all-weather shoes), (iv) Spending a small

² The SMSD indicator is part of the at-risk-of-poverty-or-social-exclusion (AROE) rate defined in the framework of the EU 2030 target on poverty and social exclusion. There is a previous indicator called *severe material deprivation* (SMD) defined for the Europe 2020 strategy. The SMD indicator measures the proportion of the population that cannot afford (rather than the choice not to do so) at least 4 out of 9 predefined material items considered by most people to be desirable or even necessary to lead an adequate life ((i) to pay their rent, mortgage or utility bills; (ii) to keep their home adequately warm; (iii) to face unexpected expenses; (iv) to eat meat or proteins regularly; (v) to go on holiday; (vi) a television set; (vii) a washing machine; (viii) a car; (ix) a telephone). The full 13 material and social deprivation items needed to calculate the new indicator are being collected on a compulsory basis in all countries since 2014.

amount of money each week on him/herself, (v) Having regular leisure activities, (vi) Getting together with friends/family for a drink/meal at least once a month.

Definition from Eurostat Statistics Explained. Glossary.

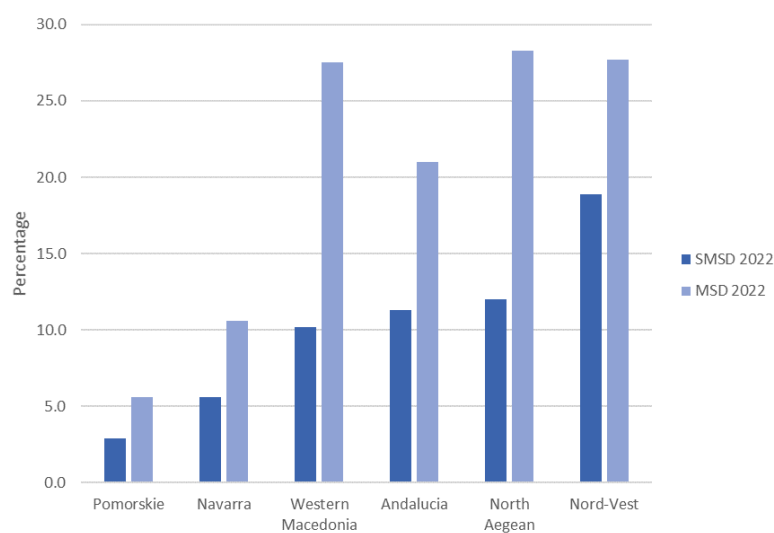
Reasons for the choice of this final indicator: Fostering social inclusion and combating poverty are core values of our European way of life and it is one of the European Pillars of Social Rights and the EU headline targets for 2030 (European Commission, 2021). The SMSD indicator is part of the at-risk-of-poverty or social exclusion rate (AROPE) defined in the framework of the EU 2030 target on poverty and social exclusion and, therefore, widely accepted to measure deprivation. This indicator informs about the severity of material and social deprivation. In the context of Target 1.1 on "extreme" poverty, the indicator of "severe" material and social deprivation is more appropriate than MSD, because it measures a higher level of severity and therefore is more suitable to monitor extreme poverty. However, the analysis of this indicator is more informative if it is joint with MSD, material and social deprivation (see Box 1).

Final Indicator	Severe material and social deprivation rate
Type	Official
Coverage	EU-27 plus others
Time coverage	Since 2014
Source	Eurostat, Regional Statistics (EU) ilc_mdsd18
Unit of measurement	Percentage
Frequency	Annual

Box 1 – Material and social deprivation (MSD) and Severe material and social deprivation (SMSD)

According to the EU social indicators dataset, MSD and SMSD are complementary indicators. Both indicators are considered relevant for the analysis of deprivation. Informing about the severity of MSD provides useful information on the composition of the materially and socially deprived population. Tracking both indicators is relevant since the severe and non-severe materially and socially deprived populations may have different evolutions in a given European region or since European regions with similar MSD rates may largely differ as regards the composition, from a severity perspective, of their materially and socially deprived populations.

The following graph illustrates this fact. It depicts MSD and SMSD in 2022 for 6 of the regions that have participated in the pilot project (ordered from lowest to highest SMSD rate). On the one hand, regions such as Western Macedonia, North Aegean and Nord-Vest have similar MSD rates but different SMSD rates. On the other hand, regions such as Andalusia and North Aegean have similar SMSD rate but very different MSD rates. The poverty reduction policies to be applied in these regions are likely to be different.



Source: Authors' own elaboration with data from Eurostat.



SDG Target 1.2 REDUCE POVERTY

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.

Indicator for final dataset: Persons living in households with very low work intensity³

Original indicator (from JRC): Persons living in households with very low work intensity

Definition: : People from 0-64 years living in households where the adults (those aged 18-64, but excluding students aged 18-24 and people who are retired according to their self-defined current economic status or who receive any pension (except survivors pension), as well as people in the age bracket 60-64 who are inactive and living in a household where the main income is pensions) worked a working time equal or less than 20% of their total combined work-time potential during the previous year.

Definition from Eurostat Statistics Explained. Glossary.

Reasons for the choice of this final indicator: This indicator is part of the at-risk-of-poverty or social exclusion rate (AROPE) defined in the framework of the EU 2030 target on poverty and social exclusion. It is a (quasi)-jobless household indicator and a widely accepted measure of deprivation. Therefore, the JRC proposal is maintained because it is pertinent to the SDG target 1.2, reduce poverty. In addition, most of the regions considered it a useful indicator for the purpose. It is also available from Eurostat's regional statistics. All these factor, it is therefore a pertinent indicator that can be used by European regions.

Final Indicator	Persons living in households with very low work intensity
Type	Official
Coverage	EU-27 plus others
Time coverage	Since 2004
Source	Eurostat, Regional Statistics (EU) ilc_lvgl21n
Unit of measurement	Percentage

³ The persons living in households with very low work intensity indicator is part of the at-risk-of-poverty-or-social-exclusion (AROPE) rate defined in the framework of the EU 2030 target on poverty and social exclusion. There is a previous indicator with the same name defined for the Europe 2020 strategy. It was defined as People from 0-59 years living in households where the adults (those aged 18-59, but excluding students aged 18-24) worked a working time equal or less than 20 % of their total combined work-time potential during the previous year.

Frequency	Annual
-----------	--------



SDG Target 1.2 REDUCE POVERTY

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.

Indicator for final dataset: Persons at risk of poverty or social exclusion (AROPE)⁴

Original indicator (from JRC): Persons at risk of poverty or social exclusion

Definition: At risk of poverty or social exclusion, abbreviated as AROPE, corresponds to the sum of persons who are either at risk of poverty, or severely materially and socially deprived or living in a household with a very low work intensity. People are included only once even if they are in more than one of the situations mentioned above. The AROPE rate is the share of the total population which is at risk of poverty or social exclusion.

Definition from Eurostat Statistics Explained. Glossary

Reasons for the choice of this final indicator: The AROPE rate is chosen because it is the main indicator to monitor the EU 2030 target on poverty and social exclusion. Therefore, the JRC proposal is maintained because it is pertinent for monitoring the SDG target 1.2, reduce poverty. All regions considered it a useful indicator for this purpose and, in addition, it is available from Eurostat's regional statistics.

Final Indicator	Persons at risk of poverty or social exclusion (AROPE)
Type	Official
Coverage	EU-27 plus others
Time coverage	Since 2004
Source	Eurostat, Regional Statistics (EU) ilc_peps11n
Unit of measurement	Percentage
Frequency	Annual



SDG Target 1.5 EXPOSURE TO VULNERABILITY

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.

Indicator for final dataset: Population exposed to disasters

Original indicator (from JRC): Affected people due to disasters

Definition: Share of population exposed to disasters such as river or coastal floods, landslides or forest fires.

Reasons for the choice of this final indicator: The newly proposed indicator measures the percentage of the population exposed to the risk of natural disasters (such as landslides, avalanches, or wildfires). It was deemed more useful for the purposes of monitoring the SDGs, particularly Target 1.5 "exposure to vulnerability", to measure the 'degree of exposure' of the population (this way, it is possible to measure how many people

⁴ There are differences between AROPE defined for the Europe 2020 strategy and for the Europe 2030 targets due to changes in the definition in the components of AROPE. See previous footnotes.

could be exposed to danger before it occurs) rather than the deaths caused by a disaster and hence the 'disastrous outcome' after the event has occurred (but we do not know, for example, how many people might still be at risk). Consequently, the percentage of the population 'exposed' to the risk provides an indication of the vulnerability of a territory and its population. It can also be a useful indication for taking preventive action before the disaster occurs (thus also limiting the number of deaths).

The choice of the indicator (in relation to landslides, floods, or forest fires) will obviously depend on the characteristics of the regional territory.

Also related with: SDG target 11.5 and SDG target 13.1

Final Indicator	Population exposed to water floods and to landslides	Population exposed to at least one forest fire
Type	Official	Official
Coverage	Italian regions	EU regions
Time coverage	Since 2015	Since 2001
Source	ISPRA (Italy)	OECD (EU)
Unit of measurement	Percentage	Percentage
Frequency	-	Annual

4.1.2 SDG 2 – Zero hunger

Table 9 summarizes the final indicator set to monitor SDG2, *End hunger, achieve food security and improved nutrition and promote sustainable agriculture*, in comparison with the initial indicator set proposed by JRC (Vega-Rapún et al., 2022). It also relates the final indicators with the UN global indicator framework (UN, 2015). The rest of the section gives, for each indicator, a definition, reasons/arguments for the choice and a small table with metadata.

Table 9 – SDG2: Final data set

SDG	Target	Final proposal	Initial JRC proposal	UN framework
2	2.2 (end malnutrition)	Malnutrition rate	Overweight rate	2.2.2 Prevalence of malnutrition (weight for height $>+2$ or <-2 standard deviation from the median of the WHO Child Growth Standards) among children under 5 years of age, by type (wasting and overweight)
2	2.3 (agricultural productivity)	Real GVA of agriculture, livestock and fishing	GVA of agriculture, livestock and fishing	2.3.2 Average income of small-scale food producers, by sex and indigenous status
		Real productivity (Real GVA per worker) in agriculture, forestry and fishing	Productivity (GVA per worker) in agriculture, forestry and fishing	2.3.1 Volume of production per labour unit by classes of farming/pastoral/forestry enterprise size
2	2.4 (sustainable food production)	Share of UAA cultivated with organic crops	Organic farming: areas with different crops	2.4.1 Proportion of agricultural area under productive and sustainable agriculture
		Productivity of organic farming	---	----

Source: Authors' own elaboration



SDG Target 2.2 END MALNUTRITION

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, pregnant and lactating women and older persons.

Indicator for final dataset: Malnutrition rate

Original indicator (from JRC): Overweight rate

Definition: Proportion of children between 2 and 17 years of age with obesity, overweight or underweight (malnutrition). A person is considered obese when the body mass index (BMI) is equal to or higher than 30, overweight if BMI is between 25 and 30 and underweight if BMI is below 18.5. BMI is calculated from the respondent's self-reported weight and height ($\text{weight}/\text{height}^2$).

Definition from World Health Organization

Reasons for the choice of this final indicator: In most cases, the data reported by the regions show not only overweight but also obesity and underweight. These three elements constitute the malnourished population. We have therefore chosen to call this indicator the malnutrition rate. It is well known that, in most European regions, obesity and overweight are much more relevant than underweight. Whenever possible, it will be interesting to distinguish between overweight and obesity on the one hand and underweight in the other. It is a pertinent indicator to monitor SDG target 2.2, end malnutrition, and most of the regions considered it a useful indicator for the purpose.

Final Indicator	Malnutrition rate
Type	Official
Coverage	Eu regions
Source	National statistics
Unit of measurement	Percentage
Frequency	Annual



SDG Target 2.3 AGRICULTURAL PRODUCTIVITY

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.

Indicator for final dataset: Real Gross Value Added (GVA) of agriculture, livestock and fishing

Original indicator (from JRC): Gross Value Added (GVA) of agriculture, livestock and fishing

Definition: Value added reflects the value generated by producing goods and services, and is measured as the value of output minus the value of intermediate consumption. Value added also represents the income available for the contributions of labour and capital to the production process. Value added by activity shows the value added created by the various industries (such as agriculture, industry, utilities, and other service activities). The indicator presents value added for an activity, as a percentage of total value added.

Definition from OECD

Gross value added is the difference between production and intermediate consumption by industry. It is also equal to the sum of primary incomes generated in the production process; thus, gross value added is equal to the sum of compensation of employees, consumption of fixed capital, net operating surplus/net mixed income and other taxes minus subsidies on production. This makes it possible to check the consistency of the

measurement of GDP according to the income approach with the measurement of GDP according to the production approach.

Reasons for the choice of this final indicator: The selected indicator measures the GVA of agriculture, livestock and fishing but in real terms. For the monitoring of this SDG, it is important to analyse the change in the output of the primary sector. This change is observed if data are analysed in real terms, either in constant prices or in volume indices. Real GVA tells us if production capacity has grown or declined, regardless of the market price of goods and services. Box 2 shows the difference between real and nominal GVA of agriculture, livestock and fishing. The change in the name of the indicator highlights this aspect.

Final Indicator	Gross Value Added (GVA) of agriculture, livestock and fishing
Type	Official
Coverage	European regions and others
Time coverage	Since 2000
Source	OECD, regional statistics
Unit of measurement	Constant prices or volume
Frequency	Annual



SDG Target 2.3 AGRICULTURAL PRODUCTIVITY

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.

Indicator for final dataset: Real productivity (real Gross Value Added per worker) in agriculture, forestry and fishing

Original indicator (from JRC): Productivity (Gross Value Added per worker) in agriculture, forestry and fishing

Definition: Real Gross Value Added (GVA) in agriculture, livestock and fishing (see previous indicator) per worker employed in the sector.

Reasons for the choice of this final indicator: All the regions in the pilot project consider the JRC proposal useful to monitor agricultural productivity. However, some report data on GVA per worker in current prices, other in constant prices. As stated before, real GVA tells us if production capacity has grown or declined, regardless of the market price of goods and services, therefore it is a better measure for productivity. The change in the name of the indicator highlights this aspect.

Final Indicator	Real productivity (Gross Value Added per worker) in agriculture, forestry and fishing
Type	Experimental
Coverage	European regions
Time coverage	Since 2000
Source	OECD, Regional Statistics
Unit of measurement	Number
Frequency	Annual



SDG Target 2.4 SUSTAINABLE FOOD PRODUCTION

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.

Indicator for final dataset: Share of utilised agricultural area UAA cultivated with organic crops

Original indicator (from JRC): Organic farming: areas with different crops

Definition: Share of utilised agricultural area UAA cultivated with organic crops of the total utilised agricultural area.

Share of utilised agricultural area is the surface area used for agricultural purposes including arable land, woody crops, permanent pastures, and family gardens, regardless of land ownership. This includes both outdoor and covered surfaces.

Organic farming encompasses all agricultural practices that fully comply with the principles of organic production at the farm level, as established in Regulation (EC) No 834/2007 or Regulation (EU) 2018/84840 concerning organic production and labeling of organic products, or, if applicable, in the most recent legislation, as well as in the corresponding national regulations implementing organic production, including the conversion period to organic farming. Organic production is a comprehensive system of farm management and food production based on the interaction between best environmental practices, a high level of biodiversity, the preservation of natural resources, the application of strict criteria regarding animal welfare, and the production of goods tailored to the preferences of certain consumers for products obtained using natural substances and processes. In crop cultivation, the use of phytosanitary products is limited, and the use of mineral nitrogen fertilizers and the cultivation of genetically modified organisms are prohibited. According to the provisions of the aforementioned Regulation, production must take place in such a way as to strictly separate the lands and production and storage locations from other surfaces that do not comply with the rules of organic production.

Definition from ISTAT 2020, Italy. Glossary

Reasons for the choice of this final indicator: The selected indicator measures the percentage of organic farming area over the total utilised agricultural area. This is crucial in relation to the target of the European Farm to Fork Strategy (Green Deal), which states that by 2030, countries should achieve 25% of utilised agricultural area UAA cultivated with organic crops compared to the total utilised agricultural area.

Final Indicator	Share of utilised agricultural area UAA cultivated with organic crops
Type	Official
Coverage	Italian regions Spanish regions
Time coverage	Since 2010
Source	ISTAT from data of Ministry of Agricultural, Food and Forestry (Italy) OCECAS (Spain)
Unit of measurement	Percentage
Frequency	Annual



SDG Target 2.4 SUSTAINABLE FOOD PRODUCTION

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.

Indicator for final dataset: Productivity of organic farming

Original indicator (from JRC): -

Definition: This is a measure of the economic performance of [organic farming](#) that is obtained by comparing the quantity of goods and services produced (output) within a specific timeframe with the amount of materials, capital, and labor (input) employed in their production.

Reasons for the choice of this final indicator: Connected to the previous indicator, it would be useful to add an indicator capable of measuring the level of productivity from organic farming. This would enable the comparison of productivity between organic agriculture and traditional models, helping to understand whether organic production can meet market demand. For example, percentage of agricultural production that comes from organic farming. Comparing these data with the share of UAA cultivated with organic crops can give a good insight of the potential of organic farming.

Final Indicator	Productivity of organic farming
Type	Official
Coverage	26 Regions in Türkiye
Time coverage	Since 2004
Source	TurkStat (Turkish Statistical Institute)
Unit of measurement	Number
Frequency	Annual

4.1.3 SDG 3 – Good health and well-being

Table 10 summarizes the final indicator set to monitor SDG3, *Ensure healthy lives and promote well-being for all at all ages*, in comparison with the initial indicator set proposed by JRC (Vega-Rapún et al., 2022). It also relates the final indicators with the UN global indicator framework (UN, 2015). The rest of the section gives, for each indicator, a definition, reasons/arguments for the choice and a small table with metadata.

Table 10 – SDG3: Final data set

SDG	Target	Final proposal	Initial JRC proposal	UN framework
3	3.2 (preventable death of newborns)	Infant mortality	Infant mortality	3.2.1 Under-5 mortality rate
				3.2.2 Neonatal mortality rate
3	3.3 (epidemics and diseases)	Deaths due to communicable diseases	Deaths due to Covid-19	3.3.1 Number of new HIV infections per 1,000 uninfected population, by sex, age and key populations
				3.3.2 Tuberculosis incidence per 100,000 population
				3.3.3 Malaria incidence per 1,000 population
				3.3.4 Hepatitis B incidence per 100,000 population
				3.3.5 Number of people requiring interventions against neglected tropical diseases
	3.4 (non-communicable diseases)	Suicide mortality rate	---	3.4.1 Mortality rate attributed to cardiovascular disease, cancer, diabetes or chronic respiratory disease
				3.4.2 Suicide mortality rate
3	3.8 (universal health coverage)	Hospital beds	Hospital beds	3.8.1 Coverage of essential health services
3	3.c (health financing and recruitment)	Self reported unmet needs for medical examination	Self reported unmet needs for medical examination	---
		Health personnel	Health personnel	3.c.1 Health worker density and distribution

Source: Authors' own elaboration



SDG Target 3.2 PREVENTABLE DEATH OF NEWBORNS

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.

Indicator for final dataset: Infant mortality

Original indicator (from JRC): Infant mortality

Definition: Deaths of children under 5 years per 1,000 births.

Reasons for the choice of this final indicator: The target explicitly mentions ending preventable deaths. Monitoring the infant mortality rate allows for tracking progress in reducing deaths that are preventable through improved healthcare, nutrition, sanitation, and other interventions. This is a well-known indicator and its estimation is widely used.

Final Indicator	Infant mortality
Type	Official
Coverage	EU-27 plus others
Time coverage	Since 1990
Source	Eurostat, regional statistics
Unit of measurement	Ratio (number per 100.000 inhabitants)
Frequency	Annual



SDG Target 3.3 EPIDEMICS AND DISEASES

By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases

Indicator for final dataset: Deaths due to communicable diseases

Original indicator (from JRC): Deaths due to Covid-19

Definition: Mortality in relation to the total population due to communicable diseases. Diseases generally recognized as communicable or transmissible are certain infectious and parasitic diseases (A00-B99), according to the International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10)-WHO Version; 2019-covid-expanded.

Reasons for the choice of this final indicator: Communicable diseases often have a significant public health impact. Monitoring deaths due to these diseases provides a clear and measurable indication of the severity of epidemics and their consequences on population health. Many communicable diseases are preventable through public health interventions such as vaccinations, hygiene practices, and effective disease management. The initial JRC proposal proposed to use an indicator on deaths due to Covid-19. This is one of the many communicable diseases, one that has developed into a pandemic but on May 5, 2023, WHO chief declared the end of covid-19 as a global health problem. The indicator that has been selected for the final proposal is a more generic indicator that does not focus on any particular communicable disease, but covers all the diseases according to the ICD-10 of WHO. The indicator reflects the effectiveness of preventive measures and healthcare systems in controlling the spread of these diseases and helps evaluate the resilience of health systems.

Final Indicator	Deaths due to communicable diseases
Type	Official
Coverage	EU-27 plus others

Time coverage	Since 2011
Source	Eurostat, regional statistics HLTH_CD_ACDR2_custom_8402797
Unit of measurement	Rate
Frequency	Annual



SDG Target 3.4 NON-COMMUNICABLE DISEASES

By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being

Indicator for final dataset: Suicide mortality rate

Original indicator (from JRC): ---

Definition: Number of suicides per 100.000 inhabitants

Reasons for the choice of this final indicator: Individual mental health is determined by multiple social, psychological and biological factors. Deterioration of mental health is associated with rapid social change, stressful working conditions, gender discrimination, social exclusion, unhealthy lifestyles, risks of violence, and the risk of violence against women and children. Mental health is becoming a major health problem in the most developed countries and regions (WHO, 2021). While high suicide rates may suggest underlying mental health challenges, it's important to recognize that suicide is a complex outcome influenced by various factors, including social, economic, and cultural aspects.

Final Indicator	Suicide mortality rate
Type	Official
Coverage	Several European countries and regions
Source	National and regional sources (Mental health plans)
Unit of measurement	Ratio (number per 100,000 inhabitants)
Frequency	Annual



SDG Target 3.8 UNIVERSAL HEALTH COVERAGE

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

Indicator for final dataset: Hospital beds

Original indicator (from JRC): Hospital beds

Definition: Hospital beds density rate. Density rate is used to describe the availability of hospital beds expressed in per 100,000 inhabitants. It is calculated dividing the absolute number of hospital beds available in a given period by the respective population in the same period and then multiplied by 100,000. Total hospital beds are all hospital beds which are regularly maintained and staffed and immediately available for the care of admitted patients.

Reasons for the choice of this final indicator: Hospital beds are a tangible representation of a country's capacity to provide health care services. The density of hospital beds is linked to the capacity of health care facilities. A sufficient number of hospital beds can contribute to better-quality care by reducing overcrowding, ensuring timely treatment, and facilitating the management of medical emergencies. Adequate bed density supports the implementation of public health measures, vaccination campaigns, and other preventive

interventions. The availability of hospital beds is crucial during public health emergencies, such as pandemics. While hospital beds density is a useful indicator, it should be complemented with other metrics to provide a comprehensive assessment of universal health coverage. These may include indicators related to the quality of care, accessibility of primary health care (see next indicator, self reported unmet needs for medical examination).

Final Indicator	Hospital beds
Type	Official
Coverage	EU-27 plus others
Time coverage	Since 1993
Source	Eurostat, regional statistics hlth_rs_bdsrg2
Unit of measurement	Ratio (number per 100.000 inhabitants)
Frequency	Annual

Indicator for final dataset: Self reported unmet needs for medical examination

Original indicator (from JRC): Self reported unmet needs for medical examination

Definition: Proportion of the population aged 16 years and older reporting unmet need for medical care due to one of the following reasons: 'financial reasons', 'waiting list', and 'too far to travel'. Needs refer to a person's own assessment of whether he or she needed a medical examination or treatment (excluding dental care), but did not have it or did not seek it

Reasons for the choice of this final indicator: Self-reported unmet needs for medical examination complements the hospital beds density rate in monitoring Target 3.8 by providing a more patient-centric perspective. It captures the patient's perspective on the accessibility and adequacy of healthcare services. It reflects whether individuals feel their healthcare needs are being met effectively.

Final Indicator	Self reported unmet needs for medical examination
Type	Official
Coverage	Several European countries and regions
Time coverage	Since 2008
Source	EU-SILC
Unit of measurement	Percentage
Frequency	Annual



SDG Target 3.c HEALTH FINANCING AND RECRUITMENT

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

Indicator for final dataset: Health personnel

Original indicator (from JRC): Health personnel

Definition: Health personnel density rate. Density rate is used to describe the availability of health personnel expressed in per 100,000 inhabitants. It is calculated dividing the absolute number of health personnel available in a given period by the respective population in the same period and then multiplied by 100,000. Health personnel are human resources available for providing health care services in the country, irrespective of the sector of employment (i.e. whether they are independent, employed by a hospital or any other health care

provider). 'Manpower' categories focus on health care professionals (physicians, dentists, nursing and caring professionals, pharmacists, physiotherapists).

Reasons for the choice of this final indicator: The density of health personnel provides insight into the capacity of the healthcare workforce. A higher density indicates a greater number of trained professionals available to deliver essential health services, which is crucial for achieving universal health coverage (Target 3.8). In addition, as Target 3.c emphasizes the recruitment, development, training, and retention of the health workforce, the health personnel density rate reflects progress in recruiting and retaining healthcare professionals. Increasing the density of health personnel often requires financial investment. Monitoring this indicator alongside health financing data provides a comprehensive view of how financial resources are being utilized to strengthen the healthcare workforce.

Final Indicator	Health personnel
Type	Official
Coverage	EU-27 plus others
Time coverage	Since 1993
Source	Eurostat, regional statistics HLTH_RS_BDSRG
Unit of measurement	Ratio (number per 100.000 inhabitants)
Frequency	Annual

4.1.4 SDG 4 – Quality of education

Table 11 summarizes the final indicator set to monitor SDG4, *Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all*, in comparison with the initial indicator set proposed by JRC (Vega-Rapún et al., 2022). It also relates the final indicators with the UN global indicator framework (UN, 2015). The rest of the section gives, for each indicator, a definition, reasons/arguments for the choice and a small table with metadata.

Table 11 – SDG4: Final data set

SDG	Target	Final proposal	Initial JRC proposal	UN framework
4	4.1 (primary and secondary education)	Participation rates primary and secondary education	Participation rates in selected education levels	4.1.1 Proportion of children and young people (a) in grades 2/3; (b) at the end of primary; and (c) at the end of lower secondary achieving at least a minimum proficiency level in (i) reading and (ii) mathematics, by sex
		Not adequate alphabetical and numerical competence, secondary school	---	
4	4.2 (access to early childhood education)	Share of pupils enrolled in early childhood education (4 years)	Pupils enrolled in early childhood education	4.2.2 Participation rate in organized learning (one year before the official primary entry age), by sex
4	4.3 (vocational and tertiary education)	Students enrolled in tertiary education by sex	Students enrolled in tertiary education	---
		Distribution of pupils and students enrolled in general and vocational programmes	Distribution of pupils and students enrolled in general and vocational programmes	---
		Participation in education (from 20 to 24 years)	Participation in education	---
		Participation rate in education and training (from 25 to 65 years) in the last 4 weeks.	---	4.3.1 Participation rate of youth and adults in formal and non-formal education and training in the previous 12 months, by sex
4	4.4 (technical and vocational skills)	Proportion of individuals with digital skills at basic or above basic level	---	4.4.1 Proportion of youth and adults with information and communications technology (ICT) skills, by type of skill
4	4.5 (gender and other disparities in education)	Share of women and men 30-34 years old with higher education level	Women 30-34 years old with higher education level	4.5.1 Parity indices (female/male, rural/urban, bottom/top wealth quintile and others such as disability status, indigenous peoples and conflict-affected, as data become available) for all education indicators on this list that can be disaggregated

4	4.6 (youth and adult literacy)	Share of early leavers from education and training	Early leavers from education and training	4.6.1 Proportion of population in a given age group achieving at least a fixed level of proficiency in functional (a) literacy and (b) numeracy skills, by sex
4	4.a (inclusive and effective learning environments for all)	Proportion of schools not physically accessible	---	4.a.1 Proportion of schools offering basic services, by type of service

Source: Authors' own elaboration



SDG Target 4.1 PRIMARY AND SECONDARY EDUCATION

By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes.

Indicator for final dataset: Participation rates primary and secondary education

Original indicator (from JRC): Participation rates in selected education levels

Definition: Participation rates in primary and secondary education as percentage of total population.

Reasons for the choice of this final indicator: Primary and secondary education in Europe is compulsory. The ages at which compulsory education starts and the duration of compulsory education differ slightly between countries (European Commission, 2022). Therefore, participation rates measured over the population of the corresponding age should be close to 100%. The indicator proposed measures participation rates as a percentage of total population. The selected indicator measures participation in these levels of education as a percentage of the total population. This gives an idea of the weight of the population in compulsory education. Its evolution over time is also a clear indicator of the demographic evolution of the regions.

Final Indicator	Participation rates primary and secondary education
Type	Official
Coverage	EU-27 plus others
Time coverage	Since 2010
Source	Eurostat, Regional Statistics educ_uae_enra15
Unit of measurement	Rate
Frequency	Annual

Indicator for final dataset: Not adequate alphabetical and numerical competence, secondary school

Original indicator (from JRC): ---

Definition: Percentage of students (from the last year of secondary school) with not adequate alphabetical and numerical competences.

Reasons for the choice of this final indicator: As already noted, primary and secondary education is compulsory in Europe. Therefore, the first part of target 4.1 is well covered in most European regions. It is therefore important to focus the analysis on the second part of this target, education leading to relevant and effective learning outcomes. Monitoring the acquisition of competences and skills in the compulsory education cycle is fundamental to achieving quality education. The selected indicator meets this need and is based on an indicator calculated for the Italian regions on the basis of a national survey on learning. There are also other measurement possibilities for this target, such as the results obtained by secondary school students (25 years of age) in the OECD Programme for International Student Assessment (PISA).

The OECD Programme for International Student Assessment (PISA), seeks to determine what is important for citizens to know and be able to do. PISA assesses the extent to which 15-year-old students near the end of their compulsory education have acquired the knowledge and skills that are essential for full participation in modern societies. The assessment focuses on the core school subjects of reading, mathematics, and science. In 2022, they also evaluate critical thinking (OECD, 2023).

Final Indicator	Not adequate alphabetical and numerical competence, secondary school
Type	Official
Coverage	Italian regions
Time coverage	Since 2019
Source	ISTAT, National learning survey (Italy)
Unit of measurement	Percentage
Frequency	Annual



SDG Target 4.2 ACCESS TO EARLY CHILDHOOD EDUCATION

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.

Indicator for final dataset: Share of pupils enrolled in early childhood education (4 years)

Original indicator (from JRC): Pupils enrolled in early childhood education.

Definition: Number of students enrolled in pre-primary education as a proportion of the resident population of the relevant age group.

Reasons for the choice of this final indicator: The indicator chosen is similar to the initial proposal made by JRC. The initial proposal measured just the number of pupils at this level of education while the final proposal is to measure this as a proportion of the resident population of the relevant age group. This unit of measure provides a better indication of the level of participation in early childhood education. Eurostat provides this data with the 4-year old population as the reference group ([EDUC UOE ENRA14 custom 8311133](#)).

Final Indicator	Share of pupils enrolled in early childhood education (4 years)
Type	Official
Coverage	EU-27 plus others
Time coverage	Since 2013
Source	Eurostat EDUC UOE ENRA14 custom 8311133
Unit of measurement	Rate
Frequency	Annual



SDG Target 4.2 VOCATIONAL AND TERTIARY EDUCATION

By 2030, ensure equal access for all women and men to affordable and quality technical, vocational, and tertiary education, including university.

Indicator for final dataset: Students enrolled in tertiary education by sex

Original indicator (from JRC): Students enrolled in tertiary education.

Definition: Number of male and female students enrolled in tertiary education (ISCED, 5-8 levels).

Reasons for the choice of this final indicator: The selection of this indicator is intended to monitor the number of students pursuing tertiary studies. UNESCO stated that tertiary education includes what is commonly understood as academic education but also includes advanced vocational or professional education. This corresponds to levels 5-8 in ISCED (International Standard Classification of Education). To analyse whether access to tertiary education is equal, it is proposed to disaggregate the data by gender. This breakdown is available from Eurostat for European regions ([educ_uoe_enrt06](#)). The EU Member States have set the target that by 2030, at least 45% of 25–34-year-olds should obtain a higher education qualification.

Final Indicator	Students enrolled in tertiary education by sex
Type	Official
Coverage	EU-27 plus others
Time coverage	Since 2013
Source	Eurostat educ_uoe_enrt06
Unit of measurement	Number
Frequency	Annual

Indicator for final dataset: Distribution of pupils and students enrolled in general and vocational programmes.

Original indicator (from JRC): Distribution of pupils and students enrolled in general and vocational programmes.

Definition: Percentage of students enrolled in general and vocational programmes in different levels of education: upper-secondary education (ISCED 3), post-secondary and non-tertiary education (ISCED 4) and short-cycle tertiary education (ISCED 5).

Reasons for the choice of this final indicator: According to the European Commission, vocational education and training (VET) provides learners with essential skills enhancing their employability, supporting their personal development, and encouraging active citizenship. VET boosts enterprise performance, competitiveness, research, and innovation. On the other hand, the higher education sector has a unique position at the crossroads of education, research, and innovation, serving society and economy. A good balance between the two programmes, general (academic) and vocational (professional), is important in a society.

Final Indicator	Distribution of pupils and students enrolled in general and vocational programmes
Type	Official
Coverage	EU-27 plus others
Time coverage	Since 2013
Source	Eurostat educ_uoe_enra13
Unit of measurement	Rate
Frequency	Annual

Indicator for final dataset: Participation in education (from 20 to 24 years)

Original indicator (from JRC): Participation in education

Definition: Students from 20 to 24 years as percentage of the corresponding age population.

Reasons for the choice of this final indicator: Students between 20 and 24 years old are mainly university students and advanced vocational or professional education. This indicator complements the previous indicators giving information about the percentage of students between 20 and 24 years as a proportion of the corresponding age population. This age range is typically when individuals are transitioning from secondary education to higher levels or specialized vocational training. By tracking participation rates in this specific age group, policymakers can gauge the extent to which young people are accessing and continuing their education beyond the basic levels. It provides insights into the effectiveness of educational systems in offering opportunities for vocational and tertiary education, which is crucial for developing the skills and knowledge needed for various careers.

Final Indicator	Participation in education (from 20 to 24 years)
Type	Official
Coverage	EU-27 plus others EDUC_UOE_ENRA14_custom_3868425
Time coverage	Since 2013
Source	Eurostat
Unit of measurement	Rate
Frequency	Annual

Indicator for final dataset: Participation rate in education and training (last 4 weeks, 25-64 years)

Original indicator (from JRC): ---

Definition: Adult participation in learning, persons aged 25 to 64 who stated that they received education or training in the four weeks preceding the survey (numerator). The denominator consists of the total population of the same age group, excluding those who did not answer to the question 'participation in education and training¹.

Reasons for the choice of this final indicator: Lifelong learning encompasses all learning activities undertaken throughout life with the aim of improving knowledge, skills and competences, within personal, civic, social or employment-related perspectives. The strategic framework for European cooperation in education and training set a benchmark on adult participation in lifelong learning, namely that an average of at least 15 % of adults aged 25 to 64 years old should participate in lifelong learning.

Final Indicator	Participation rate in education and training (last 4 weeks, 25-64 years)
Type	Official
Coverage	EU-27 plus others
Time coverage	Since 2018
Source	Eurostat trng_lfse_04
Unit of measurement	Rate
Frequency	Annual



SDG Target 4.4 TECHNICAL AND VOCATIONAL SKILLS

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.

Indicator for final dataset: Proportion of individuals with digital skills at basic or above basic level

Original indicator (from JRC): ---

Definition: Share of people aged 16 to 74 who had at least basic overall digital skills.

Reasons for the choice of this final indicator: Digital skills empower individuals to access, evaluate, and utilize vast amounts of information available online. This ability is crucial for education, research, decision-making, and staying informed in an information-driven society. This indicator monitors the implementation of the European Skills Agenda, which provides that the share of adults aged 16-74 having at least basic digital skills should reach 70% by 2025.

Final Indicator	Proportion of individuals with digital skills at basic or above basic level
Type	Official
Coverage	Several European countries and regions
Source	National and regional sources
Unit of measurement	Percentage
Frequency	Annual



SDG Target 4.5 GENDER AND OTHER DISPARITIES IN EDUCATION

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.

Indicator for final dataset: Proportion of women and men 30-34 years old with higher education level

Original indicator (from JRC): Women 30-34 years old with higher education level

Definition: Share of women and share of men with tertiary education attainment level. Tertiary education covers ISCED 2011 levels 5, 6, 7 and 8 (short-cycle tertiary education, bachelor's or equivalent level, master's or equivalent level, doctoral or equivalent level, online code ED5-8 'tertiary education').

Reasons for the choice of this final indicator: To analyse the differences between different social groups, it is necessary to know the data for both groups. In this case, the aim is to monitor possible gender differences in higher education levels. Therefore, to the initial JRC proposal focusing on female attainment, the same indicator is added for males to identify gaps, if any. By focusing on individuals aged 30-34, it captures a stage in life when many have completed their formal education and entered the workforce. The indicator looks at the proportion of men and women with higher education, providing insights into potential gender imbalances in educational opportunities and achievements.

Final Indicator	Proportion of women and men 30-34 years old with higher education level
Type	Official
Coverage	EU-27 plus others
Time coverage	Since 2000
Source	Eurostat
Unit of measurement	Rate

Frequency	Annual
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SDG Target 4.6 YOUTH AND ADULT LITERACY

By 2030, ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy.

Indicator for final dataset: Share of early leavers from education and training

Original indicator (from JRC): Share of early leavers from education and training

Definition: Percentage of the population aged 18 to 24 who has completed at lower secondary education and is not involved in further education or training; the indicator 'early leavers from education and training' is expressed as a percentage of the people aged 18 to 24 with such criteria out of the total population aged 18 to 24.

Reasons for the choice of this final indicator: Early school leaving is often associated with lower literacy levels. Monitoring the share of early leavers provides insights into the continuity of education and its impact on literacy rates among youth and adults. The indicator aligns with the broader goal of integrating literacy skills into education systems. By addressing early leaving, education systems can better equip individuals with the literacy skills needed for personal development, employment, and active participation in society.

Final Indicator	Share of early leavers from education and training
Type	Official
Coverage	EU-27 plus others
Time coverage	Since 2000
Source	Eurostat edat_lfse_16
Unit of measurement	Rate
Frequency	Annual



SDG Target 4.a INCLUSIVE AND EFFECTIVE LEARNING ENVIRONMENTS FOR ALL

Build and upgrade education facilities that are child, disability, and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all.

Indicator for final dataset: Proportion of schools not physically accessible

Original indicator (from JRC): ---

Definition: Proportion of schools that are not physically accessible.

Reasons for the choice of this final indicator: Inclusive education is built on the fundamental principle that education should be accessible to all, regardless of physical abilities. The indicator directly addresses the physical aspect of accessibility, ensuring that schools are inclusive environments for everyone. Physical inaccessibility can hinder the implementation of universal design for learning, which aims to create educational environments that accommodate diverse learning styles and needs.

Final Indicator	Proportion of schools not physically accessible
Type	Official
Coverage	Italian regions
Time coverage	Since 2019

Source	ISTAT, Regional Statiscs (Italy)
Unit of measurement	Percentage
Frequency	Annual

4.1.5 SDG 5 – Gender equality

Table 12 summarizes the final indicator set to monitor SDG5, *Achieve gender equality and empower all women and girls*, in comparison with the initial indicator set proposed by JRC (Vega-Rapún et al., 2022). It also relates the final indicators with the UN global indicator framework (UN, 2015). The rest of the section gives, for each indicator, a definition, reasons/arguments for the choice and a small table with metadata.

Table 12 – SDG5: Final data set

SDG	Target	Final proposal	Initial JRC proposal	UN framework
5	5.1 (gender discrimination)	Female achievement/disadvantage index	Female achievement/disadvantage index	5.1.1 Whether or not legal frameworks are in place to promote, enforce and monitor equality and non-discrimination on the basis of sex
5	5.2 (gender violence)	Fatal victims of gender-based violence at the hands of their partners or ex-partners	Fatal victims of gender-based violence at the hands of their partners or ex-partners	5.2.1 Proportion of ever-partnered women and girls aged 15 years and older subjected to physical, sexual or psychological violence by a current or former intimate partner in the previous 12 months, by form of violence and by age
		Victims of violence against women	Victims of violence against women	5.2.2 Proportion of women and girls aged 15 years and older subjected to sexual violence by persons other than an intimate partner in the previous 12 months, by age and place of occurrence
5	5.4 (unpaid work)	Inactive population rate due to caregiving responsibilities by sex	Inactive population rate due to caregiving responsibilities	5.4.1 Proportion of time spent on unpaid domestic and care work, by sex, age and location
		Gender gap in part-time employment incidence	Gender gap in part-time employment incidence	
5	5.5 (women participation and leadership)	Female research and development personnel	Female research and development personnel	---
		Women in parliament and government	Women in parliament and government	5.5.1 Proportion of seats held by women in (a) national parliaments and (b) local governments
		Women in managerial position	---	5.5.2 Proportion of women in managerial positions

Source: Authors' own elaboration



SDG Target 5.1 GENDER DISCRIMINATION

End all forms of discrimination against all women and girls everywhere.

Indicator for final dataset: Female achievement/ disadvantage index

Original indicator (from JRC): Female achievement/ disadvantage index

Definition: The Female Disadvantage Index (FemDI) measures the difference between the performance of men and women in a region. The best score is 0 (no disadvantage) and the worst is 100 (largest disadvantage). FemDI is built out of 30 indicators of 7 domains: Work and Money, Knowledge, Time, Power, Health, Safety and Trust, and Quality of Life. Inverse indicator.

The Female Achievement Index (FemAI) measures the level of female achievement relative to the region with the highest female achievements. It varies between 0 (lowest achievements) and 100 (highest achievements). FemAI is built out of 33 indicators of 7 domains: Work and Money, Knowledge, Time, Power, Health, Safety and Trust, and Quality of Life. Direct indicator

Reasons for the choice of this final indicator: Gender discrimination has different dimensions. The two indices that have been selected for this final list of indicators bring together several of these dimensions. This allows for complex information to be summarised in two single indicators. At present, only a single set of these indices is available for the European regions. It will be interesting to observe the evolution of these indices in successive estimates in order to be able to assess progress in achieving gender equality.

Final Indicator	Female achievement/ disadvantage index
Type	Experimental
Coverage	EU-27
Time coverage	2021
Source	European Commission, DG REGIO
Unit of measurement	Index
Frequency	---



SDG Target 5.2 GENDER VIOLENCE

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.

Indicator for final dataset: c

Original indicator (from JRC): Fatal victims of gender-based violence at the hands of their partners or ex-partners

Definition: Women fatal victims of gender-based violence.

Reasons for the choice of this final indicator: The indicator specifically targets gender-based violence, providing a focused measure of violence inflicted on women by their partners or ex-partners. Monitoring fatal victims highlights the severe and lethal consequences of gender-based violence within intimate relationships. It emphasizes the urgency of addressing this issue to prevent loss of life and protect the well-being of women and girls. It encourages proactive measures to stop violence before it escalates to lethal levels.

Final Indicator	Fatal victims of gender-based violence at the hands of their partners or ex-partners
Type	Official

Coverage	Several European countries and regions
Source	National and regional statistics
Unit of measurement	Number
Frequency	Annual

Indicator for final dataset: Victims of violence against women

Original indicator (from JRC): Victims of violence against women

Definition: Number of victims of gender violence.

Reasons for the choice of this final indicator: Not only fatal victims, is crucial for a more comprehensive assessment of SDG target 5.2. Non-fatal incidents of gender-based violence have a profound impact on victims' physical and mental well-being, as well as their overall quality of life. Survivors of gender-based violence often experience long-term physical, emotional, and psychological consequences. Monitoring the number of victims helps capture the full spectrum of these consequences and guides the development of support services for survivors. Understanding the patterns and dynamics of non-fatal incidents also informs the development of effective prevention and intervention strategies.

Final Indicator	Victims of violence against women
Type	Official
Coverage	Several European countries and regions
Source	National and regional statistics
Unit of measurement	Number
Frequency	Annual



SDG Target 5.4 UNPAID WORK

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.

Indicator for final dataset: Inactive population rate due to caregiving responsibilities by sex

Original indicator (from JRC): Inactive population rate due to caregiving responsibilities

Definition: Percentage of persons not actively seeking work, thus neither employed nor unemployed and considered to be out of the labour force due to "Inactivity due to caregiving responsibilities" which refers to the reasons of "caring for children or disabled adults" and "other family or personal responsibilities".

Reasons for the choice of this final indicator: Unpaid care of children and the elderly has historically been a task carried out by women. People engaged in this type of activities are part of the so-called inactive population. The labour force survey makes it possible to calculate what percentage of the inactive population is engaged in this type of activity. It is important to know this data for both women and men to be able to assess shared responsibility within the household and the family and recognize the value of these activities.

Final Indicator	Inactive population rate due to caregiving responsibilities by sex
Type	Official
Coverage	
Source	National and/or regional sources
Unit of measurement	Rate
Frequency	Annual

Indicator for final dataset: Gender gap in part-time employment incidence

Original indicator (from JRC): Gender gap in part-time employment incidence

Definition: Men's and women's part-time employment rates, defined as part-time employment as a percentage of total employment. The gender gap is calculated as the percentage point difference between the male and the female rate.

Reasons for the choice of this final indicator: There may be several reasons for a person to take up part-time work. One of them is usually the dedication to the care and attention of children when they are of school age. For this reason, some people choose to reduce their working hours. Historically, this has mainly been done by women. The gap measured by this indicator may be of great interest for monitoring these possible differences.

Final Indicator	Gender gap in part-time employment incidence
Type	Experimental
Coverage	OECD countries and other European countries
Time coverage	Since 2001
Source	Organisation for Economic Cooperation and Development (OECD)
Unit of measurement	Percentage
Frequency	Annual



SDG Target 5.5 WOMEN PARTICIPATION AND LEADERSHIP

Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life.

Indicator for final dataset: Female research and development personnel

Original indicator (from JRC): Female research and development personnel

Definition: Share of R&D female in R&D total personnel.

Reasons for the choice of this final indicator: Target 5.5 seeks women's participation in various spheres of public, economic and social life, especially in leadership positions. R&D is one of the aspects to be considered in this target. Therefore, analysing the percentage of women in R&D personnel is a relevant indicator. Inclusion in R&D positions is a stepping stone to leadership roles within the scientific and technological domains. Monitoring the presence of female R&D personnel provides insights into the opportunities and barriers women face in advancing to leadership positions. In addition, visible representation of women in R&D positions serves as role models for younger generations.

Final Indicator	Female research and development personnel
Type	Experimental
Coverage	Organisation for Economic Cooperation and Development (OECD)
Time coverage	Since 2003
Source	OECD countries and other European countries
Unit of measurement	Percentage
Frequency	Annual

Indicator for final dataset: Women in parliament and government

Original indicator (from JRC): Women in parliament and government

Definition: Proportion of seats held by women in regional parliaments. Number of seats occupied by women with respect to the total number of seats in the autonomous parliaments.

Proportion of mayor's offices held by women in local government. Number of mayor's offices held by women out of the total number of mayor's offices in local governments.

Reasons for the choice of this final indicator: Target 5.5 seeks women's participation in various spheres of public, economic and social life, especially in leadership positions. Another such sphere is politics, where important decisions are made that can affect the well-being of citizens. Therefore, this indicator measuring the percentage of women in local and regional government is of relevance. Having women in parliament and government ensures that women's perspectives are considered in the decision-making processes. Visible representation of women in political leadership serves as a powerful example for young girls and women, inspiring them to aspire to leadership roles and participate in civic and political activities.

Final Indicator	Women in parliament and government
Type	Official
Coverage	---
Time coverage	Since 2010
Source	National and regional sources
Unit of measurement	Percentage
Frequency	Annual

Indicator for final dataset: Women in managerial positions

Original indicator (from JRC): ---

Definition: Percentage of women who hold managerial positions

Reasons for the choice of this final indicator: A third dimension relevant to social leadership positions is the business world. For this reason, the final proposal also includes an indicator that measures the percentage of women in management positions. Monitoring the number of women in managerial positions reflects progress in breaking the glass ceiling, challenging stereotypes, and creating pathways for women to ascend to leadership roles in traditionally male-dominated fields. Women in managerial positions should be represented across various industries, including traditionally male-dominated fields, ensuring that women have leadership roles in shaping policies and practices across diverse sectors.

Final Indicator	Women in managerial positions
Type	Official
Coverage	---
Source	Labor force surveys
Unit of measurement	Percentage
Frequency	Annual

4.1.6 SDG 6 – Clean water and sanitation

Table 13 summarizes the final indicator set to monitor SDG6, *Ensure availability and sustainable management of water and sanitation for all*, in comparison with the initial indicator set proposed by JRC (Vega-Rapún et al., 2022). It also relates the final indicators with the UN global indicator framework (UN, 2015). The rest of the section gives, for each indicator, a definition, reasons/arguments for the choice and a small table with metadata.

Table 13 – SDG6: Final data set

SDG	Target	Final proposal	Initial JRC proposal	UN framework
6	6.1 (universal access to water)	Population served by safely managed drinking water supply services	Population served by safely managed drinking water supply services	6.1.1 Proportion of population using safely managed drinking water services
6	6.3 (water quality)	Water bodies that exceed a standardized quality rating	Water bodies that exceed a standardized quality rating	6.3.2 Proportion of bodies of water with good ambient water quality
		Groundwater that exceed a standardized quality rating	Groundwater that exceed a standardized quality rating	
		Population connected to wastewater with at least secondary treatment	Population connected to wastewater with at least secondary treatment	6.3.1 Proportion of domestic and industrial wastewater flows safely treated
6	6.4 (water scarcity)	Efficiency of drinking water distribution networks	---	6.4.2 Level of water stress: freshwater withdrawal as a proportion of available freshwater resources
		Water exploitation index plus (WEI+)	---	
6	6.6 (water-related ecosystems)	Wetlands of international importance	---	6.6.1 Change in the extent of water-related ecosystems over time

Source: Authors' own elaboration



SDG Target 6.1 UNIVERSAL ACCESS TO WATER

By 2030, achieve universal and equitable access to safe and affordable drinking water for all.

Indicator for final dataset: Population served by safely managed drinking water supply services.

Original indicator (from JRC): Population served by safely managed drinking water supply services.

Definition: Proportion of people receiving water supply covered by safe drinking watersystems. According to WHO or the World Bank, the percentage of people using drinking water from an improved source that is accessible on premises, available when needed and free from faecal and priority chemical contamination.

Reasons for the choice of this final indicator: According to the WHO, lack of access to adequate drinking water services contributes to deaths and illness, especially in children. Water based disease transmission by drinking contaminated water is responsible for significant outbreaks. Even though access to drinking water is

highly widespread in Europe, it is necessary to monitor that this indicator does not deteriorate. The goal is to achieve 100% coverage.

Final Indicator	Population served by safely managed drinking water supply services
Type	Official
Coverage	---
Source	National and regional sources
Unit of measurement	Percentage
Frequency	Annual



SDG Target 6.3 WATER QUALITY

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.

Indicator for final dataset: Water bodies that exceed a standardized quality rating.

Original indicator (from JRC): Water bodies that exceed a standardized quality rating.

Definition: Percentage of samples that comply with drinking water quality standards in surface water bodies. Good chemical status means that no concentrations of priority substances exceed the relevant environmental quality standards.

Reasons for the choice of this final indicator: Water quality standards play a crucial role in maintaining clean and healthy water resources for both human consumption and natural ecosystems. Water quality standards are the foundation for various water protection and management programs that aim to maintain, restore, and ensure the protection of water resources against pollution. These standards define the goals for a particular water body based on its designated use and the level of protection required to preserve the environment and public health. This indicator measures water quality in surface water bodies such as rivers and lakes.

Final Indicator	Water bodies that exceed a standardized quality rating
Type	Official
Coverage	---
Source	National and regional sources
Unit of measurement	Percentage
Frequency	Annual

Indicator for final dataset: Groundwater that exceed a standardized quality rating.

Original indicator (from JRC): Groundwater that exceed a standardized quality rating.

Definition: Percentage of samples that comply with drinking water quality standards in groundwater. Good chemical status means that no concentrations of priority substances exceed the relevant environmental quality standards.

Reasons for the choice of this final indicator: The reasons for choosing this indicator are the same as those expressed for the previous indicator. The only difference is that in this case groundwater quality is measured. Drinking water often comes from groundwater.

Final Indicator	Groundwater that exceed a standardized quality rating
Type	Official

Coverage	---
Source	National and regional sources
Unit of measurement	Percentage
Frequency	Annual

Indicator for final dataset: Population connected to wastewater with at least secondary treatment.

Original indicator (from JRC): Population connected to wastewater with at least secondary treatment.

Definition: Percentage of population connected to wastewater treatment systems with at least secondary treatment. In such system, wastewater is treated by a process generally involving biological treatment with a secondary settlement or other process, resulting in a removal of organic material that reduces the biochemical oxygen demand (BOD) by at least 70 % and the chemical oxygen demand (COD) by at least 75 %.

Reasons for the choice of this final indicator: Secondary wastewater treatment is an advanced process that significantly reduces the concentration of pollutants, such as organic matter and nutrients, in wastewater before it is released into the environment. This reduces the risk of water pollution and its associated negative impacts on water quality. It also helps protect aquatic ecosystems by removing or reducing harmful substances that can harm aquatic life. In addition, it reduces the risk of waterborne diseases by removing pathogens from wastewater. Finally, clean water is crucial for various uses, including drinking water, agriculture, and industrial processes. Monitoring the percentage of the population connected to wastewater treatment with at least secondary treatment provides a measurable and specific way to track progress toward improving water quality.

Final Indicator	Population connected to wastewater with at least secondary treatment
Type	Official
Coverage	---
Source	National and regional sources
Unit of measurement	Percentage
Frequency	Annual



SDG Target 6.4 WATER SCARCITY

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.

Indicator for final dataset: Efficiency of drinking water distribution networks

Original indicator (from JRC): ---

Definition: Volume of water delivered to users on water fed into the network.

Reasons for the choice of this final indicator: A significant portion of the water utilities manage is lost in the distribution network to problems such as pipe leakage, meter error, and unauthorized consumption. This affects the production cost and the availability of water. In a context of water scarcity and periods of drought, the efficiency of water distribution networks is a relevant factor to guarantee access to safe and affordable drinking water. Measuring the difference between the volume of water put into a water distribution system and the volume that is billed to customers is a good proxy to measure efficiency in this context.

Final Indicator	Efficiency of drinking water distribution networks
Type	Official
Coverage	Italian regions
Source	Istat, Regional Statistics, Italy

Unit of measurement	Percentage
Frequency	Annual

Indicator for final dataset: Water exploitation index plus (WEI+)

Original indicator (from JRC):

Definition: WEI+ is estimated as ratio of water use versus renewable freshwater resources for a given spatial unit e.g. river basin or country level in a defined time period i.e. seasonal (quarter) or annual.

Reasons for the choice of this final indicator: Water stress, a situation where there is not enough water of sufficient quality to meet the demands of people and the environment, is already a reality in many parts of Europe. Droughts and water scarcity are no longer rare or extreme events in Europe, and about 20 % of the European territory and 30 % of Europeans are affected by water stress during an average year (EEA, 2021).

Final Indicator	Water exploitation index plus (WEI+)
Type	Official
Coverage	EU-27 and others
Source	European Environmental Agency (EEA)
Unit of measurement	Percentage
Frequency	Every two years



SDG Target 6.6 WATER-RELATED ECOSYSTEMS

By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes.

Indicator for final dataset: Wetlands of international importance

Original indicator (from JRC): ---

Definition: Hectares of wetlands of international importance. A wetland should be considered internationally important if it contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region (Ramsar, Convention of Wetlands).

Reasons for the choice of this final indicator: Wetlands are among the most biologically diverse ecosystems on the planet, providing habitat for a wide variety of plant and animal species, including many that are threatened or endangered. Measuring and identifying wetlands of international importance helps prioritize conservation efforts for these critical areas.

Final Indicator	Wetlands of international importance
Type	Official
Coverage	Parties to the Convention
Source	Ramsar, Convention of Wetlands
Unit of measurement	Hectares
Frequency	---

4.1.7 SDG 7 – Affordable and clean energy

Table 14 summarizes the final indicator set to monitor SDG7, *Ensure access to affordable, reliable, sustainable and modern energy for all*, in comparison with the initial indicator set proposed by JRC (Vega-Rapún et al., 2022). It also relates the final indicators with the UN global indicator framework (UN, 2015). The rest of the section gives, for each indicator, a definition, reasons/arguments for the choice and a small table with metadata.

Table 14 – SDG7: Final data set

SDG	Target	Final proposal	Initial JRC proposal	UN framework
7	7.1 (access to energy)	People affected by energy poverty	People affected by energy poverty	7.1.1 Proportion of population with access to electricity
				7.1.2 Proportion of population with primary reliance on clean fuels and technology
7	7.2 (share of renewable energy)	Total energy consumption that comes from renewable sources	---	7.2.1 Renewable energy share in the total final energy consumption
		Electricity production that comes from renewable sources	Electricity production that comes from renewable sources	---
		Renewable energies in the transport sector	---	---
		Electricity production that comes from nuclear power	Electricity production that comes from nuclear power	---
7	7.3 (energy efficiency)	Energy intensity	Energy intensity	7.3.1 Energy intensity measured in terms of primary energy and GDP

Source: Authors' own elaboration



SDG Target 7.1 ACCESS TO ENERGY

By 2030, ensure universal access to affordable, reliable and modern energy services.

Indicator for final dataset: People affected by energy poverty

Original indicator (from JRC): People affected by energy poverty

Definition: (From the EPAH, Energy Poverty Advisory Hub)

High share of energy expenditure in income: Proportion of households whose share of energy expenditure in income is more than twice the national median.

Low absolute energy expenditure: Share of households whose absolute energy expenditure is below half the national median.

Inability to keep home adequately warm: Share of population not able to keep their home adequately warm based on the question “Can your household afford to keep its home adequately warm?” (EU-SILC).

Arrears on utility bills: Share of population with arrears on utility bills, based on the question “In the last twelve months, has the households been in arrear, i.e., has been unable to pay on time due to financial difficulties for utility bills (heating, electricity, gas, water, etc.) for main dwelling?” (EU-SILC).

Reasons for the choice of this final indicator: Energy is essential in everyday lives. We need energy to have sufficient levels of heating, cooling and lighting in our homes to ensure a decent standard of living. Energy poverty occurs when a household must reduce its energy consumption to a degree that negatively impacts the inhabitants' health and wellbeing. It is important to tackle energy poverty by addressing its root causes. Therefore, it is important to address fuel poverty by addressing its root causes and, to do so, we need to measure fuel poverty, analyze its evolution and see the impact of the measures that can be adopted. The EPAH analyzes information on 21 indicators that may be relevant to tackling energy poverty (EPAH, 2022b). We consider here four different indicators that are included in this analysis. These are the ones proposed by the former EPOV (European Energy Poverty Observatory).

Final Indicator	People affected by energy poverty
Type	Official
Coverage	---
Time coverage	Since 2017
Source	National sources
Unit of measurement	Percentage
Frequency	Annual



SDG Target 7.2 SHARE OF RENEWABLE ENERGY

By 2030, increase substantially the share of renewable energy in the global energy mix.

Indicator for final dataset: Total energy consumption that comes from renewable sources

Original indicator (from JRC): ---

Definition: Share of energy consumption that comes from renewable sources.

Reasons for the choice of this final indicator: The Renewable Energy Directive of the EU adopted is one of the main proposals of the “Fit for 55” legislation and a crucial step towards the implementation of the European Green Deal. This directive sets a binding target for 2030 of 42.5% renewable energy. This target must be achieved for all energy consumption and not only for electricity generation, the sector in which the use of renewables is most advanced. For this reason, the final list of indicators includes the share of renewable energies in total energy consumption.

Final Indicator	Total energy consumption that comes from renewable sources
Type	Official
Coverage	---
Source	National and regional sources
Unit of measurement	Percentage
Frequency	Annual

Indicator for final dataset: Electricity production that comes from renewable sources

Original indicator (from JRC): Electricity production that comes from renewable sources

Definition: Share of electric power generation that comes from renewable energy sources.

Reasons for the choice of this final indicator: The European Green Deal focuses on three key principles for the clean energy transition. One of this principles states the need to develop a power sector based largely on renewable resources. Within this transition, electrification is a key factor as electricity can be obtained from a variety of sources, including renewable sources such as solar, wind, hydroelectric and geothermal, which diversifies the energy matrix and reduces dependence on fossil fuels. On this path towards electrification of certain sectors, it is necessary to ensure that electricity is being obtained from renewable sources. This indicator shows the share of renewable energies in electricity production.

Final Indicator	Electricity production that comes from renewable sources
Type	Official
Coverage	---
Tme coverage	Since 2004
Source	National and regional sources
Unit of measurement	Percentage
Frequency	Annual

Indicator for final dataset: Renewable energy in the transport sector

Original indicator (from JRC): ---

Definition: Share of of the energy consumption of the transport sector that comes from renewable energy sources.

Reasons for the choice of this final indicator: The Renewable Energy Directive included in the Fit for 55 legislation proposes the introduction or enhancement of sectorial sub-targets and measures across sectors, with a special focus on sectors where progress with integrating renewables has been slower to date. One of those is the transport sector. This indicator shows the share of renewable energies in the energy consumption of the transportation sector.

Final Indicator	Renewable energy in the transport sector
Type	Official
Coverage	Italian regions
Tme coverage	Since 2012
Source	ISTAT from data of GSE S.p.A. - Energy Services Operator
Unit of measurement	Percentage
Frequency	Annual

Indicator for final dataset: Electricity production that comes from nuclear power.

Original indicator (from JRC): Electricity production that comes from nuclear power.

Definition: Share of electricity production that comes from nuclear power.

Reasons for the choice of this final indicator: Nuclear energy is a low-carbon alternative to fossil fuels and represents a critical component in the energy mix of 13 of the 27 EU Member States, accounting for almost 26% of the electricity produced in the EU (European Parliament, 2023). It is not a renewable energy but can have relevance in the energy transition due to its low carbon intensity, if safety conditions are strictly complied with.

Final Indicator	Electricity production that comes from nuclear power
Type	Official
Coverage	---
Time coverage	Since 2005
Source	National sources
Unit of measurement	Percentage
Frequency	Annual



SDG Target 7.3 ENERGY EFFICIENCY

By 2030, double the global rate of improvement in energy efficiency.

Indicator for final dataset: Energy intensity

Original indicator (from JRC): Energy intensity

Definition: Ratio of total energy supply per unit of gross domestic product (GDP).

Reasons for the choice of this final indicator: Monitoring energy intensity is crucial for tracking progress toward energy efficiency goals, reducing environmental impact, enhancing economic competitiveness, and addressing critical global challenges such as climate change and energy security. It is a relevant indicator to measure and promote sustainability in our energy systems and economies. Energy intensity allows us to measure how much energy is used to generate a unit of economic output. A decrease in energy intensity indicates that less energy is required to produce the same amount of economic value. This aligns with the goal of improving energy efficiency.

Final Indicator	Energy intensity
Type	Official
Coverage	Several European countries and regions
Time coverage	Since 2005
Source	National and regional sources
Unit of measurement	Tons of oil equivalent (toe) per million euros
Frequency	Annual

4.1.8 SDG 8 – Decent work and economic growth

Table 15 summarizes the final indicator set to monitor SDG8, *Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all*, in comparison with the initial indicator set proposed by JRC (Vega-Rapún et al., 2022). It also relates the final indicators with the UN global indicator framework (UN, 2015). The rest of the section gives, for each indicator, a definition, reasons/arguments for the choice and a small table with metadata.

Table 15 – SDG8: Final data set

SDG	Target	Final proposal	Initial JRC proposal	UN framework
8	8.1 (economic growth)	Real GDP per capita	GDP at current market prices	8.1.1 Annual growth rate of real GDP per capita
8	8.2 (economic productivity)	Real GVA per worker	GVA at basic prices	8.2.1 Annual growth rate of real GDP per employed person
8	8.3 (job creation)	Firm creation in comparison with firm closures	Firm creation	---
		Share of employed persons in the informal economy	---	8.3.1 Proportion of informal employment in total employment, by sector and sex
8	8.5 (productive employment)	Activity rate	Economic activity	8.5.2 Unemployment rate, by sex, age and persons with disabilities
		Unemployment rate	Unemployment	
		---	Employment	
		Long-term unemployment (12 months and more)	Long-term unemployment (12 months and more)	8.5.1 Average hourly earnings of employees, by sex, age, occupation and persons with disabilities
		Average compensation of employees	Compensation of employees	
8	8.6 (youth not in employment, education or training)	Young people neither in employment nor in education and training	Young people neither in employment nor in education and training	8.6.1 Proportion of youth (aged 15–24 years) not in education, employment or training
8	8.8 (labour rights)	Occupational accidents	Occupational accidents	8.8.1 Fatal and non-fatal occupational injuries per 100,000 workers, by sex and migrant status
8	8.9 (sustainable tourism)	Touristic intensity index	---	8.9.1 Tourism direct GDP as a proportion of total GDP and in growth rate
	8.10 (access to banking)	Number of operational bank branches	---	8.10.1 (a) Number of commercial bank branches per 100,000 adults and (b) number of automated teller

			machines (ATMs) per 100,000 adults
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Source: Authors' own elaboration



SDG Target 8.1 ECONOMIC GROWTH

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.

Indicator for final dataset: Real GDP per capita

Original indicator (from JRC): GDP at current market prices

Definition: Real gross domestic product per capita measures a country's economic output per person and is calculated by dividing the real GDP of a country by its population.

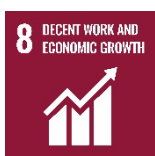
Supply side approach: GDP is equal to the sum of the gross value added of the various institutional sectors or different branches of activity, plus taxes minus subsidies on products. Real GDP is calculated with constant prices.

Demand approach: GDP is equal to the sum of final uses of goods and services by resident institutional units (final consumption expenditure and gross capital formation), plus exports minus imports of goods and services. Real GDP is calculated with constant prices

Income approach: GDP is equal to the sum of compensation of employees, taxes less subsidies on production and imports, gross operating surplus and gross mixed income of the total economy. Real GDP is calculated with constant prices

Reasons for the choice of this final indicator: Economic growth is usually analyzed according to the evolution of a country's production. To measure a country's production, GDP in real terms is used, i.e. GDP calculated at constant prices to eliminate the effect of prices and analyze only the evolution of production. Both real GDP growth and per capita GDP growth can be used to monitor economic growth. In this case, the indicator selected has been GDP per capita since target 8.1 is defined in per capita terms.

Final Indicator	Real GDP per capita
Type	Official
Coverage	EU-27 plus others
Time coverage	Since 2000
Source	Eurostat, Regional Statistics
Unit of measurement	Euros (PPS); Volume
Frequency	Annual



SDG Target 8.2 ECONOMIC PRODUCTIVITY

Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labour-intensive sectors.

Indicator for final dataset: Real GVA per worker

Original indicator (from JRC): GVA at basic prices

Definition: Gross Value Added (GVA) is equal to the sum of the gross value added of all resident institutional units engaged in production. Value added per worker is a measure of labor productivity—value added per unit of input.

Reasons for the choice of this final indicator: GVA per worker standardizes productivity measurement. By dividing GVA by the number of workers, you obtain a per-worker metric that can be compared across different regions. This allows for a more accurate time comparison of productivity levels, as it accounts for differences in the size of the labor force.

Final Indicator	Real GVA per worker
Type	Experimental
Coverage	Regional
Time coverage	Since 1995 or 2000
Source	OECD countries and other European countries
Unit of measurement	USD constant prices
Frequency	Annual



SDG Target 8.3 JOB CREATION

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.

Indicator for final dataset: Firm creation in comparison with firm closures

Original indicator (from JRC): Firm creation

Definition: Establishment birth rate (in percentage of establishments) versus establishment death rate (in percentage of establishments),

Reasons for the choice of this final indicator: The selected indicator makes it possible to analyze the net rate of business growth/decrease by comparing the rate of business start-ups with the rate of business closures. If data are available, it is recommended to analyze the creation/destruction of businesses by sector and jobs created/destroyed. The OECD provides information on these details.

Final Indicator	Firm creation in comparison with firm closures
Type	Experimental
Coverage	OECD countries and other European countries
Source	Organisation for Economic Cooperation and Development (OECD)
Unit of measurement	Rate
Frequency	Annual

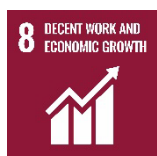
Indicator for final dataset: Share of employed persons in the informal economy

Original indicator (from JRC): ---

Definition: Proportion of informal employment in total employment.

Reasons for the choice of this final indicator: In many territories, informal employment represents a significant part of the economy and labor market and plays a key role in production, job creation and income generation. However, informality puts workers at a higher risk of vulnerability and precariousness. By its nature, informal economic activity is difficult to observe systematically and to measure. Informal workers range from agricultural day laborers to self-employed firm owners with a few employees. Informality is also associated with higher income inequality and poverty and less progress toward the Sustainable Development Goals (ILO, 2016; Ohnsorge and Yu, 2022).

Final Indicator	Share of employed persons in the informal economy
Type	Official
Coverage	Italian regions
Source	ISTAT, Regional Statics
Unit of measurement	Rate
Frequency	Annual



SDG Target 8.5 PRODUCTIVE EMPLOYMENT

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

Indicator for final dataset: Activity rate

Original indicator (from JRC): Economic activity

Definition: The activity rate is the percentage of active persons in relation to the comparable total population (working-age population) The economically active population comprises employed and unemployed persons.

Reasons for the choice of this final indicator: The labour force participation rate or activity rate provides an indication of the size of the supply of labour available to engage in the production of goods and services, relative to the population at working age. The indicator is used for understanding the labour market behaviour of different categories of the population (ILO, 2016). By examining the activity rate across different age groups and demographic categories (e.g., gender, education level, disabilities, and age), researchers and policymakers can gain a better understanding of labor force dynamics and identify disparities or trends in labor force participation.

Final Indicator	Activity rate
Type	Official
Coverage	EU-27 plus others
Source	Eurostat, regional statistics
Unit of measurement	Rate
Frequency	Annual

Indicator for final dataset: Unemployment rate

Original indicator (from JRC): Unemployment

Definition: The unemployment rate is the number of people unemployed (without work, available for work and looking for a job) as a percentage of the active population.

Reasons for the choice of this final indicator: The unemployment rate is a critical and widely used indicator for studying the labor market. It provides information on economic health, labor force dynamics, and the effectiveness of labor market policies, making it a central tool for policymakers, economists, businesses, and job seekers. Unemployment rates by specific groups, defined by age, sex, occupation or industry, are also useful in identifying groups of workers and sectors most vulnerable to joblessness (ILO, 2016).

Final Indicator	Unemployment rate
Type	Official
Coverage	EU-27 plus others
Time coverage	Since 1999
Source	Eurostat, regional statistics
Unit of measurement	Rate
Frequency	Annual

Indicator for final dataset: Long-term unemployment (12 months and more)

Original indicator (from JRC): Long-term unemployment (12 months and more)

Definition: Long-term unemployment refers to the number of people who are out of work and have been actively seeking employment for at least a year. Long-term unemployment as a percentage of unemployment. Incidence of long-term unemployment in terms of ILO.

Reasons for the choice of this final indicator: The indicators on long-term unemployment look at duration of unemployment, that is, the length of time that an unemployed person has been without work, available for work and looking for a job. While short periods of joblessness are of less concern, especially when unemployed persons are covered by unemployment insurance schemes or similar forms of support, prolonged periods of unemployment bring with them many undesirable effects, particularly loss of income and diminishing employability of the jobseeker (ILO, 2016).

Final Indicator	Long-term unemployment (12 months and more)
Type	Official
Coverage	EU-27 plus others
Time coverage	Since 1999
Source	Eurostat, regional statistics
Unit of measurement	Rate
Frequency	Annual

Indicator for final dataset: Average compensation of employees

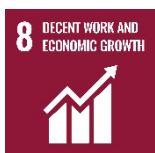
Original indicator (from JRC): Compensation of employees

Definition: The compensation of employees consists of all remuneration, in cash and in kind, which employees receive from their employers in return for work done during the relevant accounting period. The payments cover: gross (pre-tax) wages and salaries; employers' actual social contributions; imputed social contributions.

Reasons for the choice of this final indicator: Compensation is a critical aspect of employment, as it directly affects the economic well-being of workers and their families. Decent work should ensure that employees receive fair and adequate compensation for their labor, enabling them to cover their basic needs, save, and invest in their future.

Final Indicator	Average compensation of employees
Type	Official

Coverage	Several European countries and regions
Time coverage	Since 1995
Source	National and regional sources
Unit of measurement	Euros, constant prices
Frequency	Annual



SDG Target 8.6 YOUTH NOT IN EMPLOYMENT, EDUCATION OR TRAINING

By 2020, substantially reduce the proportion of youth not in employment, education or training.

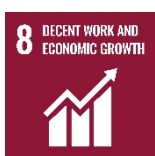
Indicator for final dataset: Young people neither in employment nor in education and training

Original indicator (from JRC): Young people neither in employment nor in education and training

Definition: Percentage of the population of a given age group and sex who is not employed and not involved in further education or training.

Reasons for the choice of this final indicator: Among the young population, the NEET (not on employment, education or training) group is neither improving their future employability through investment in skills nor gaining experience through employment, this group is particularly at risk of both labour market exclusion and social exclusion (ILO, 2016).

Final Indicator	Young people neither in employment nor in education and training
Type	Official
Time coverage	Since 2000
Coverage	EU-27 plus others
Source	Eurostat, regional statistics
Unit of measurement	Rate
Frequency	Annual



SDG Target 8.8 LABOR RIGHTS

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.

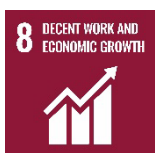
Indicator for final dataset: Occupational accidents

Original indicator (from JRC): Occupational accidents

Definition: Work accidents that have resulted in sick leave (for at least 1 day, not counting the day of the accident) or the death of the injured worker. Work accidents can occur either during the working day or during the trip between the worker's home and the place of work or vice versa (in itinerary).

Reasons for the choice of this final indicator: Occupational accidents serve as an effective indicator for monitoring safe and secure working environments as part of SDG 8, Target 8.8. They directly reflect the safety and well-being of workers, encourage preventive measures, and align with the goal of protecting labor rights. Reducing occupational accidents benefits both workers and businesses while contributing to the broader aims of sustainable development and responsible business practices.

Final Indicator	Occupational accidents
Type	Official
Coverage	Several European countries and regions
Source	National and regional sources
Unit of measurement	Rate (accidents per XX employees)
Frequency	Annual



SDG Target 8.9 SUSTAINABLE TOURISM

By 2030, devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products.

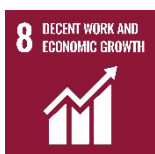
Indicator for final dataset: Tourism intensity

Original indicator (from JRC): ---

Definition: Tourism intensity is the ratio of nights spent at tourist accommodation establishments relative to the total permanent resident population of the area

Reasons for the choice of this final indicator: Tourism intensity can indirectly reflect the impact of tourism on local infrastructure and resources, as high-intensity areas are more likely to experience increased strain on services like water, waste management, and transportation. However, tourism intensity focuses solely on one aspect of tourism (accommodation nights) and population. It doesn't consider the broader aspects of sustainable tourism, such as environmental conservation, cultural preservation, and economic benefits for local communities.

Final Indicator	Tourism intensity
Type	Official
Coverage	Italian regions
Source	ISTAT, Regional Statics (Italy)
Unit of measurement	Ratio
Frequency	Annual



SDG Target 8.10 ACCESS TO BANKING

Strengthen the capacity of domestic financial institutions to encourage and expand access to banking, insurance and financial services for all.

Indicator for final dataset: Number of operational bank branches

Original indicator (from JRC): ---

Definition: Number of operational bank branches per 100,000 inhabitants.

Reasons for the choice of this final indicator: Access to banking services is a fundamental aspect of financial inclusion. The indicator helps assess the extent to which financial institutions are expanding their services. Higher branch density typically translates to shorter travel distances and reduced time and cost for individuals to access financial services. Communities with better access to banking services are more likely to benefit from increased savings, investments, and access to credit, all of which can contribute to economic growth and poverty reduction.

Final Indicator	Number of operational bank branches
Type	Official
Coverage	Several European countries and regions
Source	National and regional sources
Unit of measurement	Ratio (Number per 100,000 inhabitants)
Frequency	Annual

4.1.9 SDG 9 – Industry, innovation and infrastructure

Table 16 summarizes the final indicator set to monitor SDG9, *Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation*, in comparison with the initial indicator set proposed by JRC (Vega-Rapún et al., 2022). It also relates the final indicators with the UN global indicator framework (UN, 2015). The rest of the section gives, for each indicator, a definition, reasons/arguments for the choice and a small table with metadata.

Table 16 – SDG9: Final data set

SDG	Target	Final proposal	Initial JRC proposal	UN framework
9	9.2 (sustainable industrialization)	GVA of the industry with respect to the GVA of the total sectors	GVA of the industry with respect to the GVA of the total sectors (current price)	9.2.1 Manufacturing value added as a proportion of GDP and per capita
9	9.3 (small-scale enterprises)	Value added of small manufacturing enterprises on total manufacturing value added	---	9.3.1 Proportion of small-scale industries in total industry value added
9	9.4 (efficiency and clean technologies)	CO2 emissions per industry GDP	---	9.4.1 CO2 emission per unit of value added
9	9.5 (promote innovation)	Gross Domestic Expenditure on R&D	Gross Domestic Expenditure on R&D	9.5.1 Research and development expenditure as a proportion of GDP
		R&D personnel and researchers	R&D personnel and researchers	9.5.2 Researchers (in full-time equivalent) per million inhabitants
		Employment in high-technology manufacturing as a percentage of total employment	Employment in high-technology manufacturing as a percentage of total manufacturing employment	---
		Patent applications to the EPO	Patent applications to the EPO	---
9	9.c (access to ICT and internet)	Households with broadband connection	---	9.c.1 Proportion of population covered by a mobile network, by technology

Source: Authors' own elaboration



SDG Target 9.2 SUSTAINABLE INDUSTRIALIZATION

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.

Indicator for final dataset: GVA of the industry with respect to the GVA of the total sectors

Original indicator (from JRC): GVA of the industry with respect to the GVA of the total sectors (current price)

Definition: Gross value added (GVA) of the industry (B-E NACE activities) with respect to the GVA of the total sectors.

Reasons for the choice of this final indicator: The indicator focuses on the Gross Value Added (GVA) of the industry, which reflects the economic contribution of the industrial sector, including manufacturing and other related activities and excluding construction. This comparison is crucial for assessing whether the industrial sector is growing at a rate that is proportionate or higher than other economic sectors. A rising ratio implies that the industrial sector is playing a more significant role in the overall economy, which is often a key objective in the pursuit of sustainable industrialization. A rising iGVA ratio could also suggest that the industrial sector is creating more jobs, particularly in manufacturing and related industries.

Final Indicator	GVA of the industry with respect to the GVA of the total sectors
Type	Official
Coverage	EU-27 plus others
Time coverage	Since 2000
Source	Eurostat, regional statistics Eurostat NAMA_10R_3GVA
Unit of measurement	Rate
Frequency	Annual



SDG Target 9.3 SMALL-SCALE ENTERPRISES

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.

Indicator for final dataset: Value added of small manufacturing enterprises on total manufacturing value added

Original indicator (from JRC): ---

Definition: Share of manufacturing value added of small-scale manufacturing enterprises in the total manufacturing value added

Reasons for the choice of this final indicator: Small-scale enterprises large share of businesses worldwide and make an important contribution to job creation and global economic development. They provide opportunities in the form of both self-employment and entrepreneurship; thereby, helping individuals earn and improve their standard of living. However, they are less likely to be able to obtain bank loans than large firms; instead, they rely on internal funds, or cash from friends and family, to launch and initially run their enterprises.

Final Indicator	Value added of small manufacturing enterprises on total manufacturing value added
Type	Official
Coverage	Several European countries and regions
Source	National and regional sources

Unit of measurement	Percentage
Frequency	Annual



SDG Target 9.4 EFFICIENCY AND CLEAN TECHNOLOGIES

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

Indicator for final dataset: CO2 emissions per industry GVA

Original indicator (from JRC): ---

Definition: Carbon dioxide (CO2) emissions of resident economic units in the manufacturing sector per unit of real gross value added, regardless of the geographic location where they actually occur.

Reasons for the choice of this final indicator: By examining CO2 emissions per unit of industry GVA, we essentially assess how carbon-intensive a region's manufacturing sector is. In other words, we assess the efficiency with which an industry produces economic value relative to its carbon footprint.

Final Indicator	Total industry CO2 emissions per industry GDP
Type	Official
Coverage	Several European countries and regions
Source	National and regional sources
Unit of measurement	Ratio (Kilograms per €)
Frequency	Annual



SDG Target 9.5 PROMOTE INNOVATION

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.

Indicator for final dataset: Gross Domestic Expenditure on R&D

Original indicator (from JRC): Gross Domestic Expenditure on R&D

Definition: Gross domestic expenditure on R&D (GERD), expenditure on research and development by business enterprises, higher education institutions, as well as government and private non-profit organizations, as a proportion of GDP.

Reasons for the choice of this final indicator: Innovation is a fundamental driver of economic growth, competitiveness, and addressing global challenges. R&D expenditure is a direct investment in the creation and advancement of new knowledge, technology, and innovation. By measuring R&D spending as a proportion of a region's GDP, it is possible to gauge the commitment and resources allocated to fostering innovation within that economy.

Final Indicator	Gross Domestic Expenditure on R&D
Type	Official
Coverage	EU-27 plus others
Time coverage	Since 1994

Source	Eurostat, regional statistics Eurostat RD_E_GERDREG
Unit of measurement	Rate
Frequency	Annual

Indicator for final dataset: R&D personnel and researchers

Original indicator (from JRC): R&D personnel and researchers

Definition: Research and development (R&D) personnel and researchers measure in full-time equivalent (FTE) per million inhabitants. R&D personnel consists of all individuals employed directly in the field of R&D, including persons providing direct services, such as managers, administrators, and clerical staff. A R&D researcher can be employed in the public or the private sector, including academia, to create new knowledge, products, processes and methods, as well as to manage the projects concerned.

Reasons for the choice of this final indicator: The presence of R&D personnel and researchers is essential for building innovation capacity. Innovation is often a collaborative effort, and researchers play a critical role in generating new knowledge, conducting experiments, and developing new technologies. Monitoring this indicator helps evaluate a country's ability to drive innovation through its human capital.

Final Indicator	R&D personnel and researchers (full-time equivalent)
Type	Official
Coverage	EU-27 plus others
Time coverage	Since 1980
Source	Eurostat, regional statistics Eurostat RD_P_PERSREG
Unit of measurement	Ratio (FTE per million inhabitants)
Frequency	Annual

Indicator for final dataset: Employment in high-technology manufacturing as a percentage of total manufacturing employment

Original indicator (from JRC): Employment in high-technology manufacturing as a percentage of total manufacturing employment

Definition: Share of employees in high-tech manufacturing sectors as a proportion of total employees in manufacturing sector.

Reasons for the choice of this final indicator: High-technology manufacturing typically involves the production of advanced and complex products, often with the integration of cutting-edge technologies. The employment in this sector is indicative of a region's capacity to engage in sophisticated, technologically advanced activities. Employment in high-technology manufacturing often requires a highly skilled and specialized workforce. This employment provides an incentive for regions to invest in education and skills development, ensuring that the workforce is capable of contributing to innovation.

Final Indicator	Employment in high-technology manufacturing as a percentage of total manufacturing employment
Type	Experimental
Coverage	OECD countries and other European countries
Time coverage	Since 2006
Source	Organisation for Economic Cooperation and Development (OECD)
Unit of measurement	Rate
Frequency	Annual

Indicator for final dataset: Patent applications to the EPO

Original indicator (from JRC): Patent applications to the EPO

Definition: Number of patent applications per million inhabitants. A patent application, the application for a patent, needs to be for an invention, i.e. a new solution to a technical problem, which satisfies the criteria of: novelty (the solution must be novel); inventiveness (it must involve a non-obvious inventive step); industrial applicability (it must be capable of industrial use). The European Patent Office (EPO) examines European patent applications, enabling inventors, researchers and companies from around the world to obtain protection for their inventions in up to 44 countries through a centralised and uniform procedure that requires just one application

Reasons for the choice of this final indicator: Patents often serve as a reflection of the innovative output of R&D activities. R&D activities, which include scientific research and experimentation, are typically aimed at developing new technologies, products, or processes. As a result, many R&D efforts lead to the creation of new, patentable inventions. The number and quality of patent applications can serve as indicators of the effectiveness of R&D efforts. A high number of patent applications may suggest that R&D activities are productive and innovative.

Final Indicator	Patent applications to the EPO
Type	Official
Coverage	EU-27 plus others
Time coverage	Since 1997
Source	Eurostat, regional statistics Eurostat PAT_EP_RTOT
Unit of measurement	Ratio (number per million inhabitants)
Frequency	Annual



SDG Target 9.c ACCESS TO ITC AND INTERNET

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

Indicator for final dataset: Households with broadband connection

Original indicator (from JRC): ---

Definition: Households with internet broadband access as a percentage of total households

Reasons for the choice of this final indicator: This indicator was selected because it reflects the penetration of information and communication technology (ICT) in households, which aligns with the goal of increasing access to such technologies. Broadband connections are crucial for reliable and high-speed internet access, enabling participation in the digital economy, education, and various online services.

Final Indicator	Households with broadband connection
Type	Experimental
Coverage	OECD countries and other European countries
Source	Organisation for Economic Cooperation and Development (OECD)
Unit of measurement	Rate
Frequency	Annual

4.1.10 SDG 10 – Reduced inequalities

Table 17 summarizes the final indicator set to monitor SDG10, *reduce inequality within and among countries*, in comparison with the initial indicator set proposed by JRC (Vega-Rapún et al., 2022). It also relates the final indicators with the UN global indicator framework (UN, 2015). The rest of the section gives, for each indicator, a definition, reasons/arguments for the choice and a small table with metadata.

Table 17 – SDG10: Final data set

SDG	Target	Final proposal	Initial JRC proposal	UN framework
10	10.2 (inclusion irrespective of status)	Difference in unemployment between people with and without disabilities	Unemployment of people with disabilities	10.2.1 Proportion of people living below 50 percent of median income, by sex, age and persons with disabilities
10	10.4 (greater equality)	Gini index of disposable income before and after taxes and transfers	Gini index of disposable income (after taxes and transfers)	10.4.2 Redistributive impact of fiscal policy

Source: Authors' own elaboration



SDG Target 10.2 INCLUSION IRRESPECTIVE OF STATUS

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.

Indicator for final dataset: Difference in unemployment between people with and without disabilities

Original indicator (from JRC): Unemployment of people with disabilities

Definition: Ratio of unemployed persons to economically active persons in the population between 16 and 64 years of age with a degree of disability equal to or greater than 33% and ratio of unemployed persons to economically active persons in the population between 16 and 64 years of age without disabilities.

Reasons for the choice of this final indicator: The difference in unemployment rates between people with and without disabilities is a critical indicator for measuring social and economic inclusion because it reflects issues of equality, access, productivity, well-being, and policy effectiveness. Addressing this disparity is a crucial step toward building a more inclusive and equitable society, where all individuals, regardless of their abilities, have the opportunity to participate in and contribute to the economy and society.

Final Indicator	Difference in unemployment between people with and without disabilities
Type	Official
Coverage	Several European countries and regions
Source	National and regional sources
Unit of measurement	Percentage
Frequency	Annual



SDG Target 10.4 GREATER EQUALITY

Adopt policies, especially fiscal, wage and social protection policies, and progressively achieve greater equality.

Indicator for final dataset: Gini index of disposable income before and after taxes and transfers

Original indicator (from JRC): Gini index of disposable income (after taxes and transfers)

Definition: The Gini coefficient measures the extent to which the distribution of income (after or before taxes and transfers) within a country deviates from a perfectly equal distribution. A coefficient of 0 expresses perfect equality where everyone has the same income, while a coefficient of 1 expresses full inequality where only one person has all the income.

Reasons for the choice of this final indicator: The Gini index is a measure of income distribution. By calculating the Gini index of disposable income before taxes and transfers and comparing it with the Gini index of disposable income after taxes, the redistributive effects of fiscal policy can be analyzed. Thus, if the value of the Gini index decreases after taxes and transfers, inequality decreases after the application of fiscal policy.

Final Indicator	Gini index of disposable income before and after taxes and transfers
Type	Official/Experimental
Coverage	OECD countries and other European countries
Time coverage	Since 2013
Source	National sources/OECD
Unit of measurement	Index
Frequency	Annual

4.1.11 SDG 11 – Sustainable cities and communities

Table 18 summarizes the final indicator set to monitor SDG11, *Make cities and human settlements inclusive, safe, resilient and sustainable*, in comparison with the initial indicator set proposed by JRC (Vega-Rapún et al., 2022). It also relates the final indicators with the UN global indicator framework (UN, 2015). The rest of the section gives, for each indicator, a definition, reasons/arguments for the choice and a small table with metadata.

Table 18 – SDG11: Final data set

SDG	Target	Final proposal	Initial JRC proposal	UN framework
11	11.1 (access to housing)	Households expenses dedicated to housing costs	Households expenses dedicated to housing costs	11.1.1 Proportion of urban population living in slums, informal settlements or inadequate housing
11	11.2 (access to transport systems)	Seat-km offered by local public transport	Transport performance	11.2.1 Proportion of population that has convenient access to public transport, by sex, age and persons with disabilities
		Households declaring difficulties of connection with public transport means (per 100 households)		
		Daily accessibility	Daily accessibility	---
		Victims in road accidents n.*Million inhab.	Victims in road accidents	---
		Stock of vehicles (passenger cars) *1,000 inhab.	Stock of vehicles (passenger cars)	---
		Bicycle paths Km* 10,000 inhab.	---	---
11	11.3 (sustainable urbanization)	Density of railroads	---	---
		Difference between built-up area growth rate and population growth rate	Difference between built-up area growth rate and population growth rate	11.3.1 Ratio of land consumption rate to population growth rate
		Artificial Surfaces (% tot surface)	Land use	---
11	11.5 (people affected by disasters)	Deaths, missing persons and directly affected persons attributed to disasters per 100,000 inhabitants	---	11.5.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population
		Illegal building	---	---
11	11.6 (environmental impact)	PM2.5 Emissions	PM2.5 Emissions	11.6.2 Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities (population weighted)
		PM10 Emissions	---	

		Household and commercial waste generation per inhabitant	Household and commercial waste generation per inhabitant	11.6.1 Proportion of municipal solid waste collected and managed in controlled facilities out of total municipal waste generated, by cities
		Recycling rate	---	
11	11.7 (green and public spaces)	Urban population without green areas in their neighbourhood	---	11.7.1 Average share of the built-up area of cities that is open space for public use for all, by sex, age and persons with disabilities

Note: Final proposal - in gray, the complementary indicators

Source: Authors' own elaboration



SDG Target 11.1 ACCESS TO HOUSING

By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums.

Indicator for final dataset: Households expenses dedicated to housing costs

Original indicator (from JRC): Households expenses dedicated to housing costs

Definition: This indicator presents information on the final consumption expenditure of households on housing, water, electricity, gas and other fuels, as a percentage of their overall final consumption expenditure. Data refer to aggregate expenditure at national level. The indicator helps to understand the relative importance of housing-related expenditures within consumer spending and facilitates comparison with other household budget items, across countries as well as over time. The data in this indicator are mainly taken from the OECD Annual National Accounts Database on Final consumption expenditure of households, along the categorisation in the Classification of Individual Consumption According to Purpose (COICOP)⁵.

Definition from OECD Affordable Housing Database.

Reasons for the choice of this final indicator: Households spend a lot of money on housing and associated costs. Housing-related expenditure constituted the single-highest household expenditure item in OECD and EU countries in 2019, at an average of around 22% of final household consumption expenditure. On average, spending on housing has increased in recent decades, though there are large differences across countries (OECD, Housing-related expenditure of households, 2021). Therefore, the JRC proposal is maintained; this indicator is very useful for monitoring target 11.1, the “access for all to adequate, safe housing and basic services” (for example: the access to drinking water in households) is a primary need. It would also be interesting to note if there are relationships between the trends in housing costs and the trends in the poverty rate of families. All the regions in the pilot project consider this indicator useful to monitor this target.

⁵ The COICOP categorises the following items under housing-related expenditure: *Actual rentals for housing* (rentals normally include payments for the use of the land on which the property stands, the dwelling occupied, the fixtures and fittings for heating, plumbing, lighting, etc., and, in the case of a dwelling let furnished, the furniture. Rentals also include payments for the use of a garage to provide parking in connection with the dwelling); *Imputed rentals for housing* (Imputed rentals of owners occupying their main residence; the rental-equivalence that homeowners would pay for a house with similar characteristics to the one they own, which is designed to capture the segment of owner-occupied housing); *Maintenance and repair of the dwelling* (Expenditure that tenants and owner-occupiers incur for materials and services connected with activities undertaken regularly in order to maintain the dwelling in good working order); *Water supply and miscellaneous services relating to the dwelling* (Expenditure associated with water supply - such as hiring and reading of meters, standing charges, etc.; refuse collection and disposal; sewage collection and disposal; and, other services related to the dwelling - including co-proprietor charges for caretaking, gardening, stairwell cleaning, heating and lighting, maintenance of lifts and refuse disposal chutes, etc. in multi-occupant buildings; security services; snow removal and chimney sweeping); *Electricity, gas and other fuels* (Expenditure associated with the domestic use of, for example, electricity, natural gas, liquefied hydrocarbons and liquid and solid fuels).

Final Indicator	Households expenses dedicated to housing costs
Type	Experimental
Coverage	OECD countries and other European countries
Time coverage	Since 2000
Source	Organisation for Economic Cooperation and Development (OECD) (EU)
Unit of measurement	Percentage
Frequency	Annual



SDG Target 11.2 ACCESS TO TRANSPORT SYSTEMS

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.

Indicator for final dataset: Seat-km offered by local public transport and Households declaring difficulties of connection with public transport means (per 100 households)

Original indicator (from JRC): Transport performance

Definitions: Seat-km offered by local public transport is the total number of public transport seats available to users throughout the year. This value is calculated as the product of vehicle-kilometers² and the average capacity of the vehicles in service. Households declaring difficulties of connection with public transport means (per 100 households) is one of the urban environmental indicators, collected from a survey related to the construction of the Environmental Observatory on cities survey (Istat-Italy).

Definition from ISTAT National Institute of Statistics - Italy. Glossary.

Reasons for the choice of this final indicator: The indicator proposed by the JRC is very generic, without a unique definition: 'transport performance' can be measured in different ways, as regions have indeed suggested. Among the proposals, the one related to public transport supply in relation to the passengers served has proven to be the most satisfactory and consistent with the objective of target 11.2 regarding transport accessibility. To this more quantitative indicator, a more qualitative one related to the population's perception of the service offering has been added. This indicator is also coherent with the proposal of UN global indicator framework 'Proportion of population that has convenient access to public transport' (indicator 11.2.1, UN 2015). Therefore, the data should be read together to have a more comprehensive quantitative-qualitative analysis.

Final Indicator	Seats/ km offered by the local public transport service
Type	Official
Coverage	Italian regions
Time coverage	Since 2004
Source	ISTAT (Italy)
Unit of measurement	Number per inhab.
Frequency	Annual
Final Indicator	Households declaring difficulties of connection with public transport means (per 100 households)
Type	Official
Coverage	Italian regions
Time coverage	Since 2010
Source	ISTAT (Italy)
Unit of measurement	Percentage

Frequency

Annual



SDG Target 11.2 ACCESS TO TRANSPORT SYSTEMS

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.

Indicator for final dataset: Daily accessibility

Original indicator (from JRC): Daily accessibility

Definition: Daily accessibility indicates the amount of people that live within four hours of driving from the location at hand.

Definition from LUISA Modelling Platform (JRC and DG Regio)

Reasons for the choice of this final indicator: Together with the indicators analyzed previously, this indicator enriches the analysis regarding the accessibility to the transport system. The indicator proposed by the JRC is therefore confirmed because it is consistent with the target's objective and the majority of the regions consider this indicator useful to monitor the target with available data at the regional level. Additionally, the data provides a scenario analysis with forecasts of the data trends for 2030 and 2050.

Final Indicator	Daily accessibility
Type	Experimental
Coverage	EU-27
Time coverage	Since 2015
Source	EU-27
Unit of measurement	European Commission, Joint Research Centre
Frequency	Number
Frequency	Decade



SDG Target 11.2 ACCESS TO TRANSPORT SYSTEMS

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.

Indicator for final dataset: Victims in road accidents

Original indicator (from JRC): Victims in road accidents per Million inhabitants

Definitions: Injury accident is any accident involving at least one road vehicle in motion on a public road or private road to which the public has right of access, resulting in at least one injured or killed person.

Person killed is any person killed immediately or dying within 30 days because of an injury accident, excluding suicides.

Person injured is any person who as result of an injury accident was not killed immediately or not dying within 30 days, but sustained an injury, normally needing medical treatment, excluding attempted suicides.

Definition from Eurostat, Regional Statistics. Glossary.

Reasons for the choice of this final indicator: The indicator proposed by the JRC is confirmed because it is consistent with the target's objective. In particular, if the previous indicators were selected for a more focused analysis on "accessibility", in this case, the emphasis is placed on the "safety" of the transportation system,

which is part of the objectives of this target. All the regions consider this indicator useful to monitor this target with available data at the regional level.

Final Indicator	Victims in road accidents per Million inhabitants
Type	Official
Coverage	EU-27 plus others
Time coverage	Since 1990
Source	Eurostat, Regional Statistics tran_r_acci
Unit of measurement	Number
Frequency	Annual



SDG Target 11.2 ACCESS TO TRANSPORT SYSTEMS

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.

Complementary indicator for final dataset: Stock of vehicles (passenger cars) *1,000 inhab.

Original indicator (from JRC): Stock of vehicles (passenger cars)

Definitions: A passenger car is a road motor vehicle, other than a moped or a motor cycle, intended for the carriage of passengers and designed to seat no more than nine persons (including the driver).

Definition from Eurostat, Regional transport statistics. Glossary.

Reasons for the choice of this final indicator: The indicator proposed by the JRC is confirmed but as a complementary indicator for monitoring target 11.2. The indicator is confirmed as a complementary indicator for monitoring the target. As such, this indicator related to private transport can be useful to complement the previous analyses, particularly in relation to the availability of public transport. For example, it could be very useful to assess the evolution of private car usage, in relation to the changes in the use and availability of public transport, and to understand whether an improvement/worsening in the availability of public transportation and the quality of the service has influenced the increase/decrease in the usage of private vehicles.

Final Indicator	Stock of vehicles (passenger cars)
Type	Official
Coverage	EU-27 plus others
Time coverage	Since 1990
Source	Eurostat, Regional Statistics TRAN_R_VEHST
Unit of measurement	Number
Frequency	Annual



SDG Target 11.2 ACCESS TO TRANSPORT SYSTEMS

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.

Complementary indicators for final dataset: Bicycle paths Km* 10,000 inhab. and Density of railroads in operation per 1,000 square kilometres

Original indicator (from JRC): -

Definitions: The indicator “Bicycle paths per 10,000 inhabitants” is described as the length of the bicycle paths (road or part of road designated for one-trail cycles and sign-posted as such) converted per 10,000 inhabitants.

Data concerns length of bicycle lanes managed appropriately by local municipality, county or voivodship (excluding length of bicycle track): independent lanes for bicycles (constructed as a part of traffic road); lanes excluding from traffic roads; lanes excluding from pavement; lanes in foot-bicycle path. Length of bicycle lanes is length of lanes running in one direction. Length of bicycle lanes lying on the opposite side of the road are calculated separately. Data concerns the lanes that are used mainly for getting around, not for tourism (e.g. running through the forest) (*Monitoring the SDGs in Pomorskie region, 2023*).

The second indicator, “Density of railroads”, measures the density of railroads in operation per 1,000 square kilometres (*Monitoring the SDGs in North-West Romania region, 2023*).

Reasons for the choice of this final indicator: For monitoring the target 11.2, it was considered useful to add two additional complementary indicators to the proposal, related to the availability of bike paths and railways. In many European regions, these two modes of transportation, along with road transport, are the main means of transportation for the population.

Final Indicator	Bicycle paths Km* 10,000 inhab
Type	Official
Coverage	Pomorskie region
Time coverage	Since 2011
Source	Local Data Bank (Poland)
Unit of measurement	Km per 10,000 inhab.
Frequency	Annual
Final Indicator	Density of railroads in operation per 1,000 square kilometres
Type	Official
Coverage	Romanian regions
Time coverage	Since 2007
Source	Romanian Statistical Yearbook, National Institute of Statistics (Romania)
Unit of measurement	per 1,000 km ²
Frequency	Annual



SDG Target 11.3 SUSTAINABLE URBANIZATION

By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries.

Indicator for final dataset: Difference between built-up area growth rate and population growth rate

Original indicator (from JRC): Difference between built-up area growth rate and population growth rate

Definition: Difference between built-up area growth rate and population growth rate.

Definition from OECD, 2020.

Reasons for the choice of this final indicator: The indicator proposed by the JRC is consistent with the objectives of target 11.3 - by 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries; therefore, it was considered important to retain the indicator, even though the data are not currently available for all European regions. The indicator is also in line with the proposal by the United Nations, target 11.3.1. Ratio of land consumption rate to population growth rate. The data allow monitoring the evolution of urban area growth in relation to population growth; this is important to assess whether land consumption is related to population growth/stability/decrease, the change in built-up area per capita. The interpretation of this change should be made with caution, depending on the starting point from which it is being calculated (high or low initial levels of the built environment per capita).

Final Indicator	Difference between built-up area growth rate and population growth rate
Type	Experimental
Coverage	OECD countries and other European countries
Time coverage	Since 2000
Source	Organisation for Economic Cooperation and Development (OECD) (EU)
Unit of measurement	Percentage
Frequency	Annual

Complementary indicator for final dataset: Artificial surfaces

Original indicator (from JRC): Land use

Definition: "Artificial surfaces" (as a percentage of the total surface) refers to the extent or percentage of land in the region that is covered by human-made or artificial surfaces, such as buildings, roads and other types of infrastructure. It quantifies the amount of land that has been transformed or converted from its natural state into artificial or human-built environments (*Monitoring the SDGs in Western Macedonia region, 2023*).

Areas characterized by an artificial and often impervious cover of constructions and pavement.

Definition from Eurostat, LUCAS classification, 2022.

Reasons for the choice of this final indicator: This indicator has been selected as complementary to the previous one to monitor the percentage of land consumed, and thus the area transformed from natural to urbanized. While the previous indicator takes into account population growth, this indicator monitors surface transformation, considering various types of infrastructure and buildings (residences, industries, commerce, etc.), regardless of population growth/decline.

Final Indicator	Artificial surfaces
Type	
Coverage	European countries

Time coverage	Since 2000
Source	Copernicus, Land cover and land cover changes in European countries (EU)
Unit of measurement	Percentage
Frequency	6-7 years



SDG Target 11.3 SUSTAINABLE URBANIZATION

By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries.

Indicator for final dataset: Illegal building

Original indicator (from JRC): -

Definition: Number of unauthorized constructions per 100 constructions authorized by municipalities

Definition from Istat, National Institute of Statistics - Italy

Reasons for the choice of this final indicator: Despite being a challenging indicator to measure and not always available, this additional indicator proposed for monitoring target 11.3, allows tracking the rate of unauthorized construction in cities and regions. This is crucial because illegal building is often linked to a lack of access to basic services (e.g., water, energy, heating, etc.), poor housing quality, or overall building quality. At the same time, buildings constructed illegally but in excellent living conditions contribute to land consumption, transforming surfaces designated for natural areas – permeable areas – into cemented areas – impermeable areas.

Final Indicator	Illegal building
Type	Official
Coverage	Italian regions
Time coverage	Since 2002
Source	ISTAT, from CRESME ⁶ data (Italy)
Unit of measurement	Rate (per 100 authorized buildings)
Frequency	Annual



SDG Target 11.5 PEOPLE AFFECTED BY DISASTERS

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.

Indicator for final dataset: Deaths, missing persons and directly affected persons attributed to disasters per 100,000 inhabitants

Original indicator (from JRC): -

Definition: Number of people deaths and directly affected directly attributed to disasters per 100,000 inhabitants.

Reasons for the choice of this final indicator: Despite being a challenging indicator to measure and not always available, this additional indicator proposed for monitoring target 11.3, allows tracking the rate of

⁶ Centro ricerche economiche sociali di mercato per l'edilizia e il territorio/Center for Economic, Social, and Market Research for Construction and Territory (Italy)

unauthorized construction in cities and regions. This is crucial because illegal building is often linked to a lack of access to basic services (e.g., water, energy, heating, etc.), poor housing quality, or overall building quality. At the same time, buildings constructed illegally but in excellent living conditions contribute to land consumption, transforming surfaces designated for natural areas – permeable areas – into cemented areas – impermeable areas. The indicator is consistent with what is indicated in the United Nations framework, UN 2015 (11.5.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population).

Also related with: SDG target 1.5 (vulnerability to climate-related extreme events and disasters) and SDG target 13.1 (resilience and adaptive capacity to climate-related hazards and natural disasters).

Final Indicator	Deaths, missing persons and directly affected persons attributed to disasters per 100,000 inhabitants
Type	Official
Coverage	Spain Portugal
Time coverage	Since 2010 (Spain), 2021 (Portugal)
Source	INE (Spain) ANEPC (Portugal)
Unit of measurement	Deaths per 100,000 inhabitants
Frequency	Annual



SDG Target 11.6 ENVIRONMENTAL IMPACT

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.

Indicator for final dataset: PM2.5 Emissions

Original indicator (from JRC): PM2.5 Emissions

Definition: The indicator shows the spatial distribution of PM2.5 (sub-25µm particulate matter) emissions over Europe. The total emissions for each country/region are derived from the GAINS model (Lavalle, Aurambout and Trombetti, 2015b).

Reasons for the choice of this final indicator: According to what is reported by the World Health Organization, *every year, exposure to air pollution is still estimated to cause millions of deaths and the loss of healthy years of life. The burden of disease attributable to air pollution is now estimated to be on a par with other major global health risks such as unhealthy diets and tobacco smoking. In 2015, the World Health Assembly adopted a landmark resolution on air quality and health, recognizing air pollution as a risk factor for noncommunicable diseases such as ischaemic heart disease, stroke, chronic obstructive pulmonary disease, asthma and cancer, and the economic toll they take (WHO, 2021)*. The particulate matter, such as PM 2.5 (particulate matter, where particles have an aerodynamic diameter equal to or less than 2.5 µm; and also PM10 where particles have an aerodynamic diameter equal to or less than 10 µm) is a mixture of solid and liquid particles in the air that are small enough not to settle out on to the Earth's surface under the influence of gravity, classified by aerodynamic diameter. This type of suspended particulate matter, PM2.5, is considered the most dangerous to human health. This is due to its very fine nature, and its ability to penetrate directly into the bloodstream. For these reasons, monitoring PM2.5 and PM10 emissions is crucial to assess air quality and, therefore, valuable for monitoring the target. The data, available from Luisa platform (from JRC, EC), provide a scenario analysis with forecasts of the data trends for 2030 and 2050. This can be very useful to verify the trend in the coming years and to improve regional/national actions/policies.

Final Indicator	PM2.5 Emissions
Type	Experimental
Coverage	EU-27

Time coverage	Since 2015
Source	European Commission, Joint Research Centre
Unit of measurement	Number
Frequency	Decade



SDG Target 11.6 ENVIRONMENTAL IMPACT

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.

Indicator for final dataset: PM10 Emissions

Original indicator (from JRC): -

In the JRC proposal, the PM10 indicator had been associated with target 13.2 (climate change measures into policy).

Definition: The indicator shows the spatial distribution of PM10 (sub-10 µm particulate matter) emissions over Europe. The total emissions for each country/region are derived from the GAINS model.

Reasons for the choice of this final indicator: For the same reasons expressed in relation to the choice and importance of the PM2.5 emissions indicator, it has been chosen to add the PM10 indicator for the same reasons.

The particulate matter, such as PM 2.5 (particulate matter, where particles have an aerodynamic diameter equal to or less than 2.5 µm) and also PM10 (where particles have an aerodynamic diameter equal to or less than 10 µm) is a mixture of solid and liquid particles in the air that are small enough not to settle out on to the Earth's surface under the influence of gravity, classified by aerodynamic diameter. PM10 is harmful because it contains benzopyrenes, furans, dioxins and in short, carcinogenic heavy metals. According to the WHO, the limit value of the average daily concentration of this particulate matter is 50 micrograms per cubic meter, and the annual limit value is 20 micrograms per cubic meter. PM10 air quality has a negative effect on the respiratory system. It is responsible for coughing attacks, wheezing, and the worsening of conditions for people with asthma or acute bronchitis. For these reasons, monitoring PM2.5 and PM10 emissions is crucial to assess air quality and, therefore, valuable for monitoring this target. The data, available from Luisa platform (from JRC, EC), provide a scenario analysis with forecasts of the data trends for 2030 and 2050. This can be very useful to verify the trend in the coming years and to improve regional/national actions/policies.

Final Indicator	PM10 Emissions
Type	Experimental
Coverage	EU-27
Time coverage	Since 2015
Source	European Commission, Joint Research Centre
Unit of measurement	Number
Frequency	Decade



SDG Target 11.6 ENVIRONMENTAL IMPACT

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.

Indicator for final dataset: Household and commercial waste generation per inhabitant

Original indicator (from JRC): Household and commercial waste generation per inhabitant

Definition: Domestic waste generated by households, commerce and services, from urban collection.

Reasons for the choice of this final indicator: The indicator is highly relevant to the target's objectives and is also aligned with the goals of target 12.5 (reduce waste generation). As highlighted in the Circular Economy Action Plan, Europe is updating its legislation on waste management to promote the transition to a more sustainable circular economy model. In February 2021, the Parliament adopted a resolution on the new circular economy action plan demanding additional measures to achieve a carbon-neutral, environmentally sustainable, toxic-free and fully circular economy by 2050, including tighter recycling rules and binding targets for materials use and consumption by 2030. In March 2022, the Commission released the first package of measures to speed up the transition towards a circular economy, as part of the circular economy action plan. The proposals include boosting sustainable products, empowering consumers for the green transition, reviewing construction product regulation, and creating a strategy on sustainable textiles. In November 2022, the Commission proposed new EU-wide rules on packaging. It aims to reduce packaging waste and improve packaging design, with for example clear labelling to promote reuse and recycling; and calls for a transition to bio-based, biodegradable and compostable plastics.

Also related with: SDG target 12.5 (reduce waste generation)

Final Indicator	Household and commercial waste generation per inhabitant
Type	Official
Coverage	Portugal
Time coverage	Since 2009
Source	Statistics Portugal
Unit of measurement	Rate
Frequency	Annual

Note: The indicator in the original JRC proposal refers to statistics from Portugal; however, data on waste generation are available for all regions participating in the project (except for the North-West) from national sources.



SDG Target 11.6 ENVIRONMENTAL IMPACT

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.

Indicator for final dataset: Recycling rate

Original indicator (from JRC): -

Definition: Amount of household and commercial waste destined for recycling in relation to total waste generation.

Reasons for the choice of this final indicator: This indicator should be analyzed with Household and commercial waste generation per inhabitant. As Navarra Region suggest in the report (*Monitoring the SDGs in Navarra region, 2023*) a primary objective in achieving sustainable cities is to reduce the amount of waste generated. Waste reduction policies must be applied at different stages of the consumption chain, as there are so-called cascading externalities. Nevertheless, this is not the only objective in waste management; it is also necessary to increase waste treatment, including recycling. Separate waste collection helps to achieve this (Osés-Eraso, N. 2023).

In line with EU's 2050 climate neutrality goal under the Green Deal, the European Commission proposed in March 2022 the first package of measures to speed up transition towards a circular economy, as announced in the Circular Economy Action Plan. The new circular economy package establishes ambitious recycling and landfill reduction targets for the EU. The package sets two common goals for the European Union. The first goal is to recycle at least 55% of urban waste by 2025. This target is set to increase to 60% by 2030 and 65% by 2035. The second goal is to recycle 65% of packaging waste by 2025 (70% by 2030) with differentiated targets for different materials, as shown in the table:

Table 19 – EU goals towards a circular economy

Material	by 2025	by 2030
All types of packaging	65%	70%
Plastic	50%	55%
Wood	25%	30%
Ferrous metals	70%	80%
Aluminum	50%	60%
Glass	70%	75%
Paper and cardboard	75%	85%

Source: Authors' own elaboration

Also related with: SDG target 12.5 (reduce waste generation)

Final Indicator	Recycling rate
Type	Official
Coverage	Navarra
Time coverage	Since 2010
Source	Waste inventory of Navarre
Unit of measurement	Rate
Frequency	Annual



SDG Target 11.7 GREEN AND PUBLIC SPACES

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.

Indicator for final dataset: Urban population without green areas in their neighbourhood

Original indicator (from JRC): -

Definition: Percentage of the population residing in the municipality that does not have an accessible green area of at least 0.25 ha within a 5-minute walk (400m) of their residence (portal), as per the updated methodology by Hugo Poelman. The indicator has been also calculated exclusively for the population located in urban centers (groups of 1km² cells with high population density defined from the population grid of the GEOSTAT-2011 project), for all the municipalities that have at least 1,500 inhabitants for better comparability and matching international practices (*Monitoring the SDGs in Andalusia region, 2023*).

Reasons for the choice of this final indicator: The proposed indicator is perfectly in line with the target. In addition, this will allow covering this new target and monitoring the presence, and therefore the accessibility, of public green spaces.

Final Indicator	Urban population without green areas in their neighbourhood
Type	
Coverage	Spanish regions
Time coverage	Since 2019
Source	INE (Spain)
Unit of measurement	Percentage
Frequency	Annual

4.1.12 SDG 12 – Responsible consumption and production

Table 20 summarizes the final indicator set to monitor SDG12, *Ensure sustainable consumption and production patterns*, in comparison with the initial indicator set proposed by JRC (Vega-Rapún et al., 2022). It also relates the final indicators with the UN global indicator framework (UN, 2015). The rest of the section gives, for each indicator, a definition, reasons/arguments for the choice and a small table with metadata.

Table 20 – SDG12: Final data set

SDG	Target	Final proposal	Initial JRC proposal	UN framework
12	12.2 (management of natural resources)	Domestic material consumption DMC per capita	Carbon footprint	12.2.2 Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP
12	12.3 (reduce food waste)	Food waste	Food waste	12.3.1 (a) Food loss index and (b) food waste index
12	12.4 (chemical management)	Hazardous waste	Hazardous waste	12.4.2 (a) Hazardous waste generated per capita; and (b) proportion of hazardous waste treated, by type of treatment
12	12.5 (reduce waste generation)	Proportion of municipal waste prepared for reuse and recycling	---	12.5.1 National recycling rate, tons of material recycled
12	12.6 (sustainable practices in companies)	Number of EMAS-registered organizations/enterprises	---	12.6.1 Number of companies publishing sustainability reports
12	12.7 (sustainable public procurement practices)	Percentage of public institutions that acquire products and/or services by adopting minimum environmental criteria, in at least one procurement procedure (Green Purchasing or Green Public Procurement)	---	12.7.1 Number of countries implementing sustainable public procurement policies and action plans
12	12.b (sustainable tourism)	Incidence of tourism on waste	---	---

Note: Final proposal - in gray, the complementary indicators

Source: Authors' own elaboration



SDG Target 12.2 MANAGEMENT OF NATURAL RESOURCES

By 2030, achieve the sustainable management and efficient use of natural resources.

Indicator for final dataset: Domestic material consumption DMC per capita

Original indicator (from JRC): Carbon footprint

Definition: The DMC measures the quantity of raw materials, other than water and air, used every year by the socio-economic system and released into the environment (incorporated into emissions or effluents) or accumulated in new anthropogenic stocks (both capital goods and other durable goods and waste). Denominator: average annual population (Reg. UE N. 549/2013). Source: National Statistical Institute (Istat) – Materials' flows accounts; time-series from 2015 to 2018; annual frequency

Definition from Istat, National Statistical Institute, Italy

Reasons for the choice of this final indicator: The analysis of material flows is a particularly useful tool for the purposes of policies aimed at the environmental sustainability of development. Material flow accounting provides concise information on the physical exchanges within an economy, offering a comprehensive view of the phenomena that underlie environmental pressures. The first account of material flows at the level of the entire economy relates to Direct Material Input (DMI), which represents the set of materials that effectively enter the country's economy and are used within it. It is the sum of domestic extraction of materials used and imports. The second account relates to Domestic Material Consumption (DMC), which is obtained by subtracting the actual weight of exports from DMI. The DMC indicator derived from this account represents a measure of material "consumption" related only to internal uses of materials. Since it excludes exported quantities, DMC includes all and only the materials, whether from domestic extraction or from abroad, that remain in the country and are accumulated in stocks or transformed into waste, emissions, etc.

The carbon footprint indicator is highly relevant for monitoring SDG 13. However, it is still challenging for European regions to calculate greenhouse gas emissions resulting from all consumption, both internal and external. What is available is the internal greenhouse gas emissions production of the region, but it does not account for consumption from products and materials sourced externally from other countries. Consequently, analyses of internal production and consumption alone are insufficient to assess the carbon footprint.

Final Indicator	Domestic material consumption DMC per capita
Type	Official
Coverage	Italian regions
Time coverage	Since 2015
Source	ISTAT (Italy)
Unit of measurement	million tonnes per capita
Frequency	Annual



SDG Target 12.3 REDUCE FOOD WASTE

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.

Indicator for final dataset: Food waste

Original indicator (from JRC): Food waste

Definition: Food waste refers to the set of products discarded from the agri-food chain, which, for economic, aesthetic reasons, or due to their proximity to the expiration date, although still edible and potentially suitable for human consumption, are destined to be eliminated or disposed of.

The Waste Resources Action Program (WRAP) proposes a definition of food waste that distinguishes food waste into: Avoidable: Food and beverages ending up in the trash but still edible, such as bread pieces, apples, meat, etc.; Possibly avoidable: Food and beverages that some people consume, for example, bread crusts, while others do not; but also food that can be consumed if cooked, for example, potato peels; Inevitable: Meat bones, eggshells, pineapple peels, etc.

Definition from Ministry of Health, Italy

Reasons for the choice of this final indicator: The JRC's proposal to use this indicator is consistent and in line with the target and indicators selected by the United Nations. Therefore, it has been chosen to maintain it, even though analyzing the data at the regional level is very challenging. Out of the 10 project regions, only 2 have been able to propose methodologies for analyzing food waste at the regional level: Andalusia, from national data source (from MAPA Ministry of agriculture, fisheries and food), and Puglia, which, starting from nationally available data, has developed a methodology for regional-level calculation.

Final Indicator	Food waste
Type	Experimental
Coverage	Andalusia Puglia
Time coverage	Since 2017 (Andalusia) 2020 (Puglia)
Source	MAPA (Andalusia) Armenise (2023) regionalization of country data (Puglia)
Unit of measurement	kg/inhab
Frequency	

Box 2 – Proposal for a Regional Food Waste Indicator

This indicator is the elaboration of Massimo Armenise, Puglia region (2023). The text and the methodology is derived from the report *Monitoring The SDGs in Puglia Region* (Armenise M., 2023).

The elaboration of this indicator is based on the information obtained during the round table and the meeting with associations and civil society on the food policy. No official regional data source is available at the moment, even if there is a great interest on the topic. Given its important environmental and socio-economic impacts, food waste prevention and the need to adopt a more sustainable production and consumption model is a priority area in the EU's Circular Economy Action Plan. Starting from the [food waste data](#) published from Eurostat in October 2022 for all NUTSO level (EU member states), 2020 was the first reporting year of the EU-wide monitoring of food waste levels according to Commission delegated decision (EU) 2019/1597. Information and data are based on the Waste Framework Directive (2008/98/EC) that establishes an annual reporting obligation on measurements of the levels of food waste, on Commission delegated decision (EU) 2019/1597, that defines the common methodology and minimum quality requirements for the uniform measurement of levels of food waste.

According to Eurostat:

$$\begin{aligned}
 \text{Food Waste}_{Italy} = & \text{Food_Waste_Primary Production}_{Ita} + \text{Food_Waste_Processing and Manufacturing}_{Ita} \\
 & + \text{Food_Waste_Retail and other distribution of food}_{Ita} \\
 & + \text{Food_Waste_Restaurants and food services}_{Ita} + \text{Food_Waste_Households}_{Ita}
 \end{aligned}$$

Food waste can be defined as explained above: the index sums up the contribution of the entire food supply chain up to the final consumer. Each step can be tracked locally. Therefore, where national data are available, a feasible solution for the local measurement of the index is to set the share of the regional contribution to food waste proportionally to the weight of the local food supply chain(s). This is done by assuming that Italian households and Italian companies produce food waste in the same way (on average), wherever they are located, and by assuming that the only significant difference is related to the dimension (large or small company).

In this way it is possible to obtain:

$$Food\ Waste_j = F_Waste_Primary\ Production_j + F_Waste_Processing\ and\ Manufacturing_j \\ + F_Waste_Retail\ and\ other\ distribution\ of\ food_j \\ + F_Waste_Restaurants\ and\ food\ services_j + F_Waste_Households_j$$

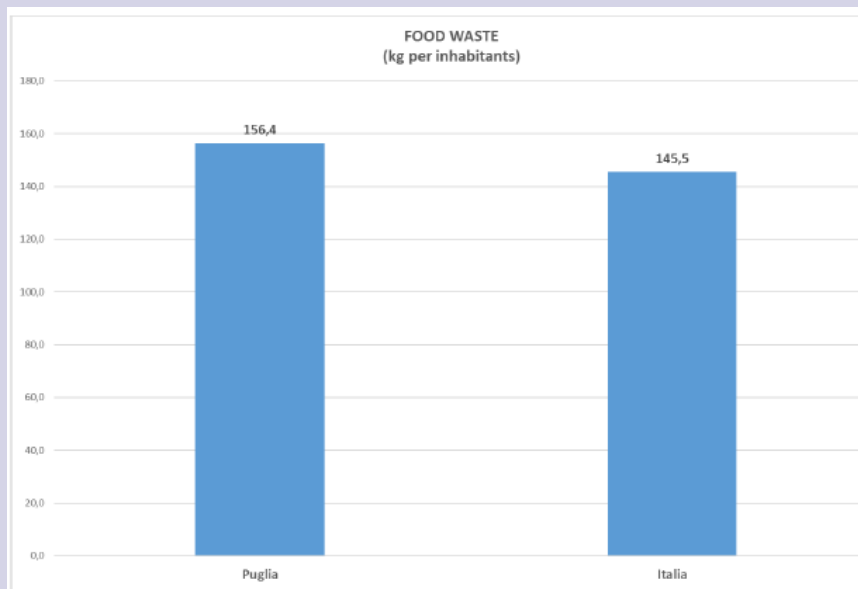
where j indicates an Italian region and where

$$F_Waste_Prim\ Production_j = F_Waste_Primary\ Production_{ita} * \frac{n.\ of\ person\ employed\ in\ prim.production\ j}{n.\ of\ person\ employed\ in\ prim.production_{ita}}$$

The same operation is realized for all other sectors contributing to food waste chain.

In this way, it is possible to obtain a proxy of this indicator for all Italian regions using the weight of each single regional sector contributing to food waste chain: Primary production of food - agriculture, fishing and aquaculture; Manufacture of food products and beverages; Retail and other distribution of food; Restaurants and food services, Households.

For each sector, we use the following regional weights: number of persons employed, number of households, number of firms. Data on these sectors are available for all European regions.



Source: Monitoring The SDGs in Puglia Region (Armenise M., 2023)

For further details, please refer to the article by Massimo Armenise, Annamaria Fiore and Marco Costantino *Misurare lo Spreco Alimentare a livello regionale: una proposta di indicatore* (MENABÒ N. 201/2023); 2023

<https://eticaeconomia.it/misurare-lo-spreco-alimentare-a-livello-regionale-una-proposta-di-indicatore/>



SDG Target 12.4 CHEMICAL MANAGEMENT

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.

Indicator for final dataset: Hazardous waste

Original indicator (from JRC): Hazardous waste

Definition: Hazardous waste is any waste as defined in Article 1(4) of Council Directive 91/689/EEC of 12 December 1991 on hazardous waste⁷.

Definition from Council Directive 91/689/EEC.

Reasons for the choice of this final indicator: Hazardous waste refers to waste materials that possess properties that make them potentially harmful or dangerous to human health, living organisms, or the environment. These materials often contain substances that are toxic, reactive, corrosive, flammable, or infectious. Hazardous waste can come from various sources, including industrial processes, manufacturing, agriculture, healthcare facilities, and households.

Due to their harmful nature, hazardous wastes are subject to strict regulations and require special handling, storage, transportation, and disposal methods to prevent environmental pollution and protect human health. Proper management and disposal of hazardous waste are essential to minimize the risks associated with these materials.

Final Indicator	Hazardous waste
Type	Official
Coverage	Western Macedonia Navarra Andalucia Piemonte Puglia Pomorskie Centro
Time coverage	Since 2003/2014
Source	Regional/national sources: Region of Western Macedonia Waste inventory, Government of Navarre REDIAM (Andalusia) ISPRA; Istat, Regional Statistics (Piemonte and Puglia) Local Data Bank (Pomorskie) EEA (Centro)
Unit of measurement	Number (Tons)
Frequency	Annual



SDG Target 12.5 REDUCE WASTE GENERATION

By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.

Indicator for final dataset: Proportion of municipal waste prepared for reuse and recycling

Original indicator (from JRC): -

Definition: Urban solid waste prepared for reuse and recycling as a proportion of the total urban solid waste collected.

Reasons for the choice of this final indicator: The proposed indicator is consistent with the objective of the target and with the proposal of the United Nations (12.5.1 National recycling rate, tons of material recycled).

⁷ For the purpose of this Directive 'hazardous waste' means: — waste classified as hazardous waste featuring on the list established by Commission Decision 2000/532/EC (1) on the basis of Annexes I and II to this Directive. This waste must have one or more of the properties listed in Annex III. The list shall take into account the origin and composition of the waste and, where necessary, limit values of concentration. This list shall be periodically reviewed and, if necessary revised. Those measures, designed to amend non-essential elements of this Directive by supplementing it, shall be adopted in accordance with the regulatory procedure with scrutiny referred to in Article 18(4) of Directive 2006/12/EC of the European Parliament and of the Council of 5 April 2006 on waste, — any other waste which is considered by a Member State to display any of the properties listed in Annex III. Such cases shall be notified to the Commission and reviewed with a view to adapting the list. Those measures, designed to amend non-essential elements of this Directive by supplementing it, shall be adopted in accordance with the regulatory procedure with scrutiny referred to in Article 18(4) of Directive 2006/12/EC.

As indicated in the analyses of target 11.6 - environmental impact (indicator: Recycling rate), to which this target is linked, in line with EU's 2050 climate neutrality goal under the Green Deal, the European Commission proposed in March 2022 the first package of measures to speed up transition towards a circular economy, as announced in the Circular Economy Action Plan. The new circular economy package establishes ambitious recycling and landfill reduction targets for the EU. The package sets two common goals for the European Union. The first goal is to recycle at least 55% of urban waste by 2025. This target is set to increase to 60% by 2030 and 65% by 2035. The second goal is to recycle 65% of packaging waste by 2025 (70% by 2030) with differentiated targets for different materials, as shown in the table:

Table 21 - EU goals towards a circular economy

Material	by 2025	by 2030
All types of packaging	65%	70%
Plastic	50%	55%
Wood	25%	30%
Ferrous metals	70%	80%
Aluminum	50%	60%
Glass	70%	75%
Paper and cardboard	75%	85%

Source: Authors' own elaboration

Also related with: SDG target 11.6 (environmental impact)

Final Indicator	Proportion of municipal waste prepared for reuse and recycling
Type	Official
Coverage	Centro
Time coverage	Since 2012
Source	Statistics Portugal, Urban waste statistics
Unit of measurement	Percentage
Frequency	Annual



SDG Target 12.6 SUSTAINABLE PRACTICES IN COMPANIES

Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle.

Indicator for final dataset: Number of EMAS (Eco-Management and Audit Scheme) registered organizations/enterprises

Original indicator (from JRC): -

Definition: The EU Eco-Management and Audit Scheme (EMAS) is a premium management instrument developed by the European Commission for companies and other organisations to evaluate, report, and improve their environmental performance ([Eco-Management and Audit Scheme \(EMAS\) \(europa.eu\)](https://ec.europa.eu/emas/))

Definition from EC.

Reasons for the choice of this final indicator: The indicator is in line with the target because EMAS is a European instrument to encourage companies to adopt sustainable practices, to integrate sustainability into the companies and improve their environmental performance, balancing environmental responsibility with business success.

In Italy, for example, the Ministry of Environment and Energy Security (MASE), with Directorial Decree No. 21 dated April 3, 2023, has established the operational procedures for obtaining the contribution aimed at EMAS registration for businesses engaged in the treatment of waste from electrical and electronic equipment (WEEE) (Institute for Environmental Protection and Research ISPRA, 2023)

Final Indicator	Number of EMAS-registered organizations/enterprises
Type	Official
Coverage	Italian regions
Time coverage	Since 2004
Source	ISTAT from ISPRA data (Italy)
Unit of measurement	Number
Frequency	Annual



SDG Target 12.7 SUSTAINABLE PUBLIC PROCUREMENT PRACTICES

Promote public procurement practices that are sustainable, in accordance with national policies and priorities.

Indicator for final dataset: Percentage of public institutions that acquire products and/or services by adopting minimum environmental criteria, in at least one procurement procedure (Green Purchasing or Green Public Procurement)

Original indicator (from JRC): -

Definition: The environmental criteria to be applied to the purchases of goods and services by public administrations, commonly known as "green procurement." The European Commission defines green public procurement (GPP) as "[...] the approach in which public administrations integrate environmental criteria in all stages of the procurement process, encouraging the spread of environmental technologies and the development of products that are environmentally sound, by seeking results and choosing solutions that have the least possible impact on the environment throughout their life cycle." The EU legislation is summarized in Italy in the Action Plan for the Sustainability of Consumption in the Public Administration Sector (PAN Green Public Procurement), updated with the Ministerial Decree of April 10, 2013, which outlines the minimum environmental criteria (CAM) to be applied for the purchase of certain categories of goods and services.

Definition from ISTAT, Italy. Glossary

Reasons for the choice of this final indicator: This indicator is relevant to monitor the target 12.7 Promote public procurement practices that are sustainable, in accordance with national policies and priorities.

In particular, common EU Green Public Procurement GPP criteria are those criteria that can be incorporated into a public procurement procedure for goods, services or works in order to reduce the environmental impact of a purchase. In 2003, the European Commission in its Communication on Integrated Product Policy (IPP) encouraged Member States to draw up publicly available National Action Plans (NAPs) for greening their public procurement. The NAPs should contain an assessment of the existing situation and ambitious targets for the next three years, specifying what measures will be taken to achieve them. The NAPs are not legally-binding but provide political impetus to the process of implementing and raising awareness of greener public procurement. While the GPP Criteria are voluntary, there are legal requirements in EU legislation that are mandatory for all public buyers.

The European Commission's Joint Research Centre (JRC) is leading the criteria development process based on an annual GPP work plan which is coordinated with the EU Ecolabel workplan. This work plan is adopted in consultation with the informal GPP Advisory Group (GPP AG)⁸.

[Green Public Procurement \(GPP\), EU](#)

⁸ <https://susproc.jrc.ec.europa.eu/product-bureau/product-groups>

Final Indicator	Percentage of public institutions that acquire products and/or services by adopting minimum environmental criteria
Type	Official
Coverage	Italian regions
Time coverage	Since 2015
Source	ISTAT, Regional Statics (Italy)
Unit of measurement	Percentage
Frequency	Annual



SDG Target 12.b SUSTAINABLE TOURISM

Develop and implement tools to monitor sustainable development impacts for sustainable tourism that creates jobs and promotes local culture and products

Indicator for final dataset: Incidence of tourism on waste

Original indicator (from JRC): -

Definition: The indicator assesses the contribution of the tourism sector to urban waste production, highlighting how per capita waste generation is influenced by tourist activities. The indicator is obtained by calculating the difference between per capita urban waste production based on the resident population and per capita urban waste production calculated using the "equivalent population," which includes the resident population and tourist stays recorded throughout the year, divided by 365 days.

Definition from ISPRA (Institute for Environmental Protection and Research), Italy.

Reasons for the choice of this final indicator: Defining and measuring sustainable tourism is a highly complex process that involves a series of analyses, linking environmental indicators (such as the impact of tourism on the environment, for example, waste impact as analyzed here), economic indicators (such as increased employment, the creation of new businesses, and new forms of business that do not compromise the environment, as well as the development of new forms of tourism such as outdoor tourism, slow tourism, and culturally-oriented tourism, among others), and social indicators (increase in services, beneficial for residents as well, for example, enhancing sustainable transportation). Tourism is crucial to economic growth and social impacts, but it brings at the same time a range of negative externalities, including high levels of unsustainable resource consumption and waste production. One of the most significant impacts of tourism (in Italy, according to ISPRA data) is the increase in waste production. Therefore, there isn't a single unique indicator for sustainable tourism; instead, various indicators that contribute to defining whether a certain type of tourism is sustainable or not should be measured together. The waste indicator analyzes only one aspect (related to waste production) but is important for monitoring a phenomenon that has an impact on the environment. It will be useful to read these data in relation to other environmental, economic, and social indicators to better understand the positive and negative impacts of activities related to the tourism sector on the environment, the economy, and society.

Final Indicator	Incidence of tourism on waste
Type	Official
Coverage	Italian regions
Time coverage	Since 2006
Source	ISTAT from ISPRA data (Italy)
Unit of measurement	Rate (Kg per inhabitants equivalent)
Frequency	Annual

4.1.13 SDG 13 – Climate action

Table 22 summarizes the final indicator set to monitor SDG13, *Take urgent action to combat climate change and its impacts*, in comparison with the initial indicator set proposed by JRC (Vega-Rapún et al., 2022). It also relates the final indicators with the UN global indicator framework (UN, 2015). The rest of the section gives, for each indicator, a definition, reasons/arguments for the choice and a small table with metadata.

Table 22 – SDG13: Final data set

SDG	Target	Final proposal	Initial JRC proposal	UN framework
13	13.2 (climate change measures into policy)	CO2 emissions	CO2 emissions	---
13		Greenhouse gas emissions	Greenhouse gas emissions	13.2.2 Total greenhouse gas emissions per year
13		Cooling and heating degree-days	Cooling and heating degree-days	---
13		PM10: moved to SDG 11, target 11.6 because more relevant	PM10 Emissions	---

Source: Authors' own elaboration



SDG Target 13.2 CLIMATE CHANGE MEASURES INTO POLICY

By 2030, achieve the sustainable management and efficient use of natural resources.

Indicator for final dataset: CO2 emissions

Original indicator (from JRC): CO2 emissions

Definition: A carbon dioxide equivalent or CO2 equivalent, abbreviated as CO2-eq is a metric measure used to compare the emissions from various greenhouse gases on the basis of their global-warming potential (GWP), by converting amounts of other gases to the equivalent amount of carbon dioxide with the same global warming potential. Carbon dioxide equivalents are commonly expressed as million metric tonnes of carbon dioxide equivalents, abbreviated as MMTCDE. The carbon dioxide equivalent for a gas is derived by multiplying the tonnes of the gas by the associated GWP: $\text{MMTCDE} = (\text{million metric tonnes of a gas}) * (\text{GWP of the gas})$.

Definition from Eurostat. Glossary.

Emissions projections of CO2 based on the spatial distribution of CO2 (Carbon dioxide) emissions over Europe. The total emissions for each territory are derived from the GAINS model (Lavalle, Trombetti and Pisoni, 2015).

Definition from JRC, EC.

Reasons for the choice of this final indicator: Carbon dioxide (CO2) represents the majority of greenhouse gases released into the atmosphere and is generally the result of human activities (Europarl 2023, from EAA data 2019). Greenhouse gases are naturally present in the atmosphere, but human activities have contributed to increasing the concentration of certain greenhouse gases in the atmosphere, which, in turn, contribute to global warming. Each greenhouse gas has a different impact on global warming, depending on how much heat it absorbs and how long it stays in the atmosphere. Carbon dioxide equivalent (CO2e) is a measure used to compare the impact of different greenhouse gases on global warming, based on their global warming potential (GWP). Therefore, this indicator (with the next indicator: Greenhouse gas emissions) is crucial for the analyses related to SDG 13, specifically focusing on the target (Climate change).

The indicator proposed by the JRC also analyzes data up to 2030, allowing assessments of the expected trends of the phenomenon in the coming years. This indicator is crucial because it provides a long-term perspective on Co2eq trends, allowing for an assessment of future climate change patterns. Forecasted information up to 2030 is essential for developing targeted policies, strategies, and interventions that can mitigate the negative impacts on the climate and support efforts to achieve global goals for reducing greenhouse gas emissions.

Final Indicator	CO2 emissions
Type	Experimental
Coverage	EU-27
Time coverage	Since 2015
Source	European Commission, Joint Research Centre
Unit of measurement	Number
Frequency	Decade



SDG Target 13.2 CLIMATE CHANGE MEASURES INTO POLICY

By 2030, achieve the sustainable management and efficient use of natural resources.

Indicator for final dataset: Greenhouse Gas Emissions

Original indicator (from JRC): Greenhouse Gas Emissions

Definition: Emissions of different greenhouse gases aggregated into a common measure based on their global warming potentials (GWP) relative to CO₂.

Definition from UN Climate Change.

Reasons for the choice of this final indicator: This indicator is crucial in relation to the climate change. “Human activity is resulting in the increased emission of so-called greenhouse gases (GHGs) which, unlike other atmospheric gases such as oxygen and nitrogen, becomes trapped in the atmosphere, unable to escape the planet. This energy returns to the surface, where it is reabsorbed. Because more energy enters than exits the planet, surface temperatures increase until a new balance is achieved. This temperature increase has long-term, adverse effects on the climate, and affects a myriad of natural systems. Effects include increases in the frequency and intensity of extreme weather events – including flooding, droughts, wildfires and hurricanes – that affect millions of people and cause trillions in economic losses”. (UN, 2022).

The previously analyzed indicator on CO₂eq emissions allows us to estimate future scenarios, while this indicator measures the trend in greenhouse gas emissions over the years. Therefore, both indicators are relevant and should be analyzed and read together, for a better understanding of the phenomenon and its impacts on climate change.

Final Indicator	Greenhouse Gas Emissions
Type	Official
Coverage	EU-27
Time coverage	Since 2001
Source	OECD (EU)
Unit of measurement	Mt CO ₂ eq
Frequency	Annual



SDG Target 13.2 CLIMATE CHANGE MEASURES INTO POLICY

By 2030, achieve the sustainable management and efficient use of natural resources.

Indicator for final dataset: Cooling and heating degree days

Original indicator (from JRC): Cooling and heating degree days

Definition: Heating degree day (HDD) index is a weather-based technical index designed to describe the need for the heating energy requirements of buildings.

Cooling degree day (CDD) index is a weather-based technical index designed to describe the need for the cooling (air-conditioning) requirements of buildings.

Definition from European Commission.

Reasons for the choice of this final indicator: Together with the previous indicators, these indicators provide a comprehensive analysis of the impacts related to climate change.

The need to heat a given building has decreased over time: the heating degree days value decreased by 11% between 1979 (3 510 degree days) and 2021 (3 126) in the EU. In other words, only 89% of the heating needs were required in 2021 compared with 1979. In contrast, the cooling degree days, value was almost three times higher in 2021 (100 degree days) than in 1979 (37), indicating that the need for cooling (air conditioning) in a given building increased over the last decades. Heating degree days and cooling degree days are weather-based technical indexes designed to describe the energy requirements of buildings in terms of heating or cooling.

The use of indicators or indexes such as heating degree days (HDD) and cooling degree (CDD) days can contribute to the correct interpretation of energy consumption for cooling and heating of buildings. HDD and CDD are weather-based technical indexes designed to describe the energy requirements of buildings in terms of heating (HDD) or cooling (CDD) ([Eurostat](#)).

Final Indicator	Cooling and heating degree days
Type	Official
Coverage	EU-27 plus others
Time coverage	Since 1979
Source	Eurostat, Regional Statistics nrg_chddr2_a
Unit of measurement	Number
Frequency	Annual

4.1.14 SDG 14 – Life below water

Table 23 summarizes the final indicator set to monitor SDG12, *Ensure sustainable consumption and production patterns*, in comparison with the initial indicator set proposed by JRC (Vega-Rapún et al., 2022). It also relates the final indicators with the UN global indicator framework (UN, 2015). The rest of the section gives, for each indicator, a definition, reasons/arguments for the choice and a small table with metadata.

Table 23 – SDG14: Final data set

SDG	Target	Final proposal	Initial JRC proposal	UN framework
14	14.1 (reduce marine pollution)	Estuarine and/or costal areas with high/very high water quality	Estuarine with high/very high water quality	---
14	14.4 (effectively regulate harvesting and end overfishing)	Fishing from stocks subject to sustainable yields	---	14.4.1 Proportion of fish stocks within biologically sustainable levels
14	14.5 (coastal and marine areas)	Protected coastal area as a percentage of total coastal area	Protected coastal area as a percentage of total coastal area	14.5.1 Coverage of protected areas in relation to marine areas
14		<i>Moved in 14.1 with estuarine</i>	Costal areas with high/very high water quality	---
14	14.a (research in marine technology)	Research and Development (R&D) expenditure of the marine economy	---	14.a.1 Proportion of total research budget allocated to research in the field of marine technology

Source: Authors' own elaboration



SDG Target 14.1 REDUCE MARINE POLLUTION

By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution.

Indicator for final dataset: Estuarine and/or costal areas with high/very high water quality

Original indicator (from JRC): Estuarine with high/very high water quality

Definition: Water quality of estuaries and coastal areas. Global, ecological and chemical status of coastal waters.

Proportion of costal areas and estuarine (or transition) water bodies in good status, with respect to the total number of estuarine water bodies in the basin. In the specific case of Andalusia (data source: River Basin Agencies) the indicator is provided disaggregated by quality parameter: ecological and chemical, as well as by hydrographic basin with more than 90% of its surface area in the Andalusian region. The status of surface water bodies is classified on based on the values of their ecological status or potential and their chemical status. The assessment of the status was based on the inventory of pressures (Annex VII of the report of the hydrological plans of the basins), following the DPSIR approach described in the guide of the Common Implementation Strategy of the WFD on pressures and impacts (European Commission, 2002). The identification of pressures should explain the current status of water bodies and, in particular, should explain the possible deterioration of water bodies due to the effects of human activities responsible for the pressures. This

deterioration situation is evidenced through the recognisable impacts on the water bodies, which is determined through the data obtained from the monitoring programmes (Quintanilla Cabañero A., 2023).

Reasons for the choice of this final indicator: Not always in statistics is there a distinction made between estuaries and marine coasts. Therefore, it has been decided to include both indicators (both associated with the target 14.1) and analyze them together or separately based on data availability and utility, according to regional characteristics. This indicator (for both coasts and estuaries) is very difficult to analyze at the regional level, but it is very relevant to measure the quality of water and the pollution level.

Final Indicator	Estuarine and/or coastal areas with high/very high water quality
Type	Official
Coverage	Spanish regions
Time coverage	Since 2013
Source	River Basin Agencies (Andalusia)
Unit of measurement	Percentage
Frequency	



SDG Target 14.4 EFFECTIVELY REGULATE HARVESTING AND END OVERFISHING

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.

Indicator for final dataset: Fishing from stocks subject to sustainable yields

Original indicator (from JRC): -

Definition: Commercialized fish from sustainable yields fisheries as a proportion of total commercialized fresh fish (*Monitoring the SDGs in Centro Region, 2023*).

The Species under Total Allowable Catches are identified through the regulation (European, Spanish and Regional) and are shown as a proportion of the total fresh fish commercialized obtained for the official fishing statistics of the Region (Quintanilla Cabañero A., 2023).

Reasons for the choice of this final indicator: While for targets 14.1 and 14.5, the focus is on more environmental aspects related to water quality (and/or water pollution) and its protection in terms of conservation and safeguarding, the indicator on fishing and research and development shifts attention to the socio-economic opportunities arising from the sea and related marine economy sectors.

Final Indicator	Fishing from stocks subject to sustainable yields
Type	
Coverage	Andalusia
Time coverage	Since 1985
Source	Consejería de Agricultura, Pesca, Agua y Desarrollo Rural (Andalusia)
Unit of measurement	Percentage
Frequency	Annual



SDG Target 14.5 COASTAL AND MARINE AREAS

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.

Indicator for final dataset: Protected coastal area as a percentage of total coastal area

Original indicator (from JRC): Protected coastal area as a percentage of total coastal area

Definition: Marine protected areas as a share of each country's exclusive economic zone.

Protected coastal areas in relation to the total coastal area. For Centro Region, are taken into account three protected area: The archipelago of the Berlengas; the Cabo Mondego and the São Jacinto Dunes (Abreu, J.2023).

Andalusia has considered: Surface area of marine sites designated under Natura 2000. The Natura 2000 network comprises marine areas designated under the EU Habitats and Birds Directives with the objective of maintaining or restoring a favourable conservation status for habitat types and species of EU concern (Quintanilla Cabañero A., 2023).

Reasons for the choice of this final indicator: As stated in the OECD publication *Marine Protected. Economics, Management and Effective Policy Mixes Areas* (OECD 2016), marine protected areas MPAs can provide a wide variety of benefits ranging from the conservation of whole areas that are home to important biodiversity, serving as nursery grounds for fisheries and enhancing fish stocks, protecting habitats that buffer the impacts of storms and waves, and removing excess nutrients and pollutants from the water. They can also provide more sustainable tourism and recreational benefits, as well as enhance other non-use values such as cultural and heritage values. The total ecosystem service benefits of achieving 10% coverage of MPAs have been estimated at USD 622-923 billion over the period 2015-2050 (Brander et al., 2015).

Final Indicator	Protected coastal area as a percentage of total coastal area
Type	
Coverage	Andalusia Centro
Time coverage	Since 2011 (Andalusia) Since 2002 (Centro)
Source	IECA (Andalusia) Institute for Nature Conservation and Forests (Centro)
Unit of measurement	Km2 (Andalusia); Percentage (Centro)
Frequency	Annual



SDG Target 14.a RESEARCH IN MARINE TECHNOLOGY

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.

Indicator for final dataset: Research and Development (R&D) expenditure of the marine economy

Original indicator (from JRC): -

Definition: Investment in scientific research, technological innovation, and development projects specifically related to marine and maritime activities (*Monitoring the SDGs in Centro Region, 2023*).

Reasons for the choice of this final indicator: The proposed indicator is consistent with the goal of the target (newly covered target), as also suggested within the framework of indicators proposed by the United

Nations (UN, 2015): indicator 14.a.1 Proportion of total research budget allocated to research in the field of marine technology.

Final Indicator	Research and Development (R&D) expenditure of the marine economy
Type	
Coverage	Centro
Time coverage	Since 2014
Source	Directorate-General for Maritime Policy (DGMP) (Centro)
Unit of measurement	€
Frequency	Annual

4.1.15 SDG 15 – Life on land

Table 24 summarizes the final indicator set to monitor SDG15, *Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss*, in comparison with the initial indicator set proposed by JRC (Vega-Rapún et al., 2022). It also relates the final indicators with the UN global indicator framework (UN, 2015). The rest of the section gives, for each indicator, a definition, reasons/arguments for the choice and a small table with metadata.

Table 24 – SDG15: Final data set

SDG	Target	Final proposal	Initial JRC proposal	UN framework
15		Land Abandonment	Land Abandonment	---
15	15.1 (restoration of ecosystems)	Forest area over total surface area	Forest area over total surface area	15.1.1 Forest area as a proportion of total land area
15	15.2 (sustainable management of forest)	Proportion of forest area subject to sustainable management instruments	---	15.2.1 Progress towards sustainable forest management
15	15.5 (degradation of habitats)	Terrestrial protected areas as a percentage of total area	Terrestrial protected areas as a percentage of total area	15.1.1 Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type
15		Estimated soil erosion	Estimated soil erosion	15.5.1 Red List Index

Source: Authors' own elaboration



SDG Target 15.1 RESTORATION OF ECOSYSTEMS

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.

Indicator for final dataset: Land Abandonment

Original indicator (from JRC): Land Abandonment

Definition: Share of abandoned agricultural land into total agricultural land.

The indicators available from the EU platform can be analyzed according to the following categories: Abandoned arable, Abandoned permanent, Abandoned pasture and Abandoned industry.

Definition from JRC – EC, Urban Data Platform Plus.

Reasons for the choice of this final indicator: Land abandonment, especially in rural areas, can have severe environmental and ecological consequences. When land is left uncultivated or unused, it can lead to various problems such as soil degradation, loss of biodiversity, and disruption of ecosystems.

Agricultural land use is the most common primary land use category in the EU; it accounted for 39.1% of the total area in 2018. Areas used primarily for forestry covered 35.9% of the EU area, while 14.8% of the area of the EU was unused or abandoned (JRC, *Urban Data Platform Plus*).

Analyzing the abandonment of agricultural land is crucial for ecosystems for several reasons: Biodiversity Conservation (abandoned lands can host a variety of plant and animal species that wouldn't be present in intensively cultivated agricultural environments; studying these habitats can help understand and conserve local biodiversity); Ecosystem Recovery (identifying abandoned lands allows for planning rehabilitation projects for these spaces; by returning the land to agricultural use or transforming it into natural habitats, ecosystems can be restored, and ecological functionality can be reinstated); Desertification Prevention (abandoned lands are often prone to desertification, a process where the soil loses fertility and becomes unable to support life; monitoring and intervening in abandoned lands can help prevent this process); Water Resources (abandoned agricultural lands can influence the water cycle in a specific area; studying these areas can help understand how changes in land use affect water resources, including rivers, lakes, and groundwater); Impact on Climate Change (terrestrial ecosystems play a crucial role in absorbing atmospheric carbon; rehabilitated and restored abandoned lands can contribute to mitigating the effects of climate change by acting as carbon sinks, absorbing more carbon than they emit). In summary, understanding and monitoring the abandonment of agricultural land are critical for preserving biodiversity, protecting ecosystems, preventing desertification, managing water resources, mitigating climate change, and promoting sustainable agricultural practices.

Final Indicator	Land Abandonment
Type	Experimental
Coverage	EU-27
Time coverage	Since 2015
Source	European Commission, Joint Research Centre
Unit of measurement	Number (Ha) and Percentage
Frequency	Decade



SDG Target 15.1 RESTORATION OF ECOSYSTEMS

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.

Indicator for final dataset: Forest area over total surface area

Original indicator (from JRC): Forest area over total surface area

Definition: Share of forest area over total surface area.

Forest is defined as land with tree crown cover (meaning all parts of the tree above ground level including its leaves, branches etc.), or equivalent stocking level, of more than 10% and with an area of more than 0.5 hectares (ha). The trees should be able to reach a minimum height of 5 metres at maturity in situ.

Definition from Eurostat. Glossary.

Reasons for the choice of this final indicator: Monitoring a region's forest cover is crucial for: Biodiversity Conservation (forests host a wide range of plant, animal, and microbial species; monitoring forest cover helps protect and conserve biological diversity, including rare and endangered organisms); Carbon Absorption (forests act as significant carbon sinks, contributing to mitigating climate change); Climate Regulation (forests influence local climate by regulating temperature and humidity); Soil Erosion Prevention (plant roots in forests stabilize the soil, preventing erosion; monitoring forest cover is essential to preserve soil fertility and reduce the risk of landslides and floods); Water Resources (they are vital for conserving water resources; trees absorb water and contribute to maintaining the regional water balance); Economic Support (forests provide essential resources such as timber, fruits, mushrooms, and non-timber forest products; it is crucial to manage these resources sustainably, supporting the local economy); additionally, forests are important tourist destinations and monitoring forest cover can help manage these areas for sustainable tourism and the well-being of local communities.

In summary, monitoring forest cover is fundamental for protecting the environment, mitigating climate change, preserving biodiversity, ensuring water resources, supporting the economy, and enhancing the quality of life for people in forested regions.

Final Indicator	Forest area over total surface area
Type	Official
Coverage	EU regions
Time coverage	Since 2005
Source	FAO-INFC, Global Forest Resources Assessment* (Piemonte Puglia) Copernicus (Western Macedonia) National sources (other regions)
Unit of measurement	Percentage
Frequency	Annual

* The indicator is available from national statistical sources in Italy (ISTAT); therefore, the data is accessible for all Italian regions. However, the analysis is conducted at a global level, so the data is likely obtainable for other European regions as well.



SDG Target 15.2 SUSTAINABLE MANAGEMENT OF FOREST

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.

Indicator for final dataset: Proportion of forest area subject to sustainable management instruments

Original indicator (from JRC): -

Definition: Surface of forest with a documented forest management scheme for a long period of time (10 years or more), with defined management objectives, and which is periodically revised ([SOEF 2011](#)). Definition of "forest certification": the assessment by an independent, qualified and accredited third party, who certifies that forest management practices meet a set of collectively agreed sustainability standards: Sustainable Forest Management certification covers forest inventory, management planning, silviculture, harvesting, as well as ecological, economic and social impacts of forestry activities. Chain of Custody certification assesses the traceability of forest-based raw materials and their derivatives through the different stages of the production process". ([PEFC](#)). (*Monitoring the SDGs in Andalusia Region, 2023*).

Reasons for the choice of this final indicator: The indicator measures progress towards forest management that protects forest resources, ecosystem services and biodiversity. Therefore, the indicator is consistent and relevant for monitoring the target.

Final Indicator	Proportion of forest area subject to sustainable management instruments
Type	
Coverage	Andalusia
Time coverage	Since 2010
Source	IECA (Andalusia)
Unit of measurement	Percentage
Frequency	Annual



SDG Target 15.5 DEGRADATION OF HABITATS

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.

Indicator for final dataset: Terrestrial protected areas as a percentage of total area

Original indicator (from JRC): Terrestrial protected areas as a percentage of total area

Definition: The indicator measures the area of terrestrial protected areas. The indicator comprises nationally designated protected areas and Natura 2000 sites. A nationally designated area is an area protected by national legislation. The Natura 2000 network comprises both marine and terrestrial protected areas designated under the EU Habitats and Birds Directives with the goal to maintain or restore a favourable conservation status for habitat types and species of EU interest.

Definition from Eurostat

Reasons for the choice of this final indicator: By the end of 2021, protected areas covered 26% of EU land, with 18.6% of this area designated as Natura 2000 sites and 7.4% as other national designations. The EU biodiversity strategy for 2030 sets out a target of protecting at least 30% of EU land by 2030, while also ensuring that all protected areas are effectively managed. If the designation of protected areas continues at the rate seen in the past decade (1.7 percentage points increase since 2011), the target will not be met. However, EU Member States are in the process of submitting pledges to designate new areas by 2030 ([EEA](#), EU).

Final Indicator	Terrestrial protected areas as a percentage of total area
Type	Official
Coverage	EU regions
Time coverage	Since 2012
Source	European Environment Agency (EU) And National sources
Unit of measurement	Percentage
Frequency	Annual



SDG Target 15.5 DEGRADATION OF HABITATS

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.

Indicator for final dataset: Estimated soil erosion

Original indicator (from JRC): Estimated soil erosion

Definition: Soil erosion rates by water estimated based on the Revised Universal Soil Loss Equation (RUSLE) empirical computer model in tonnes per ha of EU territory per year ($t\ ha^{-1}\ yr^{-1}$) (Agri-environmental indicator – soil erosion).

Soil erosion (by water and wind) can be defined as the wearing away of the land surface by physical forces such as rainfall, flowing water, wind, ice, temperature change, gravity or other natural or anthropogenic agents that abrade, detach and remove soil or geological material from one point on the earth's surface to be deposited elsewhere. When used in the context of pressures on soil, erosion refers to accelerated loss of soil as a result of anthropogenic activity, in excess of accepted rates of natural soil formation.

The main factors affecting the rates of soil erosion by water are precipitation, soil type, topography, land use and land management. The most commonly used erosion model is the Universal Soil Loss Equation (USLE) and

its revised version (RUSLE). RUSLE is the most frequently used model, which was developed to evaluate soil erosion by water at a regional scale.

Definition from Eurostat.

Reasons for the choice of this final indicator: Slowing down soil erosion is crucial to preserving soil fertility, conserving biodiversity, safeguarding water resources (if the soil erodes, sediments and contaminants can reach water bodies, compromising the quality of drinking water and aquatic ecosystems), preventing floods (soil absorbs rainwater), mitigating climate change (soil can store large amounts of carbon), and maintaining agricultural sustainability (soil erosion can make agricultural land less productive over time, threatening food security). In summary, slowing down soil erosion is essential for food security, biodiversity, water quality, natural disaster prevention, climate change mitigation, and agricultural sustainability. Soil conservation is fundamental for the long-term health of ecosystems and human communities.

Soil erosion by water is one of the most widespread forms of soil degradation in Europe. The impact of soil erosion by water processes like rain splash, overland flow/sheetwash and rill formation is the removal of soil. The main consequences are a loss of cultivable, fertile land, soil structure degradation, destruction of infrastructures, pollution of surface water, flood risk, etc. Agriculture is negatively affected by soil erosion, but also contributing to it, as land use and land management are among the main driving forces of soil erosion. Therefore, it is important to enhance management practices in agriculture (e.g. reduced tillage, management of plant residues and winter crops, stone walls, grass margins and contour farming) to prevent erosion processes (*Eurostat*).

Final Indicator	Estimated soil erosion
Type	Experimental
Coverage	EU-27
Time coverage	Since 2000
Source	Eurostat (EU) AEI PR SOILER
Unit of measurement	Tonnes per hectare
Frequency	Annual

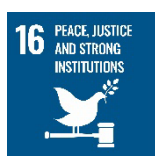
4.1.16 SDG 16 – Peace, justice and strong institutions

Table 25 summarizes the final indicator set to monitor SDG16, *Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels*, in comparison with the initial indicator set proposed by JRC (Vega-Rapún et al., 2022). It also relates the final indicators with the UN global indicator framework (UN, 2015). The rest of the section gives, for each indicator, a definition, reasons/arguments for the choice and a small table with metadata.

Table 25 – SDG16: Final data set

SDG	Target	Final proposal	Initial JRC proposal	UN framework
16	16.1 (reduce all forms of violence)	Death rate by homicide	---	16.1.1 Number of victims of intentional homicide per 100,000 population, by sex and age
16	16.2 (end violence against children)	Violence against children	---	16.2.1 Proportion of children aged 1–17 years who experienced any physical punishment and/or psychological aggression by caregivers in the past month
16	16.3 (equal access to justice for all)	Unsentenced detainees as a proportion of overall prison population	---	16.3.2 Unsentenced detainees as a proportion of overall prison population
16	16.5 (reduce corruption)	Extract from QGI an indicator on corruption	Extract from QGI an indicator on corruption	---
16	16.6 (effective institutions)	Quality of Government Index	Quality of Government Index	---
		Participation in the last elections	Participation in the last elections	---
16		---	Transparency index	---

Source: Authors' own elaboration



SDG Target 16.1 REDUCE ALL FORMS OF VIOLENCE

Significantly reduce all forms of violence and related death rates everywhere.

Indicator for final dataset: Death rate by homicide

Original indicator (from JRC): -

Definition: Voluntary homicides committed, detected, and reported by the police forces. In Italy data derived from the database of the Central Directorate of Criminal Police of the Ministry of the Interior.

Voluntary homicide: a crime committed by someone causing the death of another person. It can result from either commission or omission (in legally defined cases) and requires the presence of intent and consciousness to cause death.

Definition from National Statistics ISTAT, Italy.

Reasons for the choice of this final indicator: The indicator is considered relevant for monitoring the target 16.1 (new target covered).

Final Indicator	Death rate by homicide
Type	Official
Coverage	Italian and Greek regions
Time coverage	Since 2004 (Italy) / 2015 (Greece)
Source	ISTAT from data of the Ministry of the Interior (Italy) ELSTAT, Offences committed (Greece)
Unit of measurement	Rate (per 100,000 inhabitants)
Frequency	Annual



SDG Target 16.2 END VIOLENCE AGAINST CHILDREN

End abuse, exploitation, trafficking and all forms of violence against and torture of children.

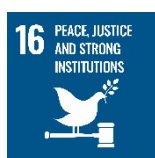
Indicator for final dataset: Violence against children

Original indicator (from JRC): -

Definition: Population under 18 years of age victims violence as a proportion of the total population under 18 years of age. The indicator is provided disaggregated by type of crime: against sexual freedom (16-2-1a), cybercrime (16-2-1b) and domestic violence (16-2-1c) (*Monitoring the SDGs in Andalusia Region, 2023*).

Reasons for the choice of this final indicator: This is a good indicator for monitoring target 16.2 as it allows not only to capture the impact of violence on this vulnerable group and to compare their situation with other age groups or regions, but also to identify the most frequent or serious forms of violence against children and to design specific measures to prevent or combat them (Quintanilla Cabañero, A. 2023).

Final Indicator	Violence against children
Type	
Coverage	Spanish regions
Time coverage	Since 2008
Source	MDSyA2030 (Andalusia)
Unit of measurement	Rate x 10000 inhab
Frequency	Annual



SDG Target 16.3 EQUAL ACCESS TO JUSTICE FOR ALL

Promote the rule of law at the national and international levels and ensure equal access to justice for all.

Indicator for final dataset: Unsented detainees as a proportion of overall prison population

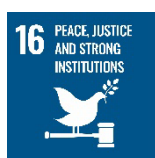
Original indicator (from JRC): -

Definition: Ratio of pre-trial detainees to total number of inmates.

Definition from National Statics ISTAT, Italy.

Reasons for the choice of this final indicator: This indicator is aligned to a target that is difficult to monitor, but it is appropriate to the purpose of the target as it allows for an assessment of the degree of respect for the principle of the presumption of innocence and the functioning of the judicial system. Moreover, it refers to a situation that affects the human rights and procedural guarantees of persons deprived of their liberty, who are a vulnerable group with specific protection needs. In any case, the indicator could be considered wrong if it exceeds a certain threshold or if it shows a sustained upward trend over time. The indicator could be influenced by various factors that do not directly depend on the judicial system; therefore, it must be treated as an interpretative indicator in order to develop policies and strategies around it (Quintanilla Cabañero, A. 2023).

Final Indicator	Unsentenced detainees as a proportion of overall prison population
Type	Official
Coverage	Italian and Spanish regions
Time coverage	Since 2010
Source	ISTAT from data of the Ministry of Justice –Dep. of prison administration (Italy) IECA (Spain)
Unit of measurement	Percentage
Frequency	Annual



SDG Target 16.5 REDUCE CORRUPTION

Substantially reduce corruption and bribery in all their forms.

Indicator for final dataset: Extract from QGI (Quality of Government Index) an indicator on corruption

Original indicator (from JRC): Extract from QGI an indicator on corruption

Definition: Corruption is one of the aspects (impartiality, corruption and quality) in the quality of government index. It measures whether there is no abuse of public office for private gain. Data is standardized around an EU mean of 0. The higher its value, the better the situation of the region in terms of corruption.

Definition from European Commission, 2021.

Reasons for the choice of this final indicator: This indicator on corruption is an extraction of the general indicator on the quality of government (QGI). In particular, the corruption index, in the QGI, helps expose the extent of corruption in a country. Corruption can undermine the effectiveness of institutions, distort the allocation of public resources, and erode citizens' trust in government institutions. Measuring the corruption index allows for the assessment of government quality and identifies areas that require reforms to enhance the integrity and transparency of institutions. Measuring the corruption index within the QGI is essential for understanding the level of corruption in a country/region, improving government quality, guiding anti-corruption reforms, and contributing to global efforts to reduce corruption and promote sustainable development, in particular it is very important to monitor progress toward this target 16.5 (reduce corruption).

Final Indicator	Extract from QGI an indicator on corruption
Type	Experimental
Coverage	208 european regions
Time coverage	Since 2010
Source	EC, University of Gothenburg
Unit of measurement	Index
Frequency	Quinquennial



SDG Target 16.6 EFFECTIVE INSTITUTIONS

Develop effective, accountable and transparent institutions at all levels.

Indicator for final dataset: Quality of Government Index

Original indicator (from JRC): Quality of Government Index

Definition: The European Quality of Government Index (QGI or EQI) captures average citizens' perceptions and experiences with corruption, quality and impartiality of three essential public services – health, education and policing – in their region of residence. The QGI is a composite indicator that uses 17 survey items to proxy for a region's level of quality of government. Data is standardized around an EU mean of 0.

Definition from European Commission, 2021.

Reasons for the choice of this final indicator: The QGI provides an objective assessment of government quality in European countries. This evaluation is crucial to understanding the effectiveness of government institutions, law enforcement, transparency, and the reliability of the public sector. QGI results can influence policy decisions and guide institutional reforms. It helps policymakers identify areas that require priority interventions to enhance government quality. Countries with high QGI scores are often more attractive for foreign investments. High-quality governance can increase investor confidence and contribute to greater economic stability. In summary, this indicator is important because it provides an empirical basis to assess government quality, guide public policies, and contribute to the improvement of institutions in Europe. While the previous indicator (which is an extraction from this index) aimed at monitoring corruption and therefore more closely related to the target 16.5, the QGI can be useful in representing the overall framework of institutional quality, in line with the objectives of target 16.6.

Final Indicator	Quality of Government Index
Type	Experimental
Coverage	208 european regions
Time coverage	Since 2010
Source	EC , University of Gothenburg
Unit of measurement	Index
Frequency	Quinquennial



SDG Target 16.6 EFFECTIVE INSTITUTIONS

Develop effective, accountable and transparent institutions at all levels.

Indicator for final dataset: Participation in the last elections

Original indicator (from JRC): Participation in the last elections

Definition: Percentage of the voting population participating in elections (European, national, local). Some regions report data on abstention rather than participation.

Reasons for the choice of this final indicator: This indicator is important for monitoring this target because it helps assess the quality of institutions in terms of representativeness relative to the population and citizens' trust in these institutions. Specifically, this indicator aids in understanding the functioning of democracy. High participation in elections helps ensure that elected representatives better reflect the will of the population. Conversely, low participation could indicate disenchantment, disinterest, or lack of trust in institutions, and election results might not accurately represent the majority's opinions. High participation contributes to ensuring

a more equitable representation of various social, economic, and cultural groups, while low participation could lead to distorted representation.

Final Indicator	Participation in the last elections
Type	Official
Coverage	European regions
Time coverage	Since 1996
Source	OECD (EU) And national/regional sources
Unit of measurement	Percentage
Frequency	Per election cycle

4.1.17 SDG 17 – Partnerships for the goals

Table 26 summarizes the final indicator set to monitor SDG17, strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development, in comparison with the initial indicator set proposed by JRC (Vega-Rapún et al., 2022). It also relates the final indicators with the UN global indicator framework (UN, 2015). The rest of the section gives, for each indicator, a definition, reasons/arguments for the choice and a small table with metadata.

Table 26 – SDG17: Final data set

SDG	Target	Final proposal	Initial JRC proposal	UN framework
17	17.2 (development assistance commitments)	Official development assistance	Official development assistance	---
17	17.3 (financial resources for developing countries)	Volume of remittances as a proportion of total GDP	---	---
17	17.6 (regional and international cooperation)	PCT co-patent applications that are done with foreign regions	PCT co-patent applications that are done with foreign regions	---
17	17.8 (enabling technology)	Individuals who used the internet for interaction with public authorities	Individuals who used the internet for interaction with public authorities	17.8.1 Proportion of individuals using the Internet
17	17.12 (imports from least developed countries)	Imports from developing countries	Imports from developing countries	---

Source: Authors' own elaboration



SDG Target 17.2 DEVELOPMENT ASSISTANCE COMMITMENTS

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 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.

Indicator for final dataset: Official development assistance

Original indicator (from JRC): Official development assistance

Definition: Official development assistance (ODA) is defined as government aid that promotes and specifically targets the economic development and welfare of developing countries. The DAC adopted ODA as the “gold standard” of foreign aid in 1969 and it remains the main source of financing for development aid. ODA data is collected, verified and made publicly available by the [OECD](#).

Definition from OECD.

Reasons for the choice of this final indicator: It was considered useful to maintain the ODA indicator proposed by the JRC because it is consistent with the objectives of the target. Monitoring ODA is crucial to ensure that development aid efforts are effective, transparent, and directed towards areas where they are most needed, thus contributing to improving the living conditions of people in developing countries.

Data are available from the OECD, but only at the national level (not regional). At the moment, among the project regions, only two regions, Navarre and Andalusia, offer data on this indicator. These are official data

from the statistical institutes of these regions. In both cases, the data is given as the percentage that this aid represents of the regions' GDP.

Final Indicator	Official development assistance
Type	Official
Coverage	Navarra and Andalusia
Source	ODS-Navarra. General Budgets of Navarra IECA Annual Regional Accounts of Andalusia
Unit of measurement	Percentage
Frequency	Annual



SDG Target 17.3 FINANCIAL RESOURCES FOR DEVELOPING COUNTRIES

Mobilize additional financial resources for developing countries from multiple sources.

Indicator for final dataset: Volume of remittances as a proportion of total GDP

Original indicator (from JRC): -

Definition: Ratio of residents' current transfers abroad to GDP at current prices. Only non-EU countries are taken into account (*Monitoring the SDGs in Pomorskie region, 2023*).

The data on foreign workers' remittances refer to money transfers abroad conducted through payment institutions or other authorized intermediaries without passing through bank accounts belonging to either the sender or the recipient (settled in cash).

Definition from Bank of Italy.

Reasons for the choice of this final indicator: The indicator is appropriate to this target because it measures one of the most important and stable sources of external financing for developing countries. It is monitored and proposed by the United Nations because it is an easy variable to calculate, compare and report, as it is based on official and standardised data on countries' balance of payments and gross domestic product (Quintanilla Cabañero, A. 2023).

Final Indicator	Volume of remittances as a proportion of total GDP
Type	Official
Coverage	Spanish and Italian regions
Time coverage	Since 2013 (Andalusia) Since 2005 (Italy)
Source	IECA - Annual Regional Accounts of Andalucía, Instituto de Estadística y Cartografía de Andalucía Balance of payments, Bank of Spain (Spain) ISTAT from Bank of Italy (Italy)
Unit of measurement	Percentageas (Andalusia) Millions of Euro, current values (Italy)
Frequency	Annual



SDG Target 17.6 REGIONAL AND INTERNATIONAL COOPERATION

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.

Indicator for final dataset: PCT co-patent applications that are done with foreign regions

Original indicator (from JRC): PCT co-patent applications that are done with foreign regions

Definition: The Patent Cooperation Treaty, abbreviated as PCT, is an international treaty which allows for a filing of an international patent application to have the same effect as a national application in each of the contracting countries designated in the patent application. However, patents are still granted nationally.

Definition from European Commission. Glossary

Reasons for the choice of this final indicator: In line with the target on international cooperation, this indicator allows monitoring of PCT patent applications involving collaborations between inventors and companies from different nations. Joint PCT patent applications are significant as they facilitate and encourage international collaboration, provide global protection for inventions, attract investments, foster innovation and economic growth, and contribute to the global sharing of scientific and technological knowledge, leading to new products, technologies, and services that contribute to economic development at both national and global levels.

Final Indicator	PCT co-patent applications that are done with foreign regions
Type	Experimental
Coverage	OECD countries and other European countries
Time coverage	Since 1997
Source	Organisation for Economic Cooperation and Development (OECD)
Unit of measurement	Share
Frequency	Annual



SDG Target 17.8 ENABLING TECHNOLOGY

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.

Indicator for final dataset: Individuals who used the internet for interaction with public authorities

Original indicator (from JRC): Individuals who used the internet for interaction with public authorities

Definition: Percentage of individuals who used the internet for interaction with public authorities.

The data for this indicator are obtained from a survey, the EU survey on the use of Information and Communication Technologies⁹.

Definition from Eurostat (isoc_i).

⁹ the EU survey on the use of Information and Communication Technologies (ICT) in households and by individuals is an annual survey conducted since 2002 aiming at collecting and disseminating harmonised and comparable information on the use of ICT in households and by individuals. Data presented in this domain are collected on a yearly basis by the National Statistical Institutes and are based on Eurostat's annual model questionnaire. This questionnaire is updated each year to reflect the evolving situation of information and communication technologies.

Indicators from this survey are used for benchmarking purposes and in particular, this survey supports measuring the implementation of one of the six priorities for the period 2019-2024 of the von der Leyen European Commission – A Europe fit for the digital age. The strategy is built on three pillars: (1) Technology that works for the people; (2) A fair and competitive digital economy; (3) An open, democratic and sustainable society. Furthermore, it facilitates monitoring of the EU's digital targets for 2030 set by the Digital Compass for the EU's Digital Decade, evolving around four cardinal points: skills, digital transformation of businesses, secure and sustainable digital infrastructures, and digitalization of public services.

The survey is collecting data of internet users, individuals who have used the internet in the three months prior to the survey. Regular internet users are individuals who used the internet, on average, at least once a week in the three months prior to the survey (Eurostat).

Reasons for the choice of this final indicator: This indicator is of great relevance in our society, for everyday life, education, work, and participation in society, enabling access to information and services anytime and anywhere. Specifically, the indicator on the use of the internet for interaction with public authorities, e-Government, by individuals allows for the assessment of the perceived quality of public websites and satisfaction with e-Government services, such as: requesting documents like tax returns, applying for a passport or identity card, changing residence, requesting social security benefits, accessing public healthcare services, accessing public educational services, applying for university enrollment, using public libraries, etc.

During the period of the Covid-19 pandemic, the ability to access and use the internet has been of particular significance, for example accessing public services, education services ("e-learning"), healthcare services, etc. Many areas in our regions still face issues of digital divide (e.g., some more remote mountainous regions), and consequently, among the challenges, this also leads to the disadvantage of not being able to access public services. Therefore, monitoring this indicator allows for evaluating the enhancement of technology use (target) as well as the citizens' ability to access e-government public services at any time and in any place.

Final Indicator	Individuals who used the internet for interaction with public authorities
Type	Official
Coverage	EU-27 plus others
Time coverage	Since 2011
Source	Eurostat, Regional Statistics ISOC R GOV I
Unit of measurement	Percentage
Frequency	Annual



SDG Target 17.12 Imports from least developed countries

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.

Indicator for final dataset: Imports from developing countries

Original indicator (from JRC): Imports from developing countries

Definition: Imports from developing countries as a percentage of total imports.

Developing countries are defined as countries on the OECD [Development Assistance Committee](#) (DAC¹⁰) list of recipients of Official Development Assistance (ODA).

Definition from OECD.

Reasons for the choice of this final indicator: This indicator is not easily available at the regional level (import data are often available at the regional level, but the indicator needs to be constructed in relation to the classification of developing countries). However, the indicator is very useful for monitoring the target and assess how to facilitate market access for these countries.

Final Indicator	Imports from developing countries
Type	
Coverage	Navarra, Andalusia, Puglia, Piemonte and Centro
Time coverage	Since 2000 (Italy) Since 2015 (Spain)

¹⁰ The DAC has categorised countries by the following: Least Developed Countries (LDCs), Landlocked Developing Countries (LLDCs), Small Island Developing States (SIDS), and Fragile contexts (FCs).

	2022 (Centro, Portugal)
Source	ODS-Navarra, Nastat (Navarra) IECA (Andalusia) Coeweb – ISTAT (Italian regions) CCDR Centro (Portugal)
Unit of measurement	Number (€) or Percentage
Frequency	Annual

4.1.18 The final dataset

In summary, starting from the JRC's initial proposal that included 83 indicators in total, covering 52 SDG targets, the final dataset proposal includes **116 indicators** covering **75 total targets**, 23 of which are new (the 52 targets already included in the JRC's proposal are maintained).

Out of the 83 indicators from the original proposal, 70 have been maintained and utilised, while the others were excluded or replaced with new indicators suggested by the regions. 46 indicators are new and derived from the project regions' proposals.

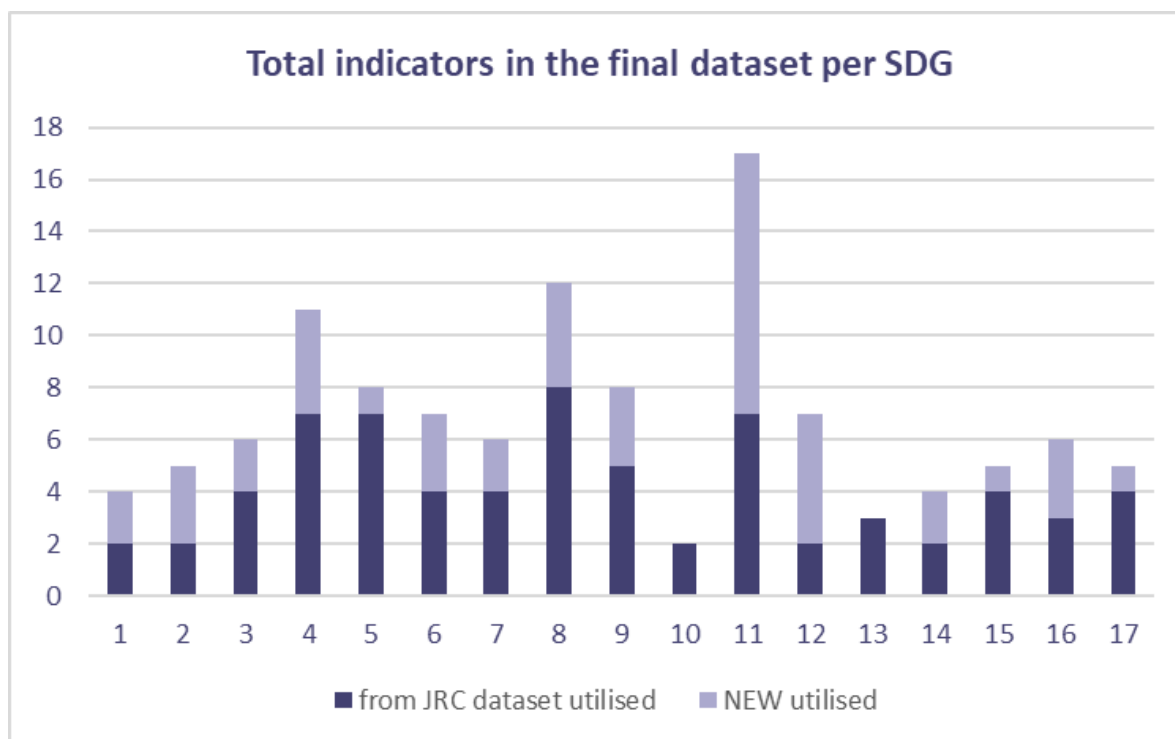
The list of final indicators is available in *Annex 5* of this Report.

Figure 7 - Summary schema of total indicators and target covered: from the initial proposal by JRC to the final dataset



Source: authors' own elaboration

Figure 8 - Final indicators per SDG



Source: authors' own elaboration

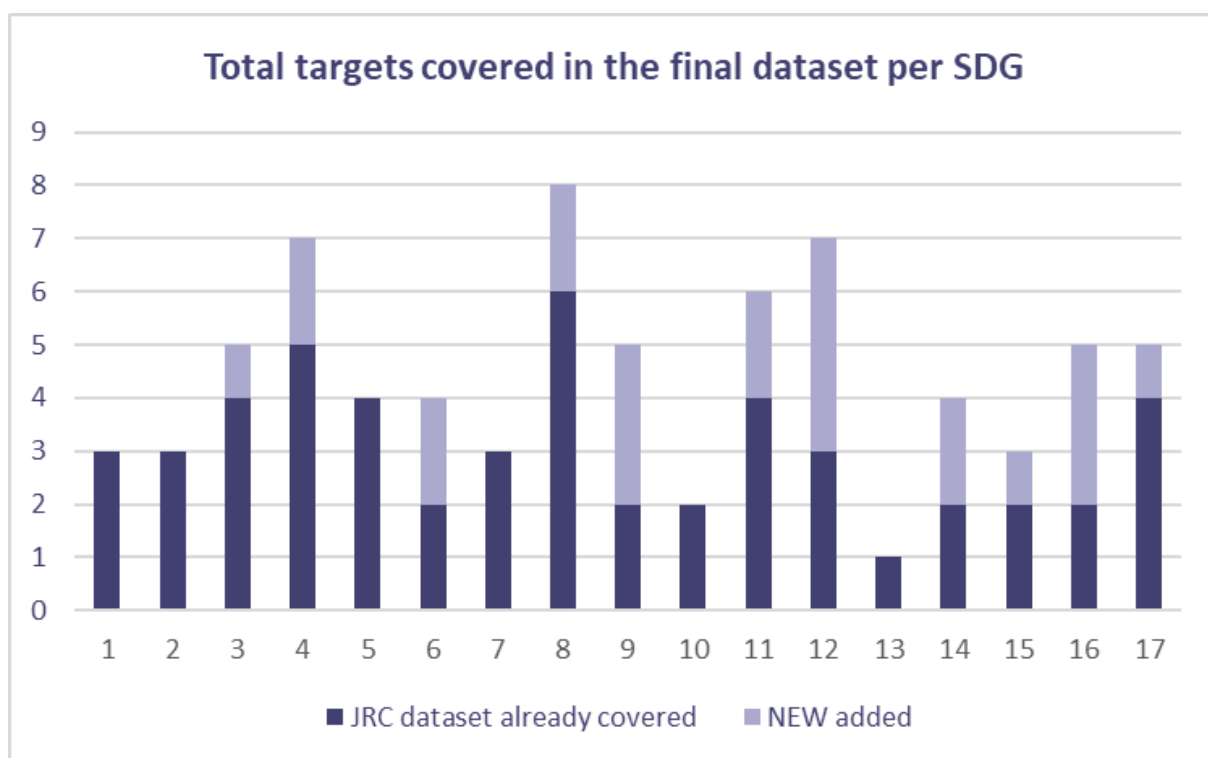
Table 27 - Final indicators per SDG

INDICATORS	JRC dataset	from JRC dataset	NEW	FINAL dataset
SDG	proposal	utilised	utilised	utilised
1	4	2	2	4
2	4	2	3	5
3	5	4	2	6
4	7	7	4	11
5	7	7	1	8
6	4	4	3	7
7	4	4	2	6
8	10	8	4	12
9	5	5	3	8
10	2	2	0	2
11	9	7	10	17
12	3	2	5	7

13	4	3	0	3
14	3	2	2	4
15	4	4	1	5
16	4	3	3	6
17	4	4	1	5
TOT	83	70	46	116

Source: authors' own elaboration

Figure 9 - Total targets covered per SDG



Source: authors' own elaboration

Table 28 - Total targets covered per SDG

TARGETs	JRC dataset	NEW	FINAL dataset
SDG	already covered	added	N. targets
1	3	0	3
2	3	0	3
3	4	1	5
4	5	2	7
5	4	0	4
6	2	2	4
7	3	0	3
8	6	2	8
9	2	3	5
10	2	0	2
11	4	2	6
12	3	4	7
13	1	0	1
14	2	2	4
15	2	1	3
16	2	3	5
17	4	1	5
TOT	52	23	75

Source: authors' own elaboration

5. CHALLENGES AND BOTTLENECKS

The Sustainable Development Goals (SDGs) present both an ambitious vision and a formidable challenge for the world. Envisioned by the United Nations, the 17 SDGs aim to address a wide array of global issues, including poverty, education, inequality, climate change, environmental degradation, peace, and justice. Within this great global challenge represented by the SDGs, we can identify different challenges that we face on the road to achieving them. Without wishing to be exhaustive, we can point out the following general challenges:

- **Complex interconnectedness:** The SDGs recognize the intricate web of interconnected issues that span national borders. Tackling one goal often requires progress on others, creating a complex and interdependent challenge (Le Blanc, 2015; Nilsson, et al., 2016; Bali et al., 2021).
- **Financial resources:** Achieving the SDGs targets requires appropriate interventions at many scales, often requiring considerable investments. Allocating and mobilizing these resources poses a challenge, especially considering existing economic disparities among nations and/or regions (Vorisek and Yu, 2020; Kulkarnil et al., 2022).
- **Policy alignment:** Policies at the national, regional, and local levels need to align to create a cohesive strategy for achieving the SDGs. Implementing policies that align with the SDGs often requires a shift in traditional approaches, which might face resistance from established systems and interests (Tosun and Leininger, 2017; Allen and Malekpour, 2023).
- **Changing societal mindsets:** Cultural and societal norms may need to shift to align with the principles of sustainability and inclusivity. This requires not only policy changes but also changes in attitudes and behaviors at the individual and community levels (Allen and Malekpour, 2023).
- **Global cooperation requirement:** Achieving the SDGs necessitates unprecedented levels of international collaboration. Countries, organizations, and individuals must work together, transcending political, economic, and cultural differences. For example, goals related to climate action and environmental sustainability are particularly challenging due to the complex nature of climate change. Mitigating its impacts requires coordinated efforts on a global scale.
- **Territorial approach:** A territorial approach recognizes the diversity of challenges and opportunities that exist at the local level. Local communities often have unique characteristics, and tailoring strategies to the specific needs of each territory ensures that interventions are relevant and effective. Regions play a critical role in this paradigm shift and need to embrace the full potential of the SDGs as a policy tool to improve people's lives (OECD, 2020b).
- **Monitoring and accountability:** Tracking progress on the SDGs and holding stakeholders accountable for their commitments is a substantial challenge. Establishing effective monitoring mechanisms on a global scale requires robust systems and international cooperation but also regional and local involvement. Differences in geography, governance and technology, among others, make it dangerous to rely on generalized knowledge for progress in achieving the SDGs in a given region. Universal benchmarking of the SDGs can be counterproductive (Bali Swain and Ranganathan, 2021).

This report has focused mainly on the combination of the latter two aspects, the territorial approach and the monitoring and follow-up of the SDGs, that is, in the monitoring of SDGs at the regional level. The aim of the report was to select a list of indicators useful for SDG monitoring at the regional level. The analysis carried out has identified important challenges and bottlenecks in the process.

Challenge: Data availability and quality; Bottleneck: Limited regional statistical capacity.

Accurate and reliable data at the local level is essential to monitor progress towards the SDGs and to make informed decisions to help achieve the goals. One of the challenges we face when analysing the SDGs at the regional level is the harmonisation and homogeneity of data. The analysis carried out has shown that there are different data sources, supranational, national or regional, that produce data. In many cases, these three levels are coordinated and the information they provide is homogeneous and harmonized. When there exists a regional entity with statistical capacity, data availability is wider and more reliable. In other cases, regional data availability depends on the efforts of national entities. In some countries, however, a centralized governance structure, where the majority of competencies are concentrated at the national level, result in limited power

and autonomy for regional entities. Such is the case of Portugal (Abreu, 2023). This situation leads to significant challenges such as the lack of regional data as the availability, production, and quality of regional data are entirely dependent on national or supranational entities. These lead to:

- **Inconsistent data:** Different regions may have varying levels of data availability and quality. Some regions may lack comprehensive data on certain SDG indicators, making it difficult to assess progress accurately.
- **Time lags:** Data might not be up-to-date, creating challenges in monitoring the real-time progress of the SDGs.

Some of the selected indicators come from supranational institutions with sufficient and proven statistical capacity to provide accurate information on indicators at the regional level. That is the case of Eurostat, the OECD or JRC. When information on an indicator in the list is available from these sources, data is readily available for most European regions.

However, only part of the selected indicators come from these supranational sources. Other come from national sources that offer regional data. In any case, this report and previous reports on which it is based have shown the difficulties in obtaining regional data when statistical capacity is not available at regional level. When the selected indicators come from national or regional estimations, it is up to each region to find out whether this indicator is being calculated or could be calculated in that region. The indicator has been selected for its usefulness in monitoring the corresponding target. The challenge is to make these indicators generally available in all European regions. However, bottleneck arises here, limited regional statistical capacity. Some regions may lack the expertise and infrastructure needed to collect, analyze, and report on SDG data. Building regional statistical capacity is crucial for effective regional monitoring of the SDGs.

Challenge: Europe's regional diversity; Bottleneck: Administrative issues

Territorial contexts can vary significantly, posing challenges in developing standardized approaches to monitor the SDGs. What works well in one region may not be directly applicable in another, requiring tailored strategies for each territory. There is great geographical, biological, and physical variety among the European regions, but also different levels of economic development and social cohesion (European Commission, 2022b). These differences condition how regions respond to different shocks, such as financial crises, pandemics, wars or periods of high inflation. Each region has unique challenges, priorities, and cultural contexts that affect their progress toward the SDGs.

In Europe, there are also different levels of decentralisation of political and administrative responsibilities from central government to regional and local levels. This creates a bottleneck in the regional analysis. Decentralization often means that regions and local governments have varying degrees of autonomy and control over data collection and reporting. Regions with varying levels of decentralization may differ in their administrative capacity to implement policies effectively.

Challenge: Interpreting the data; Bottleneck: Communication and awareness

Interpretation of the results is important for assessing progress towards the SDGs. For the interpretation of each indicator, at least the preferred direction of change or the desired trends should be specified (Wu and Wu, 2012). Benchmarks for the different indicators can be useful to assess this progress. We face different challenges in data interpretation:

- **Benchmarking:** Regions with different economic, social, and environmental conditions may have varying starting points in their pursuit of the SDGs. This makes it challenging to set uniform benchmarks and measure progress effectively. Setting ambitious but achievable targets for regions with different capabilities can be challenging. A one-size-fits-all approach may not work. Bali Swain and Ranganathan (2021) point out that each region has its own specific structural and development contexts and hence universal benchmarking would be ineffective. Regions have diverse starting points in social, environmental or economic conditions. Universal benchmarks may not account for these regional variations.
- **Overall interpretation within a region:** Managing a large number of indicators as those analyzed in this report poses the great challenge of making a global interpretation of the results. Is the analyzed region on the right path towards sustainability? This question is very difficult to answer without a correct analysis of the relationships between indicators or the development of some composite index that allows us to group the indicators. Can the improvement in one indicator compensate for the worsening of another? Are we betting on strong sustainability, in which substitution is not possible, or on weak sustainability, in which substitution is possible and/or acceptable?

- **Comparison between regions:** Given the diversity between European regions, comparisons between regions can sometimes be misleading. Regions can vary significantly in terms of their starting points, economic conditions, social demographics, and environmental contexts. Comparing regions without considering these variations can lead to inaccurate conclusions. Different regions may have different timelines and milestones in their SDG implementation, making direct year-to-year comparisons less meaningful. In addition, regions may be affected by external factors beyond their control, such as global economic trends, climate events, or migration patterns, which can influence progress.

The interpretation of data should be used to communicate information about progress on the SDGs, but also the difficulties encountered, to society at large. We must engage citizens in the SDGs if we are to succeed. Cultural and societal norms may need to shift to align with the principles of sustainability and inclusivity. Changing societal mindsets to advance the SDGs is a holistic process that involves shifting cultural and social norms to align with sustainability and inclusivity principles. Communicating progress on the SDGs to the public and raising awareness can be a bottleneck, especially in regions with varying literacy levels and communication challenges. Building awareness and changing mindsets often require sustained efforts over an extended period. It's important to recognize that progress may be gradual and may require consistent reinforcement.

Other challenges encountered in relation to the analysis of the technical regional reports:

1. It's not possible to comprehensively analyze and compare the data across regions due to the following reasons:
 - regions have used different sources for analyzing the same indicator and they had different preferences in selecting the source to use (European or national/regional sources;
 - the units of measurement used do not always align (some regions have preferred absolute numbers, while others have used percentages or rates, etc.).
2. Additionally, regions have interpreted the meaning of replaced indicators ("1to1"), alternative indicators, complementary indicators, or additional indicators differently.
3. Some regions chose to prioritize European sources when the data was available, while other regions preferred to prioritize national/regional sources when available (even if the data was available from European sources). For indicators not available from European or national/regional sources, regions proposed alternative indicators when possible.
4. The new proposals from the regions sometimes lack of a proper statistical definition.
5. Limitations/issues of data availability at the European level for all regions in Europe (for example, Eurostat data related to the indicators analyzed in this report are not always available for regions in Germany and/or Austria).

Box 3 – Some challenges reported by the Regions

- **Technical** challenges: data accessibility, data not available at regional level, no historical series, old data, not disaggregated, not consistent/standardized, ...;
- Difficulty and inability to **understand** the reasons behind the trends, the future challenges and **interpret data**;
- Some areas are not adequately considered in SDG framework. **Treasure but not measure**;
- Different **levels of decentralisation** and legal frameworks greatly influence the implementation of the SDGs. National governments have an important role in supporting and coordinating regions' effort;
- Difficulty in **prioritizing actions and resource** taking in considerations the different political priorities, economic challenges, stakeholders, data availability;
- SDG **interlinkages** are perceived as very difficult to identify and quantify: synergies and trade-offs;
-

6. FORMULATION OF RECOMMENDATIONS

With the list of indicators selected in this project, the aim is to make a meaningful contribution to the pivotal role that regions should play in achieving the Sustainable Development Goals (SDGs). We want the goals delineated in the SDGs to be achieved at the regional level, understanding that successful achievement at this scale invariably translates into national success. However, the inverse relationship does not hold true: achieving the SDGs at the national level may occur alongside substantial disparities among the regions and territories constituting the country.

The compiled list of indicators is extensive and diverse, allowing the capability to approach to the holistic framework for sustainable development outlined in the 17 SDGs. A substantial portion of these selected indicators is widely employed at various territorial levels, predominantly within countries. Their application at the territorial level facilitates a more nuanced understanding of the prevailing conditions at the local and regional levels. It is within these smaller geographical scales that numerous daily activities transpire, and decisions are made that wield a direct impact on the overall quality of life for the population.

The ensuing recommendations delineate guidelines for the utilization of these indicators in monitoring the SDGs at the regional level.

Regional Diversity

As previously mentioned, Europe exhibits considerable geographical, social, and economic diversity among its regions. This diversity becomes even more pronounced when expanding the analysis to regions in other parts of the world. The suggested list of indicators aims to provide a broad framework for monitoring the Sustainable Development Goals (SDGs) in diverse regions. However, the interpretation and relevance assigned to each indicator are influenced by regional diversity. Differences in geography, governance and technology, among others, make it dangerous to rely on generalized knowledge for progress in achieving the SDGs in a given region (Nilsson et al., 2016). Certain indicators may lack relevance in specific regions, with the most apparent example being the indicators proposed in SDG14 and non-coastal regions. Some indicators may be of vital importance for one region but not for another, given its economic structure (value added of small manufacturing enterprises for one region, tourism intensity, for other) or its natural wealth (share of forest surface, for one region or proportion of wetlands, for other).

Regarding interpretation, progress deemed as modest in one indicator for a particular region may hold significant importance in another. This discrepancy can be attributed to a region's social priorities, production structure, or the policies implemented. For instance, if there is a focus on promoting organic farming, a slight advancement in indicator "share of utilised agricultural area UAA cultivated with organic crops" may not be positively evaluated because the policy aimed for more substantial progress. Conversely, the same progress achieved without a targeted policy may be considered a success.

This is why the list of indicators proposed here for monitoring the SDGs at the regional level must be interpreted in the context of each region. The geographical, demographic, cultural, and climatic diversity of Europe means that the interpretation of the data may differ. Therefore, it is recommended to utilize the proposed indicators while adapting the interpretation to the unique characteristics of each region.

An ageing Europe

Europeans are living longer than ever before and the age profile of society is evolving rapidly. Demographic ageing means that the proportion of working-age people in the EU is declining, while the number of older people is increasing; this pattern will continue over the next two decades, as the post-war baby-boom generation completes its transition to retirement (Eurostat, 2020). This profound demographic change may change the assessment and interpretation of many of the indicators included in this set of indicators. Clearly, this may affect labour market indicators, such as some of those included in SDG8, but also education (SDG4) and health (SDG3) indicators. As populations age, there is a notable impact on labor markets, with a declining proportion of working-age individuals potentially straining economic productivity. Furthermore, aging societies often experience increased demand for healthcare services, impacting both the accessibility and affordability of healthcare systems. Additionally, shifting demographics influence patterns of consumption and resource

utilization, posing implications for environmental sustainability. As the elderly population grows, so does the need for social services, placing additional pressure on welfare systems. Navigating these challenges requires innovative approaches to address the evolving dynamics of an aging population, ensuring that sustainability initiatives account for the demographic shifts in society.

As Europe ages, new challenges emerge that can either support or pose risks to regions' trajectories toward sustainability, as outlined by the SDGs. It is recommended not to lose sight of demographic factors in the interpretation of the indicators.

An era of global shocks

Climate crisis, financial crisis, pandemic, war, migration... a multitude of phenomena, many of them unforeseen, change the conditions of the world around us and have a significant impact at the regional level. Climate change can lead to extreme weather events, such as floods, droughts and more intense storms, which directly affect regions. Coastal regions are particularly vulnerable to sea level rise, but changes in weather patterns can also affect agricultural production, which has direct consequences on regional food security. Financial crises can lead to job losses and declining incomes, directly affecting local communities and their ability to meet their basic needs. Pandemics put significant pressure on health systems at the regional level, potentially leading to hospital overcrowding and affecting medical response capacity. And all of these global conflicts can contribute to the displacement of people, whether due to climate shocks, war or economic crises, directly affecting host communities at the regional level.

Again, it is recommended that all these global phenomena be taken into account in the interpretation of the various indicators selected. The effects of these global shocks can mask the efforts made by regions to achieve the various targets proposed in the SDGs. Some indicators may be more sensitive than others to these shocks, or they may be affected at different points in time, some at the time the shock occurs, others with a lag.

Synergies and trade-offs

As Pradhan et al. (2017) point out, in contrast to conventional development agendas that focus on a narrow set of dimensions; the SDGs provide a holistic and multidimensional view of development. Thus, the SDGs represent a universal set of goals that are interconnected in a complex web of interactions. Universality implies that none of the SDGs has priority, while their multidimensional and integrated nature results in complex feedbacks between the different SDG targets (Le Blanc, 2015; Bali Swain and Ranganathan, 2021). One recommendation, which is also a challenge, is to work on the interrelationship between the different SDG targets and to analyse the synergies and trade-offs that may exist between the selected indicators. We must take a holistic view to ensure that progress in one area is not compromised by setbacks in others. Nilsson et al. (2016) rightly point out, regions must interpret the SDGs and their interrelationships according to their regional circumstances and levels of development, as interactions will vary from region to region.

Progress needs to be made in analyzing the synergies and trade-offs that exist between the different SDGs. Moreover, the use and analysis of the indicators proposed in this set can contribute to this analysis. We recommend analyzing possible relationships between the different indicators in order to make progress in achieving an overall interpretation.

Box 4 – Some recommendations from the Regions

- **Enhance coherence** between regional policies, strategies and plans for sustainability goals;
- Allow comparison of regional data with **European, national and regional targets** by 2030/2050;
- **Connect monitoring and implementation**, in link with regional strategies and European policies;
- Include **impact indicators** reflecting the effectiveness of regional policies for sustainable development;
- Collect, provide and use **disaggregated data** for a comprehensive understanding of progress and to **identify disparities and inequalities**;
-

7. CONCLUSIONS

At the halfway point of the 2030 Agenda, the SDGs are in jeopardy, as progress stalls amid climate crisis, economic fluctuations, conflicts and the aftermath of pandemics. Advancing the SDGs is a challenge we must all join in. We need to move forward without leaving anyone behind. The role of territories in this challenge is fundamental; local progress can lead to global success. This project puts European regions at the center of these advances.

Monitoring the SDGs is crucial to be able to move forward, we cannot manage what we cannot measure. We need indicators to tell us how we are doing, whether we are moving in the right direction. Reliable, indicators, sensitive to changes that allow us to identify problems and difficulties in order to react in time and move forward.

The project "Regions2030: monitoring the SDGs in the EU regions - filling the data gaps" was created for these purposes, aiming to contribute to defining a set of indicators, useful in the European framework for all European regions, for monitoring the SDGs at the regional level (NUTSII).

The list of suggested indicators in this Final Report is the result of collaborative work (conducted from July to November 2023): it stems from the proposal by the JRC (initial proposal worked on by regions from December 2022 to June 2023) and the input and suggestions of the ten regions participating in the project (North Aegean, Western Macedonia, Navarra, Andalusia, Piemonte, Puglia, Pomorskie, Centro, Nord-Vest, and Manisa, Afyonkarahisar, Kutahya, Usak – T33). Some of the proposed indicators are available from European sources, while others are only accessible from national or regional sources, making it challenging to have data available for all European regions. However, this dataset can serve as an excellent starting point, both for the involved regions and for other European regions wishing to approach SDG monitoring analyses (using European or national/regional sources, depending on data availability).

The final dataset includes 116 indicators, allowing for the monitoring of all 17 SDGs and, specifically, 75 SDG Targets of the 2030 Agenda. These 116 indicators not only align with European-level guidance (particularly from the JRC) and the needs expressed by regions (often in line with national requirements), but some of these proposed indicators are also consistent with UN global indicator framework (UN, 2015).

It is important to emphasize, however, that these indicators should be read while considering the demographic, socio-economic, environmental, morphological, geographical, and political characteristics of the regions in order to be correctly interpreted. For many indicators, it is also crucial to compare trends (of two or more indicators, for example) to truly understand the reasons behind the positive/negative trend of the analyzed phenomenon or the effects of one indicator on another, or the degree of correlation between two phenomena. Keeping this in mind, along with the suggestions and challenges described in this report, it is certainly useful to have a set of reference indicators applicable to all regions in Europe, related to the SDGs, (the first experience at the European level). However, this requires careful and specific qualitative reading depending on the local characteristics and needs.

The project results could be valuable for all regions engaged in sustainability goal monitoring at the regional level in Europe, or for those considering initiating this type of analysis. They provide methodological insights on how to select and measure certain indicators at the regional level (also useful at the national level). This is part of a process that does not end here but will necessarily evolve over time in response to potential future changes. Europe, with initiatives like the Green Deal and other EU Strategies, Plans and Regulations (e.g., FIT FOR 55, Biodiversity Strategy, Circular Economy, Farm to Fork Strategy, Gender Equality Strategy, the European Pillar of Social Rights Action Plan, EU4Health Program, the Action Plan for Integration and Inclusion, European Skills Agenda, the Action Plan for Digital Education, etc.), has set sustainability goals to be achieved by 2030, 2035, and 2050. Will we be able to reach them? This is the great challenge of monitoring. Monitoring, with all the limitations and challenges described, could be a solid knowledge foundation to support regions in directing policies towards the transition for sustainable development.

REFERENCES

- Abreu, J. (2023) *Monitoring the SDGs in Centro region, Portugal*, Stamos, I. editor(s), Publications Office of the European Union, Luxembourg, doi:10.2760/34277, JRC134393.
- Allen, C. and Malekpour, S. (2023). Unlocking and accelerating transformations to the SDGs: a review of existing knowledge. *Sustainability Science* 18:1939–1960.
- Armenise, M. (2023). *Monitoring the SDGs in Puglia region, Italy*, Stamos, I. and Vega Rapun, M. editor(s), Publications Office of the European Union, Luxembourg, doi:10.2760/611303, JRC134403.
- Bali Swain, R. and Ranganathan, S. (2021). Modelling interlinkages between sustainable development goals using network analysis, *World Development* 138: 105136.
- Bertozzi, C., Siragusa, A., Stamos, I., Proietti, P., Rainoldi, A., Espadas, J., Gallego Garcia, F., Dzurovčinová, P., Hakala, J., Iori, E. and Bertoft, A. (2021) European cities localising the SDGs: experiences and lessons learned, Publications Office of the European Union, Luxembourg, 2021, ISBN 978-92-76-46206-4, doi:10.2760/74637, JRC127341.
- Botzen, W., Duijndam, S. and van Beukering, P. (2021). Lessons for climate policy from behavioral biases towards COVID-19 and climate change risks. *World Development*, 137: 105214.
- Carayannis, Elias G.; Campbell, David F.J. (2010). Triple Helix, Quadruple Helix and Quintuple Helix and How Do Knowledge, Innovation and the Environment Relate To Each Other? A Proposed Framework for a Trans-disciplinary Analysis of Sustainable Development and Social Ecology. *International Journal of Social Ecology and Sustainable Development* 1 (1): 61–62. doi:10.4018/jesd.2010010105.
- Ciambra, A., Siragusa, A., Proietti, P., and Stamos, I. (2023) Monitoring SDG localisation: An evidence-based approach to standardised monitoring frameworks. *Journal of Urban Ecology*. <https://doi.org/10.1093/jue/juad013>
- Ciambra, A., Stamos, I., and Siragusa, A. (2023) Localizing and Monitoring Climate Neutrality through the Sustainable Development Goals (SDGs) Framework: The Case of Madrid. *Sustainability*. 2023; 15(6):4819. <https://doi.org/10.3390/su15064819>
- Clark, C.W. (2010): *Mathematical bioeconomics. The mathematics of conservation*, Third edition, Wiley, New Jersey.
- EEA (2020). Towards zero pollution in Europe. EEA Signals 2020. Publications Office of the EU.
- EEA (2021). Water resources across Europe. Confronting water stress: an updated assessment. EEA Report, No.12/2021. European Environmental Agency.
- EPAH (2022a). *Introduction to the Energy Poverty Advisory Hub (EPAH) Handbooks: A Guide to Understanding and Addressing Energy Poverty*. European Commission. Publication Office of the European Union
- EPAH (2022b). *Energy poverty national indicators: Insights for a more effective measuring*. Energy Poverty Advisory Hub. European Commission
- EPAH (2023). *Energy Poverty Advisory Hub (EPAH) Handbook 1: A Guide to Energy Poverty Diagnosis*. European Commission. Publication Office of the European Union.
- European Commission (2021). The European Pillar of Social Rights Action Plan. COM/2021/102 final. Document 52021DC0102.
- European Commission (2022). Compulsory education in Europe 2022-2023. Eurydice facts and figures. Luxembourg: Publications Office of the European Union.
- European Commission (2022b). Cohesion in Europe towards 2050. Eighth report on economic, social, and territorial cohesion. Publications Office of the European Union, Luxembourg.
- European Parliament (2023). Nuclear energy. Fact Sheets on the European Union – 2023. European Parliament.
- Eurostat (2023). Food waste and food waste prevention – estimates. [Eurostat](https://ec.europa.eu/eurostat/tgm/table.do?tab=main&init=1&language=en&plugin=1).

- FAO (2014). *Food wastage footprint. Full-cost accounting*. Final Report, Food and Agriculture Organization of the United Nations.
- FAO and UN Water (2021). Progress on Level of Water Stress. Global status and acceleration needs for SDG Indicator 6.4.2. Rome. <https://doi.org/10.4060/cb6241en>
- Foudi, S. and Osés-Eraso, N. (2014). Flood risk management: assessment for prevention with hydro-economic approaches. In: Markandya, A., Galarraga, I., Sainz de Murieta, E. (Eds.), *Routledge Handbook of the Economics of Climate Change Adaptation*. Taylor & Francis.
- Foudi, S., Osés-Eraso, N. and Tamayo, I. (2015). Integrated spatial flood risk assessment: The case of Zaragoza. *Land Use Policy*, 42: 278–292.
- Gertner, J. (2009). Why Isn't the Brain Green? *The Green Issue*. The New York Times Magazine.
- ILO (2016). Key Indicators of the Labour Market, Ninth edition. Geneva, International Labour Office.
- Jacobs-Crisioni, C; Batista e Silva, F.; Lavallo, C.; Baranzelli, C.; Barbosa, A. and Perpiña Castillo, C. (2016). Accessibility and territorial cohesion in a case of transport infrastructure improvements with changing population distributions. *European Transport Research Review*, 8: 9.
- Jones, R., Dewey, B., Seaver, B. (2022). Aquaculture: Why the world needs a new wave of food production. World Economic Forum.
- Koutsomarkos, N. (2023). *Monitoring the SDGs in Western Macedonia region, Greece*, Stamos, I. editor(s), Publications Office of the European Union, Luxembourg, doi:10.2760/570811, JRC134405.
- Kulkarnil, S., Hof, A., Ambrósio, G., Edelenbosch, O., Köberle, A.C., van Rijn, J. and van Vuuren, D. (2022). Investment needs to achieve SDGs: An overview. *PLOS Sustainability and Transformation* 1(7): e0000020.
- Lavallo, C.; Aurambout, J.P. and Trombetti, M. (2015a): UI - Atmospheric emissions of PM10 (LUISA Platform REF2014). European Commission, Joint Research Centre (JRC) [Dataset] PID: <http://data.europa.eu/89h/jrc-luisa-ui-air-pm10-emissions-ref-2014>
- Lavallo, C.; Aurambout, J.P. and Trombetti, M. (2015b): UI - Atmospheric emissions of PM25 (LUISA Platform REF2014). European Commission, Joint Research Centre (JRC) [Dataset] PID: <http://data.europa.eu/89h/jrc-luisa-ui-air-pm25-emissions-ref-2014>
- Lavallo, C.; Jacobs-Crisioni, C. (2015): LF444 - Daily accessibility (LUISA Platform REF2014). European Commission, Joint Research Centre (JRC) [Dataset] PID: <http://data.europa.eu/89h/jrc-luisa-lf444-daily-accessibility-ref-2014>
- Lavallo, C.; Trombetti, M.; Pisoni, E. (2015): UI - Atmospheric emissions of CO2 (LUISA Platform REF2014). European Commission, Joint Research Centre (JRC) [Dataset] PID: <http://data.europa.eu/89h/jrc-luisa-co2-atmospheric-emissions-ref-2014>
- Le Blanc, D. (2015). Towards integration at last? The sustainable development goals as a network of targets. *Sustainable Development*, 23: 176-187.
- Lella, L., *Monitoring the SDGs in Piedmont region, Italy*, Stamos, I. editor(s), Publications Office of the European Union, Luxembourg, doi:10.2760/595669, JRC134399.
- Messner, F. and Meyer, V. (2005). Flood damage, vulnerability and risk perception—challenges for flood damage research. In: UFZ Discussion Papers 13/2005.
- Mrozowska, S. (2023) *Monitoring the SDGs in Pomorskie region, Poland*, Stamos, I. and Vega Rapun, M. editor(s), Publications Office of the European Union, Luxembourg, doi:10.2760/137116, JRC134402.
- Nilsson, M., Griggs, D. and Visbeck, M. (2016). Map the interactions between sustainable development goals, *Nature* 534: 320-322.
- OECD (2016a). CO2 emissions embodied in consumption. OECD, Directorate for Science, Technology and innovation.
- OECD (2016b). Marine Protected. Economics, Management and Effective Policy Mixes Areas. OECD Environment Directorate, December 2016. <https://www.oecd.org/environment/resources/Marine-Protected-Areas-Policy-Highlights.pdf>

- OECD (2020a), OECD Regions and Cities at a Glance 2020, OECD Publishing, Paris, <https://doi.org/10.1787/959d5ba0-en>.
- OECD (2020b), A Territorial Approach to the Sustainable Development Goals: Synthesis report, OECD Urban Policy Reviews, OECD Publishing, Paris.
- OECD (2023). PISA 2022 Assessment and Analytical Framework, PISA, OECD Publishing, Paris, <https://doi.org/10.1787/dfe0bf9c-en>.
- Ohnsorge, F. and Yu, S. eds. (2022). *The Long Shadow of Informality: Challenges and Policies*. Washington, DC: World Bank. doi:10.1596/978-1-4648-1753-3. License: Creative Commons Attribution CC BY 3.0 IGO.
- Osés-Eraso, N. (2023) *Monitoring the SDGs in Navarre region, Spain*, Stamos, I., Vega Rapun, M., editors, Publications Office of the European Union, Luxembourg, doi: 10.2760/841149, JRC134398.
- Pop, D. (2023). *Monitoring the SDGs in North-West Romania region, Romania*, Stamos, I. editor(s), Publications Office of the European Union, Luxembourg, doi:10.2760/457691, JRC134400.
- Pradhan, P., Costa, L., Rybski, D., Lucht, W. and Kropp, J. P. (2017). A systematic study of sustainable development goal (SDG) interactions, *Earth's Future* 5: 1169-1179.
- Quintanilla Cabañero, A. (2023). *Monitoring the SDGs in Andalusia region, Spain*, Stamos, I., Vega Rapun, M., editors, Publications Office of the European Union, Luxembourg, doi: 10.2760/728276, JRC134397.
- Tosun, J. and Leininger, J. (2017). Governing the Interlinkages between the Sustainable Development Goals: Approaches to Attain Policy Integration. *Global Challenges* 1, 1700036.
- Türker, M. (2023) *Monitoring the SDGs in TR33 region, Türkiye*, Stamos, I., Vega Rapun, M., editors, Publications Office of the European Union, Luxembourg, doi:10.2760/056317, JRC134404.
- Siragusa, A., Stamos, I., Bertozzi, C. and Proietti, P. (2022) *European Handbook for SDG Voluntary Local Reviews - 2022 Edition*, EUR 31111 EN, Publications Office of the European Union, Luxembourg, 2022, ISBN 978-92-76-53390-0, doi:10.2760/218321, JRC129381
- Strogylopoulos, G. (2023) *Monitoring the SDGs in North Aegean region, Greece*, Stamos, I. editor(s), Publications Office of the European Union, Luxembourg, doi:10.2760/628867, JRC134401.
- UN (2018). *Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development*. A/RES/71/313 (Annex). United Nations.
- Vega Rapun, M., Stamos, I., Siragusa, A. and Proietti, P. (2022). *REGIONS2030 – European regional SDG indicators*. Publications Office of the European Union, Luxembourg. doi:10.2760/850788, JRC131581.
- Vorisek, D. and Yu, S. (2020). Understanding the Cost of Achieving the Sustainable Development Goals. *World Bank Policy Research Working Paper*, 9146. World Bank Group.
- WHO (2021). *Comprehensive Mental Health Action Plan 2013–2030*. Geneva: World Health Organization. Licence: CC BY-NC-SA 3.0 IGO.

LIST OF ABBREVIATIONS AND DEFINITIONS

AROPE	At risk of poverty or social exclusion
BMI	Body Mass Index
BOD	Biochemical Oxygen Demand
COD	Chemical Oxygen Demand
CDD	Cooling Degree Day
DAC	Development Assistance Committee
DMC	Domestic Material Consumption
DMI	Direct Material Input
EEA	European Environmental Agency
EMAS	Eco-Management and Audit Scheme
EPAH	Energy Poverty Advisory Hub
EPO	European Patent Office
EPOV	European Energy Poverty Observatory
EU-SILC	European Union Statistics on Income and Living Conditions
FAO	Food and Agriculture Organization
FemAI	Female Achievement Index
FemDI	Female Disadvantage Index
FTE	Full-Time Equivalent
GDP	Gross Domestic Product
GERD	Gross Domestic Expenditure on R&D
GHG	Greenhouse Gases
GPP	Green Public Procurement
GVA	Gross Value Added
GWP	Global Warming Power
HDD	Heating Degree Day
ICD-10	International Statistical Classification of Diseases and Related Health Problems 10th Revision
ICT	Information and Communication Technologies
ISCED	International Standard Classification of Education
IPP	Integrated Product Policy
JRC	Joint Research Centre
ILO	International Labour Organization
NACE	Nomenclature statistique des Activités économiques dans la Communauté Européenne
NAP	National Action Plan
NEET	Not on Employment, Education or Training
ODA	Official Development Assistance

OECD	Organization for Economic Cooperation and Development
PCT	Patent Cooperation Treaty
PISA	Programme for International Student Assessment
PM	Particulate Matter
QGI/EQUI	Quality of Government Index/European Quality of Government Index
R&D	Research and Development
RUSLE	Revised Universal Soil Loss Equation
SCP	Sustainable consumption and production
SDG	Sustainable Development Goals
SMD	Severe Material Deprivation
SMSD	Severe Material and Social Deprivation
TES	Total Energy Supply
UAA	Utilised Agricultural Area
UN	United Nations
UNESCO	United Nations Educational Scientific and Cultural Organization
USLE	Universal Soil Loss Equation
VET	Vocational Education and Training
WEI+	Water Exploitation Index +
WHO	World Health Organization

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ANNEXES

Annex 1. Description of the 10 regions that participated in the project

North Aegean (Greece) – EL41



North Aegean is the second smallest Region in Greece with 194.136 inhabitants and the second least urban. It is in the north-eastern part of the Aegean and has a sea border with Turkey. It consists of 10 large (Lesvos, Chios), medium (Samos, Limnos, Ikaria) and small (Agios Efstratios, Oinousses, Psarra, Fourni and Thymaina) islands.

The region had to align its strategy and concrete actions to the five Policy Objectives of the EU, with the four objectives of the EPA 2021-2025, with the 5 Strategic Objectives of the 1st PPA 2021-2027 of PBA, with the 8 Priorities of the Operational Program "North Aegean" 2021-2027, with the achievement of the strategic options of the National Energy and Climate Strategy, the

National Transport Strategy and the National Digital Strategy.

A development strategy has been formulated for the North Aegean Region for the period 2021-2027. This strategy will be supported by various financial tools, including the ESPA 2021-2027, which will provide funding for the Regional Program of the North Aegean Region 2021-2027, as well as sectoral programs with geographically focused interventions under the Public Benefit Agreement (PBA). Additionally, the National Recovery Plan for the period 2021-2023, which includes inter-regional projects related to the North Aegean Region, and the National Development Program 2021-2025 will also contribute to financing the Regional Development Program of the North Aegean Region. Under the framework of the 'ESPA 2021-2017', the European Commission approved the Regional Program 'North Aegean 2021-2027' on August 29, 2022. Its strategic goal is to enhance the local planning and implementation, leveraging the full potential of the islands while promoting economic and social cohesion.

Western Macedonia (Greece) – EL53



The Region of Western Macedonia is a border region in Greece with a population of 254.595 inhabitants (2021) and a surface of 9.451 sq.m. It is the only enclosed region of Greece with no access to sea. The Region is an administrative unit of 1st degree, according to the Greek legislation of local self-government organizations. It is further divided in 12 Municipalities with a total of 226 settlements.

In July 2022 Greece presented its 2nd VNR (the 1st VNR was published in 2018) addressing all the SDGs and the progress towards the targets since 2018. A multitude of Strategies and financing Programmes for the 2021-2027 period, that are relevant to the SDGs, concern the Region of Western Macedonia and support its development path from a former lignite region to become the greenest Region of Greece. Most notably the Territorial Just Transition Plan Western Macedonia and the Programme Western Macedonia 2021-2027 will make available an unprecedented flow of financial resources exclusively for the Region to address almost all of the 17 SDGs.

The Region currently lacks a single monitoring system to accommodate indicators for all the SDGs. However, disconnected monitoring activities that are currently performed in or by the Region include data and indicators that are relevant to the SDGs targets. An overall mechanism for monitoring is expected to be installed in the short-term, through the creation of the Just Transition Observatory, which has already been announced in the framework of the Just Development Transition Programme 2021-2027 (not exclusively for the Region but also for other territorial units in Greece).

Navarra (Spain) – ES22



The Comunidad Foral de Navarra – Navarre (region ES22, according to NUT2 classification of the EU) is located in northern Spain. The area of this European region is 10,391 km² and its population in 2022 was 664,117 inhabitants.

Navarre has been working to align its policies and programs with the SDGs of the 2030 Agenda almost since its approval by the United Nations in 2015. Already in 2016, a

resolution of the Parliament of Navarre urged the regional government to work towards this alignment of policies and plans with the 2030 Agenda. In 2017, following this resolution, the Government of Navarre approved the creation of the so-called Interdepartmental Commission, a commission in charge of preparing a report on the policies, programs and actions of the Regional Government to meet the challenges of the 2030 Agenda. This report was published the following year and identifies domestic policies, planning instruments and legislative initiatives that are aligned with some of the targets of the different SDGs. Almost at the same time as this report was presented, the web viewer for monitoring the SDGs in Navarre was launched; it contains data, graphs and maps but also the reports published by the region on the SDGs. Navarre has conducted two monitoring reports on progress towards the SDGs, the first in 2020 (Gobierno de Navarra, 2020) and the second in 2021 (Gobierno de Navarra, 2021a). Over the last year, the region has been working on the strategy for the sustainable development of Navarre and the fulfilment of the sustainable development goals (SDG) of the 2030 Agenda, known as *Sustainable Navarre Strategy* (Gobierno de Navarra, 2023). The goal of this strategy is to establish procedures for the comprehensive evaluation of the effect that the different public policies of the Autonomous Community of Navarre have on sustainability, both in terms of design (ex-ante) and results (ex-post).

Andalucía (Spain) – ES61



Andalucía is a region situated in Southern Spain, administratively an Autonomous Community, divided into eight provinces (Almería, Granada, Jaén, Córdoba, Málaga, Sevilla, Cádiz and Huelva). It is the most populated (8.472.407 inhabitants in 2021), the second largest (87.599 km²) and the third one in GDP (160.747 ME) in the country. A predominantly agricultural area in the past, Andalucía main activities are currently in the service sector. The weight of tourism is particularly remarkable, estimated at 6,5 % of GDP in 2021.

The region has had a long tradition on the implementation and commitment with the 2030 Agenda since its approval in 2015. A first step towards the adoption of the Agenda is the 'Andalusian Sustainable Development Strategy' (Estrategia Andaluza de Desarrollo Sostenible, EADS), which was approved in June 2018. In December 2021, a Delegate Commission for the 2030 Agenda was created in order to plan, promote and coordinate actions for the effective implementation of the 2030 Agenda, and the evaluation of their contribution to the achievement of the SDGs. In July 2021, the Government of Andalucía released 'The Andalusian Path on the 2030 Agenda' (La Senda Andaluza en la Agenda 2030), a thorough report mapping all the activities in execution by the Regional Ministries and Entities towards the implementation of the SDGs, sketching their contribution and including SDG targets aligned to each budgetary program.

The main effort by Andalucía in terms of regional SDG monitoring is the development of the Andalusian Sustainable Development Indicators System for the 2030 Agenda. Its aim is to establish a framework of statistical indicators, based on those established by the United Nations and by the Statistical Office of the European Union (Eurostat), in order to monitor the objectives and goals of the 2030 Agenda at Regional level. The system is currently composed of 276 indicators covering all the SDGs.

Piemonte (Italy) – ITC1



Piemonte is an internal region located in the North-West part of Italy. This is a landlocked area, with no direct access to the sea, adjacent to France and Switzerland.

The region is divided into 7 provinces and 1 metropolitan city (established in 2015); the capital of the region is Torino. The region is characterized by a very high number of municipalities (1.181), 28% of which are located in mountain areas.

The Piemonte landscape is very heterogeneous not only from the morphological point of view (43,2% of the territorial surface is covered by mountains, 30,3% by hills and 26,5% by plain), but also in relation to its socio-economic traits and its environmental features. It is a diversified territory, including urban (with medium and large cities), mountain and rural areas.

The Piemonte Region, in coherence with the National Sustainable Development Strategy and the objectives of the 2030 Agenda, approved its own Regional Sustainable Development Strategy (RSDS) in 2022. The RSDS is structured in Macro-Areas and in Strategic Objectives with targets and indicators associated to them. A "coherence matrix" connects the RSDS measures to the core economic programming tools as well as to the NSDS and the 2030 Agenda. The Strategy document is accompanied by a document-annex "Tools for monitoring

the SRSvS - Methodology and Indicators" (Annex 2 of the RSDS), in which the indicators, selected on a regional scale for monitoring the sustainability goals that the Region itself has set through its Strategy, are analyzed and described.

Puglia (Italy) – ITF4



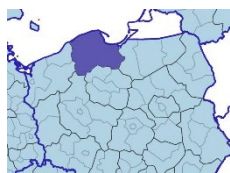
provinces.

The region of Puglia is situated in the Southeast of Italy and covers an area of 19 363 km². Puglia hosts about 4 million inhabitants (6% of the Italian population) with a high population density (around 210 inhabitants/ km²) being one of the most densely populated regions in Italy. The population is distributed among 257 municipalities, 10% of which exceed 25 thousand inhabitants, with one Metropolitan City (Bari) and 5

The local government, was the first in Italy to adopt the Equitable and Sustainable Well-being indicators (BES) to analyse the effects of economic decisions, incorporating them into the financial and budgetary planning of the Region (Regional Law No. 47/2019). BES indicators and the SDGs have many points of contact as they both contribute to provide a quality information base and to measure wellbeing and sustainable development. Puglia started to build its own Regional Sustainable Development Strategy (RSDvS) in April 2019. The definition of the system of Regional Sustainable Development Goals (RSDGs) of Puglia moves within the framework defined by the Regional Government Program, adopted on November 26, 2020, with which the Regional Council outlined the strategies and policies to combine competitiveness, attractiveness and solidarity, as requested both by the 2030 Agenda and the National Strategy for Sustainable Development.

In addition, the Region of Puglia presented its VLR with 9 other Italian Regions together with VNR Italy on July 15, 2022 at the High-Level Political Forum of the United Nations in New York.

Pomorskie (Poland) – PL63



Pomorskie region is located in northern Poland. It occupies an area of 1,831,34 ha (6% of the country's area). The seat of the voivodeship authorities is Gdańsk. The administrative division of the Pomorskie region is as follows: 4 cities with county rights, 16 counties, 25 urban municipalities, 17 urban-rural municipalities, 81 rural municipalities. The number of inhabitants in 2020 amounted to 2,346,717 people.

At the national level, the key document through which the 2030 Agenda and its Sustainable Development Goals are implemented in Poland is the Strategy for Responsible Development (SRD), adopted by the Council of Ministers on 14 February 2017. At the regional level, according to the information obtained from the Department of Regional and Spatial Development of Office of the Marshal of the Pomorskie Voivodeship, monitoring is carried out as part of the Pomorskie Monitoring and Evaluation System operating in the Pomorskie region (PSME). As part of the Pomorskie Monitoring and Evaluation System, an internal monitoring platform was created, where each strategic document in the region has a separate system of indicators.

The SDGs are monitored both while monitoring the execution of the Strategy of the Pomeranian Voivodeship 2030 and the five Regional Strategic Programs.

Centro (Portugal) – PT16



a crucial role in the country's development and progress.

The Centro Region of Portugal, situated in the heart of the country, is renowned for its diverse landscapes, vibrant cities, and rich cultural heritage. The Centro Region is one of the seven main regions of Portugal, located in the central part of the country. It is composed of eight sub-regions (NUTS III) and 100 municipalities, with a total population of 2.2 million inhabitants. As a significant administrative division within Portugal, the Centro Region plays

Aligned with the global commitment to sustainable development, the Centro Region has embraced the 2030 Agenda for Sustainable Development, and its 17 Sustainable Development Goals (SDGs) to be achieved by 2030. The Centro Regional Coordination and Development Commission (CCDR Centro) is a regional public institution responsible for promoting development and coordinating policies in the Centro Region. As a regional public institution operating under the authority of the Portuguese Ministry of Territorial Cohesion, the CCDR

Centro is dedicated to promote balanced and sustainable development throughout the Centro Region, working in collaboration with local authorities, organizations, and other stakeholders.

After aligning its vision with the SDGs, the regional authority planned to establish a monitoring framework for the 2030 Agenda at the regional level. It has actively been monitoring regional, national, and European strategies for a significant period and developed a digital platform called Data Centro in 2012, showcasing over 1000 regional indicators.

Nord-Vest (Romania)- R011

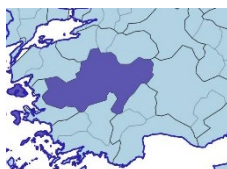


The Nord-Vest region, one of the eight regions at NUTS2 level (development regions) in Romania, was established through the association of 453 local and county governments from six counties. In terms of territorial administrative units, the region has 49 urban settlements (6 county head municipalities, 12 municipalities and 25 towns) and 404 rural settlements (communes). The total population of the region amounted to 2,831,263 inhabitants in 2021, of which 53.94% lived in urban areas, while 46.06% in rural areas.

With the adoption of the 2030 Agenda for Sustainable Development in 2015 by all United Nations (UN) Member States, Romania also committed to achieving the 17 SDGs with 169 specific targets. Romania's Sustainable Development Strategy 2030, adopted by the Government in November 2018, was designed with the involvement of all relevant stakeholders. The Strategy was meant to be "the basis for the future sectoral, regional, and local strategies", but it does not specify that regional authorities are required to design an SDG strategy of their own. Such policy measures continue to be adopted at either national or local governance level.

Thus, while regional development plans cover some SDGs, Nord-Vest has no standalone regional SDG strategy. Measures and strategies have not yet been implemented to encourage and support development regions in monitoring the SDGs. Most of the data relevant for monitoring SDG achievement are still reported at country or local level only. This constitutes a major challenge in conducting a review for Nord-Vest (or for any other development region in Romania).

Manisa, Afyonkarahisar, Kutahya, Usak (Turkey) – TR33



The TR33 Region located in the Northern Aegean part of Türkiye consists of 4 provinces: Afyonkarahisar, Kütahya, Manisa and Uşak. The region is governed by Zafer Development Agency (hereinafter ZAFER), one of 26 regional development agencies in Türkiye.

Sustainability efforts accelerated in Türkiye after the announcement of Sustainable Development Goals (SDGs). Türkiye was one of the first countries to publish a Voluntary National Review (VNR), in 2016 and 2019 respectively. Türkiye's VNRs emphasized the government's commitment to contribute to a sustainable future through the adoption of the 2030 Agenda. The last six Development Plans in Türkiye were based on sustainable development. In particular, the green growth approach was mainstreamed in the 10th and 11th Development Plans, in addition to sectoral and thematic policy and strategy documents. Practically every ministry in Türkiye works to align the SDGs of its policy and strategies.

Regional sustainability efforts follow national vision goals in the TR33 Region. The TR33 Regional Plan (2024-2028) was prepared in alignment with SDGs for regional policy, with each strategy aiming to increase income in rural areas, improve the participation of disadvantaged groups and facilitate the transformation of green industry technology. On the other hand, ZAFER designed policies to ensure regional sustainability through not only the TR33 Regional Plan but also the TR33 Innovation Strategy (2013), Gender Equality Plan (2021), Local Economic Development Programs (YEGEP) (2015, 2016 and 2019), and TR33 Strategy & Action Plan for Entrepreneurship (2019).

Note: The texts are taken from the technical reports of the pilot regions.

Annex 2. The individual indicators available at the regional level

Table 29 - Available indicators at the regional level (from the JRC proposal), from EU or other sources

FIT for PURPOSE indicators with available data at the regional level (NUTS2)											
n.	JRC Indicators	North Aegean (Greece)	W. Macedonia (Greece)	Navarra (Spain)	Andalucía (Spain)	Piemonte (Italy)	Puglia (Italy)	Pomorskie (Poland)	Centro (Portugal)	Nord-Vest (Romania)	T33 (Turkey)
1	Persons living in households with very low work intensity	x	x	x	x	x	x	x	x	x	
2	Affected people due to disasters		A	x	A	A	A		x		x
3	Material and social deprivation	x	x	A	x	A	A	x	x	x	
4	Persons at risk of poverty or social exclusion	x	x	x	x	x	x	x	x	x	
5	Gross Value Added (GVA) of agriculture, livestock and fishing	x	x	x	x	x	x	x		x	
6	Organic farming: areas with different crops	x	x	x	x	A	x		x		A
7	Productivity (Gross Value Added per worker) in agriculture, forestry and fishing	x	x	x	x	x	x	x	x	x	x
8	Overweight rate			x	x	x	x	x	x		
9	Deaths due to Covid-19	x	x	A	x	x	x	x	A		x
10	Self reported unmet needs for medical examination	x	x	x	x	A	x	x		x	
11	Health personnel	x	x	x	x	x	x	x	x	x	x
12	Hospital beds	x	x	x	x	x	x	x	x	x	x
13	Infant mortality	x	x	x	x	x	x	x	x	x	x
14	Women 30-34 years old with higher education level	x	x	x	x	x	x	x	x		A
15	Students enrolled in tertiary education	x	x	x	x	x	x	x	x	x	x
16	Participation in education	x	x	x	x	x	x	x	x	x	x
17	Pupils enrolled in early childhood education	x	x	x	x	x	x	x	x	x	x
18	Early leavers from education and training	x		x	x	x	x	x	x	x	x
19	Participation rates in selected education levels	x	x	x	x	x	x	x	x	x	x
20	Distribution of pupils and students enrolled in general and vocational programmes	x	A	x	x	x	x	x	x		x
21	Fatal victims of gender-based violence at the hands of their partners or expartners			x	x	x	x		x		
22	Victims of violence against women	A		x	x	x	x		x		
23	Female research and development personnel			x	x	x	x	x	x	x	
24	Inactive population rate due to caregiving responsibilities	A	A	x	x		A	x	x		A
25	Women in parliament and government	x	x	x	x	x	x	x	x	x	A
26	Female achievement/disadvantage index	x	x	x	x	x	x	x	x	x	
27	Gender gap in part-time employment incidence	A	x	x	x	x	x		x	x	x
28	Water bodies that exceed a standardized quality rating	x	x	x	x	A	x		x	x	

29	Groundwater that exceed a standardized quality rating		x		x	A	x		x		
30	Population served by safely managed drinking water supply services			x	A	A	A	x	x		A
31	Population connected to wastewater with at least secondary treatment	A			x	A	A	x	x		A
32	Electricity production that comes from nuclear power				x						
33	Electricity production that comes from renewable sources		A	x	x	x	x	x	x		x
34	Energy intensity			x	x	x	x	x	x		
35	People affected by energy poverty	x	x	x	x		A		x		
36	Occupational accidents	x	x	x	x	x	x	x	x	x	
37	Economic activity	x	x	x	x	x	x	x	x	x	x
38	Unemployment	X	x	x	x	x	x	x	x	x	x
39	Firm creation	x	A		x	x	x		x	x	
40	Employment	x	x	x	x	x	x	x		x	x
41	GDP at current market prices	x	x	A	x	x	x	x	x	x	x
42	GVA at basic prices	x	x	A	x	x	x	x		x	x
43	Long-term unemployment (12 months and more)	x	x	x	x	x	x	x	x		x
44	Compensation of employees	x	x	A	x	x	x	x	x	x	
45	Young people neither in employment nor in education and training	x	x	x	x	x	x	x	x		x
46	GVA of the industry with respect to the GVA of the total sectors (current price)	x	x	x	x	A	x	x	x	x	
47	Gross Domestic Expenditure on R&D	x	x	x	x	x	x	x	x	x	
48	R&D personnel and researchers	x	x	x	x	x	x	x	x	x	x
49	Employment in high-technology manufacturing as a percentage of total manufacturing employment		A	x	x	x	x	x	x	x	x
50	Patent applications to the EPO	x		x	x	x	x	x	x		
51	Unemployment of people with disabilities		A	x	x	A	A	x			x
52	Gini index of disposable income (after taxes and transfers)	A	A	x	x	x	x	x	x		A
53	Households expenses dedicated to housing costs	x	x	x	x	x	x	x	x		x
54	Transport performance	x	A			x	A				x
55	Daily accessibility	x	x	x		x	x	x	x	x	
56	Stock of vehicles (passenger cars)	x	x	x	x	x	x	x		x	x
57	Difference between built-up area growth rate and population growth rate		A	x	A	A	A		x	x	
58	Land use	x				x	x	x			x
59	PM2.5 Emissions	x	x	x	x	x	x	x	x	x	A
60	Household and commercial waste generation per inhabitant	x	x	A	x	x	x	x	x		A
61	Victims in road accidents	x	x	x	x	x	x	x	x	x	x
62	Carbon footprint				x	A	A		x		

63	Food waste	A			A		A				
64	Hazardous Waste		x	x	x	x	x	x	x		
65	PM10 Emissions	x	x	x	x	x	x		x	x	
66	CO2 Emissions	x	x	x	x	x	x	x	x	x	x
67	Greenhouse Gas Emissions	x		x	x	x	x		x		x
68	Cooling and heating degree days	x	x	x	x	x	x	x	x	x	x
69	Estuarine with high/very high water quality				x		A		x		
70	Protected coastal area as a percentage of total coastal area				A		A		x		
71	Coastal areas with good/very good water quality	x			x		A		x		
72	Terrestrial protected areas as a percentage of total area		x	x	A	x	x	x	x	x	
73	Estimated soil erosion	x	x	x	x	x	x	x	x	x	
74	Land Abandonment	x	x	x	A	x	x		x	x	
75	Forest area over total surface area	x	x	x	x	x	x	x	x	x	
76	Transparency index				x	A	A				
77	Participation in the last elections	x	x		x	x	x	x	x	x	x
78	Quality of Government Index	x	x	x	x	x	x	x	x	x	
79	Extract from QGI an indicator on corruption	x	x	x	x	x	x	x	x	x	
80	Official Development Assistance			x	x					x	x
81	Imports from developing countries			x	x	x	x		x		
82	PCT co-patent applications that are done with foreign regions			x	x	x	x	x	x	x	x
83	Individuals who used the internet for interaction with public authorities	x	A	x	x	x	x	x	x	x	
Tot_Indicators FfP		56	51	64	73	62	66	60	70	47	35
	Tot_EU sources	40	38	36	7	46	39	22	18	40	29
	Tot_Different sources (national, regional, local)	16	13	28	66	16	27	38	52	9	6
Tot_Alternative indicators (A) (tab.4)		6	11	6	7	13	15	0	1	0	9
TOT AVAILABLE INDICATORS		62	62	70	80	75	81	60	71	49	44

Source: authors' own elaboration

When the indicator is deemed "fit for purpose," but regional-level data is not available, the regions opt to utilize an "alternative" indicator to substitute the original indicator proposed by the JRC, predominantly choosing indicators from national/regional/local sources. Below are the alternative indicators to those proposed by the JRC, as suggested by the 10 pilot regions.

Annex 3. Key metadata for the indicators used by the regions for each analyzed target



SDG 1 – NO POVERTY

From the dataset proposed by the JRC, for SDG1, 4 indicators are suggested, which cover three SDG targets:

- Target 1.1 extreme poverty, 1 indicator: Material and social deprivation
- Target 1.2 reduce poverty, 2 indicators: Persons living in households with very low work intensity and Persons at risk of poverty or social exclusion
- Target 1.5 exposure to vulnerability, 1 indicator: Affected people due to disasters

Material and social deprivation, Persons living in households with very low work intensity and Persons at risk of poverty or social exclusion, are official indicators, available from European sources (Eurostat, Regional Statistics). Affected people due to disasters is an experimental indicator (case study for the JRC).

Material and social deprivation (1.1). Five regions (North Aegean, Western Macedonia, Pomorskie, and Nord-Vest) have chosen to maintain the European source, while the others (Andalucía, Navarra, Piemonte, Puglia and Centro) have opted for the same indicator or proxies (severe material deprivation or severe material and social deprivation) from national/regional sources. For one region, Manisa, Afyonkarahisar, Kutahya, Usak, the indicator is considered fit for the purpose but there aren't available data at the regional level, so the indicator is excluded in the analysis of T33 region.

Persons living in households with very low work intensity (1.2). This is an official indicator; seven regions have confirmed the indicator proposed by the JRC and available from European sources (Eurostat, Regional Statistics), except for two regions (Andalucía and Centro) that opted for data from national or regional sources. In this case as well, Region T33 is excluded, as regional-level data for this region are not available.

Persons at risk of poverty or social exclusion (1.2). This is an official indicator; six regions have confirmed the indicator proposed by the JRC and available from European sources (Eurostat, Regional Statistics), except for three regions (Andalucía, Pomorskie and Centro) that opted for data from national or regional sources. In this case as well, Region T33 is excluded, as regional-level data for this region are not available.

Affected people due to disasters (1.5). This is a particular case; it is an experimental indicator, proposed by the JRC as a case study. Some regions used an available indicator from national source: Navarra and Andalucía (Spain) measured deaths attributed to natural disasters, as a number of people killed directly attributed to disasters per 100,000 inhabitants; and Centro (Portugal) used the rate of deaths and directly affected persons attributed to disasters per 100,000 inhabitants. Other regions employed different indicators, often alternative indicators, from national sources: Piemonte and Puglia (Italy) opted to utilize the percentage of population exposed to water floods and to landslides (Piemonte). However, as demonstrated by regions such as Western Macedonia (Greece) and Manisa, Afyonkarahisar, Kutahya, Usak (Turkey) there is a European indicator from the OECD that focuses on the population exposed to at least one forest fire (%). This is very useful but it does not encompass other types of disasters. For these reasons, the indicator should be better defined and as Navarra suggests, beyond deaths due to disasters, an interesting indicator to analyse whether regions are reducing exposure and vulnerability is the proportion of people and/or areas exposed to these events (heat waves, fires, floods). Hazard, exposure, vulnerability and risk go beyond deaths due to extreme events (Foudi et al., 2015).

SDG Target 1.1 EXTREME POVERTY

By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than \$1.25 a day.

Indicator: Material and social deprivation

Proportion of people living in households with severe material and social deprivation, deprived in at least seven of the following list of thirteen items (new definition 2021 – Europe 2030 target):

cannot afford to go on holiday for at least one week per year, cannot afford a meal of meat, poultry or fish at least every second day, cannot afford to keep the dwelling at an adequate temperature, do not have the ability to meet unforeseen expenses, have had delays in the payment of expenses related to the main dwelling (mortgage or rent, gas bills, community fees, etc.) or instalment purchases in the last 12 months, cannot afford a car, cannot replace damaged or old furniture, cannot afford to replace damaged clothes with new ones, cannot afford to have two pairs of shoes in good condition, cannot afford to meet friends/family for a meal or a drink at least once a month, cannot afford to participate regularly in leisure activities, cannot afford to spend a small amount of money on himself/herself, cannot afford internet connection.

In this case, Navarra, Piemonte, Puglia have opted for alternative indicator from national sources: Severe material deprivation (Piemonte and Puglia) and Severe material and social deprivation (Navarra).

Table 30 – Material and social deprivation

SDG 1 END POVERTY IN ALL ITS FORMS EVERYWHERE				
From the JRC dataset	SDG Target(s)	1.1 (extreme poverty)		
	Indicator Name	Material and social deprivation		
	Type	Official		
	Coverage	EU-27 plus others		
	Source	European Union Statistics on Income and Living Conditions (EU-SILC)		
	Unit of measurement	Rate		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Material and social deprivation	European Union Statistics on Income and Living Conditions (EU-SILC) (EU)	2018-2022	Percentage
<i>Western Macedonia</i>	Material and social deprivation	European Union Statistics on Income and Living Conditions (EU-SILC) (EU)	2018-2021	Percentage
<i>Navarra</i>	Severe material and social deprivation	Eurostat, Regional Statistics (EU)	2014-2021	Percentage
<i>Andalucía</i>	Material and social deprivation	INE - Living Conditions Survey (N/R)	2015-2021	Percentage
<i>Piemonte</i>	Severe material deprivation	ISTAT (N/R)	2004-2021	Percentage
<i>Puglia</i>	Severe material deprivation	ISTAT (N/R)	2004-2021	Percentage
<i>Pomorskie</i>	Material and social deprivation	Eurostat, Regional Statistics (EU)	2019-2022	Percentage
<i>Centro</i>	Material and social deprivation	Statistics Portugal, Statistics on income and living conditions (N/R)	2018-2021	Percentage
<i>Nord-Vest</i>	Material and social deprivation	Eurostat, Regional Statistics (EU)	2014-2021	Rate
<i>TR33</i>	Not available			

Source: authors' own elaboration

SDG Target 1.2 REDUCE POVERTY

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.

Indicator: Persons living in households with very low work intensity

Proportion of persons aged 0-64 living in jobless households or in households with low employment intensity (households in which working-age members worked less than 20% of their total working potential in the year preceding the survey year) (new definition 2021 - Europe 2030 target).

Table 31 - Persons living in households with very low work intensity

SDG 1 END POVERTY IN ALL ITS FORMS EVERYWHERE				
From the JRC dataset	SDG Target(s)	1.2 (reduce poverty)		
	Indicator Name	Persons living in households with very low work intensity		
	Type	Official		
	Coverage	EU-27 plus others		
	Source	Eurostat, Regional Statistics		
	Unit of measurement	Percentage		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Persons living in households with very low work intensity	Eurostat, Regional Statistics (EU)	2018-2022	Percentage
<i>Western Macedonia</i>	Persons living in households with very low work intensity	Eurostat, Regional Statistics (EU)	2018-2021	Percentage
<i>Navarra</i>	Persons living in households with very low work intensity	Eurostat, Regional Statistics (EU) and OCECAS (N)	2004-2021	Percentage
<i>Andalucia</i>	Persons living in households with very low work intensity	INE - Living Conditions Survey (N/R)	2015-2021	Percentage
<i>Piemonte</i>	Persons living in households with very low work intensity	Eurostat, Regional Statistics (EU)	2017-2021	Percentage
<i>Puglia</i>	Persons living in households with very low work intensity	Eurostat, Regional Statistics (EU)	2004-2021	Percentage
<i>Pomorskie</i>	Persons living in households with very low work intensity	Eurostat, Regional Statistics (EU)	2019-2022	Percentage
<i>Centro</i>	Proportion of resident population with less than 65 years of age living in households with very low work intensity per capita	Statistics Portugal, Statistics on income and living conditions (N/R)	2017-2021	Percentage
<i>Nord-Vest</i>	Persons living in households with very low work intensity	Eurostat, Regional Statistics (EU)	2007-2020	Percentage
<i>TR33</i>	Not available			

Source: authors' own elaboration

SDG Target 1.2 REDUCE POVERTY

By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than \$1.25 a day.

Indicator: Persons at risk of poverty or social exclusion

Abbreviation AROPE. The AROPE rate is the proportion of people who are in at least one of the three criteria of risk of poverty or social exclusion: at risk of relative poverty (considering the national poverty line), living in households with severe material deprivation or living in households with low work intensity..

Table 32 - Persons at risk of poverty or social exclusion

SDG 1 END POVERTY IN ALL ITS FORMS EVERYWHERE				
From the JRC dataset	SDG Target(s)	1.2 (reduce poverty)		
	Indicator Name	Persons at risk of poverty or social exclusion		
	Type	Official		
	Coverage	EU-27 plus others		
	Source	Eurostat, Regional Statistics		
	Unit of measurement	Rate		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Persons at risk of poverty or social exclusion	Eurostat, Regional Statistics (EU)	2018-2020	Percentage
<i>Western Macedonia</i>	Persons at risk of poverty or social exclusion	Eurostat, Regional Statistics (EU)	2018-2021	Rate
<i>Navarra</i>	Persons at risk of poverty or social exclusion AROPE	Eurostat, Regional Statistics (EU) and OCECAS (N)	2004-2021	Percentage
<i>Andalucia</i>	Persons at risk of poverty or social exclusion	INE - Living Conditions Survey (N/R)	2015-2021	Percentage
<i>Piemonte</i>	Persons at risk of poverty or social exclusion	Eurostat, Regional Statistics (EU) and ISTAT (N)	2016-2021	Rate
<i>Puglia</i>	Persons at risk of poverty or social exclusion	Eurostat, Regional Statistics (EU)	2004-2020	Rate
<i>Pomorskie</i>	Persons at risk of poverty or social exclusion	Local Data Bank (N)	2005-2019	Percentage
<i>Centro</i>	Proportion of resident population at risk of poverty or social exclusion	Statistics Portugal, Statistics on income and living conditions (N/R)	2018-2021	Percentage
<i>Nord-Vest</i>	Persons at risk of poverty or social exclusion	Eurostat, Regional Statistics (EU)	2007-2020	Rate
<i>TR33</i>	Not available			

Source: authors' own elaboration

SDG Target 1.5 EXPOSURE TO VULNERABILITY

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.

Indicator: Affected people due to disasters

In this case, it is an experimental indicator, proposed by the JRC as a case study. Some regions used an available indicator from national source: Navarra and Andalucia (Spain) measured deaths attributed to natural disasters per 100,000 inhabitants; and Centro (Portugal) used the rate of deaths and directly affected persons attributed to disasters per 100,000 inhabitants.

Other regions employed different indicators, often alternative indicators, from national sources: Piemonte and Puglia (Italy) opted to utilize the percentage of population exposed to water floods and to landslides (Piemonte).

However, as demonstrated by regions such as Western Macedonia (Greece) and Manisa, Afyonkarahisar, Kutahya, Usak (Turkey) there is a European indicator from the OECD that focuses on the population exposed to at least one forest fire (%). This is very useful but it does not encompass other types of disasters.

Table 33 - Affected people due to disasters

SDG 1 END POVERTY IN ALL ITS FORMS EVERYWHERE				
From the JRC dataset	SDG Target(s)	1.5 (exposure to vulnerability)		
	Indicator Name	Affected people due to disasters		
	Type	Experimental		
	Coverage			
	Source	Case study		
	Unit of measurement	Ratio		
	Frequency			
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	Not available			
Western Macedonia	Population exposed to at least one forest fire	OECD (EU)	2001-2021	Percentage
Navarra	Affected people due to disasters	OCECAS (N/R)	2010-2020	Rate (deaths per 100,000 inhabitants)
Andalucia	Affected people due to disasters	IECA (N/R)	2015-2021	Rate (deaths per 100,000 inhabitants)
Piemonte	Population exposed to water floods and to landslides	ISPRA (N/R)	2015, 2016, 2020	Percentage
Puglia	Population exposed to water floods	ISPRA (N/R)	2015, 2016, 2020	Percentage
Pomorskie	Not available			
Centro	Deaths, missing persons and directly affected persons attributed to disasters per 100,000 inhabitants	ANEP, Operational Decision Support System (SADO) (N/R)	2021	Rate
Nord-Vest	Not available			
TR33	Population exposed to at least one forest fire	OECD (EU)	2001-2021	Percentage

Source: authors' own elaboration



SDG 2 - ZERO HUNGER, FOOD SECURITY AND SUSTAINABLE AGRICULTURE

For the SDG2 the JRC suggested four indicators, which cover three SDG targets:

- Target 2.2 end malnutrition, 1 indicator: Overweight rate
- Target 2.3 agricultural productivity, 2 indicators: Gross Value Added (GVA) of agriculture, livestock and fishing and Productivity (Gross Value Added per worker) in agriculture, forestry and fishing
- Target 2.4 sustainable food production, 1 indicator: Organic farming: areas with different crops

In the JRC proposal dataset, Productivity (Gross Value Added per worker) in agriculture, forestry, and fishing is an experimental indicator, while the others are official indicators. The only available data from European sources are for Organic farming: areas with different crops (from Eurostat) and Productivity (Gross Value Added per worker) in agriculture, forestry, and fishing (from OECD database), indeed, quite often, regions have preferred to use national or regional sources.

Overweight rate (2.2). The indicator suggested by the JRC is official but not available from European source. Therefore, six regions opted to data available from national or regional statics except for North Aegean, Western Macedonia, Nord-Vest and T33 regions.

Gross Value Added (GVA) of agriculture, livestock and fishing (2.3). In the JRC proposal, this is an official indicator but no European source is identified as useful for this purpose. All the regions (that have found available data at the regional level) chose data from national sources, except for Western Macedonia which has used data from Eurostat.

Productivity (Gross Value Added per worker) in agriculture, forestry and fishing (2.3). Even though this is an experimental indicator, data are available from OECD, and four regions - Piemonte, Puglia, Navarra, and Manisa, Afyonkarahisar, Kutahya, Usak - chose this European source; Western Macedonia analyzed data from Eurostat; Andalucia, North Aegean, Pomorskie, and Centro chose national/regional sources.

Organic farming: areas with different crops (2.4). The indicator is official and available from European source (Eurostat) but all the regions used data from national sources, except Pomorskie and Nord-Vest (for them the indicator is fit for purpose but without available data at the regional level). For example, Piemonte opted for alternative indicator from national sources (Share of utilised agricultural area cultivated with organic crops), because, although the Eurostat data are available at the regional level, they are not updated (the most recent available year is 2007).

SDG Target 2.2 END MALNUTRITION

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, pregnant and lactating women and older persons.

Indicator: Overweight rate

Proportion of children between 2 and 17 years of age with obesity, overweight or underweight. A person is considered obese when BMI is equal to or higher than 30 kg/m². Body mass index (BMI) is calculated from the respondent's self-reported weight and height (weight/height²).

Table 34 - Overweight rate

SDG 2 END HUNGER, FOOD SECURITY AND SUSTAINABLE AGRICULTURE				
From the JRC dataset	SDG Target(s)	2.2 (end malnutrition)		
	Indicator Name	Overweight rate		
	Type	Official		
	Coverage	Sweden		
	Source	Public Health Agency of Sweden		
	Unit of measurement	Share		
	Frequency	4 years		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	Not available			
Western Macedonia	Not-fit for purpose			
Navarra	Overweight rate	OCECAS (N/R)	2012, 2017	Percentage
Andalucia	Overweight rate	INCLASNS (N/R)	2017, 2020	Percentage
Piemonte	Overweight rate	ISTAT (N/R)	2001-2021	Share (*100 persons)
Puglia	Overweight rate	ISTAT (N/R)	2001-2021	Share
Pomorskie	Overweight rate	Statistics Poland (N/R)	2019	Percentage
Centro	Proportion of resident population with 18 and more years old with overweight or obesity	Statistics Portugal, National health survey (N/R)	2014, 2019	Percentage
Nord-Vest	Not available			
TR33	Not available			

Source: authors' own elaboration

SDG Target 2.3 AGRICULTURAL PRODUCTIVITY

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.

Indicator: Gross Value Added (GVA) of agriculture, livestock and fishing

Gross value added is the difference between production and intermediate consumption by industry. It is also equal to the sum of primary incomes generated in the production process; thus, gross value added is equal to the sum of compensation of employees, consumption of fixed capital, net operating surplus/net mixed income and other taxes minus subsidies on production. This makes it possible to check the consistency of the measurement of GDP according to the income approach with the measurement of GDP according to the production approach.

Table 35 - Gross Value Added (GVA) of agriculture, livestock and fishing

SDG 2 END HUNGER, FOOD SECURITY AND SUSTAINABLE AGRICULTURE				
From the JRC dataset	SDG Target(s)	2.3 (agricultural productivity)		
	Indicator Name	Gross Value Added (GVA) of agriculture, livestock and fishing		
	Type	Official		
	Coverage	Basque county		
	Source	Eustat (Instituto Vasco de Estadística)		
	Unit of measurement	Number		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	Gross Value Added (GVA) of agriculture, livestock and fishing	ELSTAT (N/R)	2000-2020	Number
Western Macedonia	Gross Value Added (GVA) of agriculture, livestock and fishing	Eurostat, Regional Statistics (EU)	2000-2021	Number
Navarra	Gross Value Added (GVA) of agriculture, livestock and fishing	Nastat (N/R)	2005-2020	Number (thousand €)
Andalucia	Gross Value Added (GVA) of agriculture, livestock and fishing	INE - Annual National Accounts for Spain (N/R)	2015-2021	€/UTA
Piemonte	Gross Value Added (GVA) of agriculture, livestock and fishing	ISTAT (N/R)	2000-2021	Milions of €
Puglia	Gross Value Added (GVA) of agriculture, livestock and fishing	ISTAT (N/R)	2000-2021	Milions of €
Pomorskie	Gross Value Added (GVA) of agriculture, livestock and fishing	Local Data Bank (N/R)	2000-2020	Milions of €
Centro	Gross Value Added (GVA) of agriculture, livestock and fishing – not fit for purpose redundant*	Statistics Portugal, Regional economic accounts (N/R)	1995-2021	€
Nord-Vest	Gross Value Added (GVA) of agriculture, livestock and fishing	Romanian Statistical Institute (N/R)	2007-2021	Number (Thousands of lei)
TR33	Not available			

Source: authors' own elaboration

*Centro - Since there is already an existing indicator that measures agricultural sector productivity (Productivity (Gross Value Added per worker) in agriculture, forestry, and fishing), this one may be redundant and will be overlooked for Centro Region.

SDG Target 2.3 AGRICULTURAL PRODUCTIVITY

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.

Indicator: Productivity (Gross Value Added per worker) in agriculture, forestry and fishing

The Gross Value Added is the difference between production and intermediate consumption by industry. It is also equal to the sum of primary incomes generated in the production process; thus, gross value added is equal to the sum of compensation of employees, consumption of fixed capital, net operating surplus/net mixed income and other taxes minus subsidies on production.

Table 36 - Productivity (Gross Value Added per worker) in agriculture, forestry and fishing

SDG 2 END HUNGER, FOOD SECURITY AND SUSTAINABLE AGRICULTURE				
From the JRC dataset	SDG Target(s)	2.3 (agricultural productivity)		
	Indicator Name	Productivity (Gross Value Added per worker) in agriculture, forestry and fishing		
	Type	Experimental		
	Coverage	OECD countries and other European countries		
	Source	Organisation for Economic Cooperation and Development (OECD)		
	Unit of measurement	Number		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	Productivity (Gross Value Added per worker) in agriculture, forestry and fishing	ELSTAT (N/R)	2000-2020	Number
Western Macedonia	Productivity (Gross Value Added per worker) in agriculture, forestry and fishing	Eurostat, Regional Statistics (EU)	2008-2020	Number
Navarra	Productivity (Gross Value Added per worker) in agriculture, forestry and fishing	OECD (EU)	2000-2020	GVA per worker (USD 2015 PPP)
Andalucia	Productivity (Gross Value Added per worker) in agriculture, forestry and fishing	IECA (N/R)	2015-2021	€/worker
Piemonte	Productivity (Gross Value Added per worker) in agriculture, forestry and fishing	OECD (EU)	2004-2019	€
Puglia	Productivity (Gross Value Added per worker) in agriculture, forestry and fishing	OECD (EU)	2004-2019	GVA per worker (USD 2015 PPP)
Pomorskie	Productivity (Gross Value Added per worker) in agriculture, forestry and fishing	Local Data Bank (N/R)	2002-2020	€
Centro	Productivity in agriculture, forestry and fisheries	Statistics Portugal, Regional economic accounts and Labour force survey (N/R)	2011-2021	€/per capita
Nord-Vest	Productivity (Gross Value Added per worker) in agriculture, forestry and fishing	OECD (EU)	2015	in constant 2010 USD PPP
TR33	Productivity (Gross Value Added per worker) in agriculture, forestry and fishing	OECD (EU)	2009-2015	Number

Source: authors' own elaboration

SDG Target 2.4 SUSTAINABLE FOOD PRODUCTION

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.

Indicator: Organic farming: areas with different crops

Agricultural area (crops, grassland and pasture) under organic production as a proportion of the total agricultural area in the region.

In this case, Piemonte opted for alternative indicator from national sources (Share of utilised agricultural area UAA cultivated with organic crops), because the Eurostat data is not updated (the most recent available year is 2007). Manisa, Afyonkarahisar, Kutahya, Usak chose also an alternative indicator (hectars of production areas) because data on organic farming are not available at the regional level from European source.

Table 37 - Organic farming: areas with different crops

SDG 2 END HUNGER, FOOD SECURITY AND SUSTAINABLE AGRICULTURE				
From the JRC dataset	SDG Target(s)	2.4 (sustainable food production)		
	Indicator Name	Organic farming: areas with different crops		
	Type	Official		
	Coverage	EU-27 plus others		
	Source	Eurostat, Regional Statistics		
	Unit of measurement	Number		
	Frequency	Triannual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	Organic farming: areas with different crops	ELSTAT (N/R)	2009, 2020	Number
Western Macedonia	Organic farming: areas with different crops	ELSTAT (N/R)	2009, 2020	Number
Navarra	Organic farming: areas with different crops	OCECAS (N/R)	2010-2021	Percentage
Andalucia	Organic farming: areas with different crops	IECA (N/R)	2015-2021	Percentage
Piemonte	Share of utilised agricultural area (UAA) cultivated with organic crops	ISTAT - Ministry of Agricultural, Food and Forestry (N/R)	2010-2021	Percentage
Puglia	Organic farming: areas with different crops	ISTAT - Ministry of Agricultural, Food and Forestry (N/R)	2010-2021	Percentage
Pomorskie	Not available			
Centro	Proportion of agricultural area with organic farming	Statistics Portugal, Agriculture census (N/R)	2009-2019	Percentage
Nord-Vest	Not available			
TR33	Production area	TurkStat, Turkish Statistical Institute (N/R)	2004-2021	Number (Ha)

Source: authors' own elaboration



SDG 3 – GOOD HEALTH AND WELL-BEING

For the SDG3 the JRC suggested five indicators, which cover four SDG targets:

- Target 3.2 preventable death of new-borns, 1 indicator: Infant mortality
- Target 3.3 epidemics and diseases, 1 indicator: Deaths due to Covid-19
- Target 3.8 universal health coverage, 1 indicator: Hospital beds
- Target 3.c health financing and recruitment, 2 indicators: Self reported unmet needs for medical examination and Health personnel

In the JRC proposal dataset, all the indicators are official, sourced from European databases (Eurostat), except for the indicator related to Deaths due to Covid-19, which is only available from national sources. This specific indicator is valuable for this historical period, however, it is difficult to consider it as highly significant for the target 3.3, because it focuses solely on a subset of epidemic diseases/deaths (specifically, those caused by Covid-19) without accounting for other forms of viral diseases. Due to these limitations, some regions propose alternative indicators. For instance, Centro suggests using "Death rate due to communicable diseases," encompassing a broader scope of diseases. Conversely, Navarra suggests an alternative indicator, "Patients cared for in mental health centres," which is pertinent to a significant portion of the population across all age groups, particularly in the context of the ongoing pandemic.

Infant mortality (3.2). The indicator suggested by the JRC is official with data available from European source. Six regions analysed data from Eurostat, therefore, four regions (Navarra, Andalucia, Pomorskie and Centro) opted to data available from national or regional statics.

Deaths due to Covid-19 (3.3). In the JRC proposal, this is an official indicator but all the regions (that have found available data at the regional level) chose data from national sources, except Navarra, Centro that suggested alternative indicators and Nord-Vest that excluded this indicator, because data are not readily available for regional-level analysis.

Although this indicator may be relevant in the short term, it may lack long-term relevance. Therefore, it will be excluded and replaced by an indicator that tracks a broader range of communicable diseases, as Centro suggests, considering the possibility of new threats emerging in the future. The replacement indicator will be "Death rate due to communicable diseases".

Hospital beds (3.8). This is an official indicator, data are available from Eurostat, but three regions chose national/regional sources (Andalucia, Pomorskie and Centro).

Self reported unmet needs for medical examination (3.c). The indicator is official and available from European source (Eurostat) but not for all the regions; four regions used data from European sources (North Aegean, Western Macedonia, Pomorskie and Nord-Vest), Navarra and Andalucia opted for national sources; Piemonte and Puglia chose alternatives indicators. For Centro and T33 regions data are not available.

Health personnel (3.c). The indicator is official and available from European source (Eurostat); Andalucia, Centro and Pomorskie opted for national sources.

SDG Target 3.2 PREVENTABLE DEATH OF NEWBORNS

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.

Indicator: Infant mortality

Deaths of children under 5 years per 1,000 births.

Table 38 - Infant mortality

SDG 3 ENSURE HEALTHY LIVES AND PROMOTE WELL-BEING FOR ALL AT ALL AGES				
From the JRC dataset	SDG Target(s)	3.2 (preventable death of new-borns)		
	Indicator Name	Infant mortality		
	Type	Official		
	Coverage	EU-27 plus others		
	Source	Eurostat, Regional Statistics		
	Unit of measurement	Rate		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Infant mortality	Eurostat, Regional Statistics (EU)	2013-2017	Number
<i>Western Macedonia</i>	Infant mortality	Eurostat, Regional Statistics (EU)	1991-2021	Rate
<i>Navarra</i>	Infant mortality	OCECAS (N/R)	2010-2021	Percentage (neonatal)
<i>Andalucia</i>	Deaths of children under 28 days per 1,000 births	Eurostat, Regional Statistics	2015-2021	Rate (Deaths per 1000 births)
<i>Piemonte</i>	Infant mortality	Eurostat, Regional Statistics (EU)	2013-2017	Number
<i>Puglia</i>	Infant mortality	Eurostat, Regional Statistics (EU)	1990-2020	Rate
<i>Pomorskie</i>	Infant mortality	Local Data Bank (N/R)	2005-2021	Rate (Deaths per 1000 births)
<i>Centro</i>	Infant mortality	Statistics Portugal, Deaths (N/R)	1996-2021	Percentage
<i>Nord-Vest</i>	Infant mortality	Eurostat, Regional Statistics (EU)	2007-2020	Percentage
<i>TR33</i>	Infant mortality	Eurostat, Regional Statistics (EU)	2013-2017	Number

Source: authors' own elaboration

SDG Target 3.3 EPIDEMICS AND DISEASES

By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases.

Indicator: Deaths due to Covid-19

Table 39 - Deaths due to Covid-19

SDG 3 ENSURE HEALTHY LIVES AND PROMOTE WELL-BEING FOR ALL AT ALL AGES				
From the JRC dataset	SDG Target(s)	3.3 (epidemics and diseases)		
	Indicator Name	Deaths due to Covid-19		
	Type	Official		
	Coverage	Spain		
	Source	CNE (National Centre of Epidemiology)		
	Unit of measurement	Number/rate		
	Frequency	Daily		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	Deaths due to Covid-19	Ministry of Health of Greece (N/R)	2020-2022	Number
Western Macedonia	Deaths due to Covid-19	National Public Health Organization Data, Greece (N/R)	2021-2022	Number
Navarra	Patients cared for in mental health centres	Mental Health Plans of Navarre and Social Reality Observatory; Spanish Statistical Institute (N/R)	2015-2021	Number
Andalucia	Deaths due to Covid-19	IECA (N/R)	2020-2021	Rate (x100000 inhab.)
Piemonte	Deaths due to Covid-19	ISTAT (N/R)	2019-2022	Number
Puglia	Deaths due to Covid-19	Eurostat, Regional Statistics (EU)	2020	Rate
Pomorskie	Deaths due to Covid-19	Local Data Bank (N/R)	2020-2021	Number
Centro	Death rate due to communicable diseases	Statistics Portugal, National health survey (N/R)	2007-2021	Rate (per 100000)
Nord-Vest	Not available			
TR33	Deaths due to Covid-19	TurkStat (Turkish Statistical Institute) (N/R)	2019-2021	Number

Source: authors' own elaboration

SDG Target 3.8 UNIVERSAL HEALTH COVERAGE

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.

Indicator: Hospital beds

Total available beds in hospital which are regularly maintained and staffed and immediately available for the care of admitted patients.

Table 40 - Hospital beds

SDG 3 ENSURE HEALTHY LIVES AND PROMOTE WELL-BEING FOR ALL AT ALL AGES				
From the JRC dataset	SDG Target(s)	3.8 (universal health coverage)		
	Indicator Name	Hospital beds		
	Type	Official		
	Coverage	EU-27 plus others		
	Source	Eurostat, Regional Statistics		
	Unit of measurement	Number		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Hospital beds	Eurostat, Regional Statistics (EU)	2010-2019	Number
<i>Western Macedonia</i>	Hospital beds	Eurostat, Regional Statistics (EU)	1993-2019	Number
<i>Navarra</i>	Hospital beds	Eurostat, Regional Statistics (EU)	1993-2020	Rate (per 100000 inhab.)
<i>Andalucia</i>	Hospital beds	IECA (N/R)	2015-2021	Rate (per 1000)
<i>Piemonte</i>	Hospital beds	Eurostat, Regional Statistics (EU)	1993-2020	Number
<i>Puglia</i>	Hospital beds	Eurostat, Regional Statistics (EU)	1993-2020	Number
<i>Pomorskie</i>	Hospital beds	Local Data Bank (N/R)	2005-2021	Rate (Per 10 thousand persons)
<i>Centro</i>	Beds of hospitals	Statistics Portugal, Hospitals survey (N/R)	2013-2021	Number
<i>Nord-Vest</i>	Hospital beds	Eurostat, Regional Statistics (EU)	2007-2020	Rate (per 100000 inhab.)
<i>TR33</i>	Hospital beds	Eurostat, Regional Statistics (EU)	2002-2021	Number

Source: authors' own elaboration

SDG Target 3.c HEALTH FINANCING AND RECRUITMENT

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.

Indicator: Self reported unmet needs for medical examination

Proportion of the population aged 16 years and older reporting unmet need for medical care due to one of the following reasons: 'financial reasons', 'waiting list', and 'too far to travel'. Needs refer to a person's own assessment of whether he or she needed a medical examination or treatment (excluding dental care), but did not have it or did not seek it.

Table 41 - Self reported unmet needs for medical examination

SDG 3 ENSURE HEALTHY LIVES AND PROMOTE WELL-BEING FOR ALL AT ALL AGES				
From the JRC dataset	SDG Target(s)	3.c (health financing and recruitment)		
	Indicator Name	Self reported unmet needs for medical examination		
	Type	Official		
	Coverage	EU-27 plus others		
	Source	European Union Statistics on Income and Living Conditions (EU-SILC)		
	Unit of measurement	Percentage		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Self reported unmet needs for medical examination	European Union Statistics on Income and Living Conditions (EU-SILC)	2018-2022	Percentage
<i>Western Macedonia</i>	Self reported unmet needs for medical examination	European Union Statistics on Income and Living Conditions (EU-SILC)	2018-2021	Percentage
<i>Navarra</i>	Self reported unmet needs for medical examination	Income and Living Conditions Survey Navarra (N/R)	2014-2021	Percentage
<i>Andalucia</i>	Self reported unmet needs for medical examination	IECA (N/R)	2015-2021	Percentage
<i>Piemonte</i>	Satisfaction with health services (family doctors and public hospital services)	Opinion Climate Survey - IRES Piemonte (N/R)	2021-2022	Percentage
<i>Puglia</i>	Unmet needs for medical examination	ISTAT (N/R)	2017-2021	Percentage
<i>Pomorskie</i>	Self reported unmet needs for medical examination	Eurostat, Regional Statistics (EU)	2019-2021	Percentage
<i>Centro</i>	Not available			
<i>Nord-Vest</i>	Self reported unmet needs for medical examination	Eurostat, Regional Statistics (EU)	2008-2021	Percentage
<i>TR33</i>	Not available			

Source: authors' own elaboration

SDG Target 3.c HEALTH FINANCING AND RECRUITMENT

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.

Indicator: Health personnel

Human resources available for providing health care services in the country, irrespective of the sector of employment (i.e. whether they are independent, employed by a hospital or any other health care provider). 'Manpower' categories focus on health care professionals (physicians, dentists, nursing and caring professionals, pharmacists, physiotherapists).

Table 42 - Health personnel

SDG 3 ENSURE HEALTHY LIVES AND PROMOTE WELL-BEING FOR ALL AT ALL AGES				
From the JRC dataset	SDG Target(s)	3.c (health financing and recruitment)		
	Indicator Name	Health personnel		
	Type	Official		
	Coverage	EU-27 plus others		
	Source	Eurostat, Regional Statistics		
	Unit of measurement	Number		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Health personnel	Eurostat, Regional Statistics (EU)	2017-2020	Number
<i>Western Macedonia</i>	Health personnel	Eurostat, Regional Statistics (EU)	1993-2020	Number
<i>Navarra</i>	Health personnel	Eurostat, Regional Statistics (EU)	1996-2020	Rate (doctors per 100000 inhab.)
<i>Andalucia</i>	Health personnel	MSSSI (N/R)	2015-2021	Rate (per 1000)
<i>Piemonte</i>	Health personnel	Eurostat, Regional Statistics (EU)	2000-2021	Number
<i>Puglia</i>	Health personnel	Eurostat, Regional Statistics (EU)	2000-2021	Number/per inhabitant /per 100thousand inhab
<i>Pomorskie</i>	Health personnel	Local Data Bank (EU)	2010-2016	Rate (per 10 thousand persons)
<i>Centro</i>	Health personnel	Statistics Portugal, Health personnel statistics (EU)	2011-2021	Rate (medical doctors per 1000 inhab)
<i>Nord-Vest</i>	Health personnel	Eurostat, Regional Statistics (EU)	2007-2020	Number per 100,000 inhabitants
<i>TR33</i>	Health personnel	Eurostat, Regional Statistics (EU)	1993-2020	Number

Source: authors' own elaboration



SDG 4 - INCLUSIVE AND QUALITY EDUCATION

For the SDG4 the JRC suggested seven indicators, which cover five SDG targets:

- Target 4.1 primary and secondary education, 1 indicator: Participation rates in selected education levels
- Target 4.2 access to early childhood education, 1 indicator: Pupils enrolled in early childhood education
- Target 4.3 vocational and tertiary education, 3 indicators: Students enrolled in tertiary education, Participation in education and Distribution of pupils and students enrolled in general and vocational programmes
- Target 4.5 gender and other disparities in education (and Target 4.6 youth and adult literacy), 1 indicator: Women 30-34 years old with higher education level
- Target 4.6 youth and adult literacy, 1 indicator: Early leavers from education and training

The proposal of JRC includes seven indicators for education, all of them are official and obtained from European databases from Eurostat. The indicators cover different educational levels, from compulsory education (primary and secondary education) to non-compulsory education (both post-secondary and pre-primary education).

Participation rates in selected education levels (4.1). The indicator suggested by the JRC is official with data available from European source, Eurostat, and it is available for all the regions of this project. Andalusia has chosen a national source.

Pupils enrolled in early childhood education (4.2). The indicator suggested by the JRC is official with data available from European source, Eurostat, and it is available for all the regions; also in this case Andalusia has chosen a national source to analyse this indicator. Centro opted for an alternative indicator Students enrolled in pre-primary education.

Students enrolled in tertiary education (4.3). Also in this case, it is an official indicator suggested by the JRC with data available from European source, Eurostat, and it is available for all the regions, but Andalusia and Centro have preferred to use national sources.

Participation in education (4.3). The indicator suggested by the JRC is official with data available from European source, Eurostat, and it is available for all the regions of this project. Andalusia has chosen a national source.

Distribution of pupils and students enrolled in general and vocational programmes (4.3). The indicator suggested by the JRC is official with data available from European source, Eurostat, and it is available for all the regions of this project. Andalusia has chosen a national source. Data are not available only for Western Macedonia, that has chosen to replace this indicator with a similar one Participation rate in education and training (last 4 weeks). This is a relevant indicator for Nord-Vest but with no corresponding data at the regional level.

Women 30-34 years old with higher education level (4.5, 4.6). In the JRC proposal, this is an official indicator but without a European source as a reference. However, at the European level, Eurostat monitors this indicator: some regions found available data from European sources: North Aegean, Western Macedonia, Navarra, Piemonte, Puglia chose data from Eurostat; the others opted for national sources. However, data are not available for the Romanian region, neither from a European nor a national source.

To correspond with the indicator used to monitor the European Education Area strategic framework, Centro decided to use the age group of 25-34 years old. Also T33 chose an alternative indicator Female and 30-34 and Universities and Other Higher Educational Institutions, available from national source.

Early leavers from education and training (4.6). The indicator suggested by the JRC is official from Eurostat. Andalusia, Western Macedonia and Centro opted for a national source.

SDG Target 4.1 PRIMARY AND SECONDARY EDUCATION

By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes

Indicator: Participation rates in selected education levels

Participation rates by educational level as percentage of total population.

Table 43 – Participation rates in selected education levels

SDG 4 ENSURE INCLUSIVE AND EQUITABLE QUALITY EDUCATION AND PROMOTE LIFELONG LEARNING OPPORTUNITIES FOR ALL				
From the JRC dataset	SDG Target(s)	4.1 (primary and secondary education)		
	Indicator Name	Participation rates in selected education levels		
	Type	Official		
	Coverage	EU-27 plus others		
	Source	Eurostat, Regional Statistics		
	Unit of measurement	Rate		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	Participation rate at primary and lower secondary levels	Eurostat, Regional Statistics (EU)	2013-2021	Rate
Western Macedonia	Participation rate at primary and lower secondary levels	Eurostat, Regional Statistics (EU)	2013-2020	Rate
Navarra	Participation rate at primary and lower secondary levels	Eurostat, Regional Statistics (EU)	2013-2020	Percentage
Andalusia	Participation rate at primary and lower secondary levels	Education and Universities Ministry (N/R)	1990-2022	Percentage
Piemonte	Participation rate at primary and lower secondary levels	Eurostat, Regional Statistics (EU)	2013-2020	Rate
Puglia	Participation rates in selected education levels	Eurostat, Regional Statistics (EU)	2013-2020	Rate
Pomorskie	Participation rates in selected education levels	Eurostat, Regional Statistics (EU)	2013-2020	Percentage
Centro	Participation rates for pre-primary to tertiary education	Eurostat, Regional Statistics (EU)	2010-2021	Rate
Nord-Vest	Participation rate at primary and lower secondary levels	Eurostat, Regional Statistics (EU)	2013-2020	Percentage
TR33	Participation rate at primary and lower secondary levels	Eurostat, Regional Statistics (EU)	2013-2021	Rate

Source: authors' own elaboration

SDG Target 4.2 ACCESS TO EARLY CHILDHOOD EDUCATION

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

Indicator: Pupils enrolled in early childhood education

Pupils enrolled in early childhood education. Pre-primary education. Non-compulsory education.

Table 44 - Pupils enrolled in early childhood education

SDG 4 ENSURE INCLUSIVE AND EQUITABLE QUALITY EDUCATION AND PROMOTE LIFELONG LEARNING OPPORTUNITIES FOR ALL				
From the JRC dataset	SDG Target(s)	4.2 (access to early childhood education)		
	Indicator Name	Pupils enrolled in early childhood education		
	Type	Official		
	Coverage	EU-27 plus others		
	Source	Eurostat, Regional Statistics		
	Unit of measurement	Number		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	Pupils enrolled in early childhood education	Eurostat, Regional Statistics (EU)	2013-2021	Number
Western Macedonia	Pupils enrolled in early childhood education	Eurostat, Regional Statistics (EU)	2013-2020	Number
Navarra	Pupils enrolled in early childhood education	Eurostat, Regional Statistics (EU)	2013-2020	Number
Andalucia	Pupils enrolled in early childhood education	IECA (N/R)	2013-2020	Percentage
Piemonte	Pupils enrolled in early childhood education	Eurostat, Regional Statistics (EU)	2013-2020	Number
Puglia	Pupils enrolled in early childhood education	Eurostat, Regional Statistics (EU)	2013-2020	Number
Pomorskie	Pupils enrolled in early childhood education	Eurostat, Regional Statistics (EU)	2013-2020	Number
Centro	Students enrolled in pre-primary education	Directorate-General for Education and Science Statistics (N/R)	2003/2004-2020/2021	Rate
Nord-Vest	Pupils enrolled in early childhood education	Eurostat, Regional Statistics (EU)	2013-2021	Number
TR33	Pupils enrolled in early childhood education	Eurostat, Regional Statistics (EU)	2013-2021	Number

Source: authors' own elaboration

SDG Target 4.3 VOCATIONAL AND TERTIARY EDUCATION

By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university.

Indicator: Students enrolled in tertiary education

Number of students enrolled in tertiary education.

Table 45 - Students enrolled in tertiary education

SDG 4 ENSURE INCLUSIVE AND EQUITABLE QUALITY EDUCATION AND PROMOTE LIFELONG LEARNING OPPORTUNITIES FOR ALL				
From the JRC dataset	SDG Target(s)	4.3 (vocational and tertiary education)		
	Indicator Name	Students enrolled in tertiary education		
	Type	Official		
	Coverage	EU-27 plus others		
	Source	Eurostat, Regional Statistics		
	Unit of measurement	Number		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Students enrolled in tertiary education	Eurostat, Regional Statistics (EU)	2013-2021	Number
<i>Western Macedonia</i>	Students enrolled in tertiary education	Eurostat, Regional Statistics (EU)	2013-2020	Number
<i>Navarra</i>	Students enrolled in tertiary education	Eurostat, Regional Statistics (EU)	2013-2020	Number
<i>Andalucia</i>	Students enrolled in tertiary education	Education and Universities Ministry (N/R)	2015-2022	Number
<i>Piemonte</i>	Students enrolled in tertiary education	Eurostat, Regional Statistics (EU)	2013-2020	Number
<i>Puglia</i>	Students enrolled in tertiary education	Eurostat, Regional Statistics (EU)	2013-2020	Number
<i>Pomorskie</i>	Students enrolled in tertiary education	Eurostat, Regional Statistics (EU)	2013-2021	Number
<i>Centro</i>	Students enrolled in tertiary education	Directorate-General for Statistics of Education and Science (N/R)	2001/2002-2021/2022	Number
<i>Nord-Vest</i>	Students enrolled in tertiary education	Eurostat, Regional Statistics (EU)	2013-2020	Number
<i>TR33</i>	Students enrolled in tertiary education	Eurostat, Regional Statistics (EU)	2013-2021	Number

Source: authors' own elaboration

SDG Target 4.3 VOCATIONAL AND TERTIARY EDUCATION

By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university.

Indicator: Participation in education

Participation rates by age group (from 20 to 24 years) as percentage of corresponding age population. Non-compulsory education.

Table 46 - Participation in education

SDG 4 ENSURE INCLUSIVE AND EQUITABLE QUALITY EDUCATION AND PROMOTE LIFELONG LEARNING OPPORTUNITIES FOR ALL				
From the JRC dataset	SDG Target(s)	4.3 (vocational and tertiary education)		
	Indicator Name	Participation in education		
	Type	Official		
	Coverage	EU-27 plus others		
	Source	Eurostat, Regional Statistics		
	Unit of measurement	Rate		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Participation in education	Eurostat, Regional Statistics (EU)	2013-2020	Percentage
<i>Western Macedonia</i>	Participation in education	Eurostat, Regional Statistics (EU)	2013-2020	Rate
<i>Navarra</i>	Participation in education	Eurostat, Regional Statistics (EU)	2013-2020	Percentage
<i>Andalucia</i>	Participation in education	IECA (N/R)	2005-2021	Percentage
<i>Piemonte</i>	Participation in education	Eurostat, Regional Statistics (EU)	2013-2020	Rate
<i>Puglia</i>	Participation in education	Eurostat, Regional Statistics (EU)	2013-2020	Rate
<i>Pomorskie</i>	Participation in education	Eurostat, Regional Statistics (EU)	2013-2021	Percentage
<i>Centro</i>	Participation rate in selected education levels among 20–24-year-olds	Eurostat, Regional Statistics (EU)	2013-2020	Rate
<i>Nord-Vest</i>	Participation in education	Eurostat, Regional Statistics (EU)	2014-2020	Rate
<i>TR33</i>	Participation in education (From 20 to 24 years)	Eurostat, Regional Statistics (EU)	2013-2021	Rate

Source: authors' own elaboration

SDG Target 4.3 VOCATIONAL AND TERTIARY EDUCATION

By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university.

Indicator: Distribution of pupils and students enrolled in general and vocational programmes

Percentage of pupils and students enrolled in general and vocational programmes. Different levels of education

Table 47 - Distribution of pupils and students enrolled in general and vocational programmes

SDG 4 ENSURE INCLUSIVE AND EQUITABLE QUALITY EDUCATION AND PROMOTE LIFELONG LEARNING OPPORTUNITIES FOR ALL				
From the JRC dataset	SDG Target(s)	4.3 (vocational and tertiary education)		
	Indicator Name	Distribution of pupils and students enrolled in general and vocational programmes		
	Type	Official		
	Coverage	EU-27 plus others		
	Source	Eurostat, Regional Statistics		
	Unit of measurement	Percentage		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	Distribution of pupils and students enrolled in general and vocational programmes	Eurostat, Regional Statistics (EU)	2013-2021	Percentage
Western Macedonia	Participation rate in education and training (last 4 weeks).	Eurostat, Regional Statistics (EU)	2000-2022	Rate
Navarra	Distribution of pupils and students enrolled in general and vocational programmes	Eurostat, Regional Statistics (EU)	2013-2020	Percentage
Andalucia	Distribution of pupils and students enrolled in general and vocational programmes	Education and Universities Ministry (N/R)	2015-2022	Percentage
Piemonte	Distribution of pupils and students enrolled in general and vocational programmes - Upper secondary education - general	Eurostat, Regional Statistics (EU)	2013-2020	Percentage
Puglia	Distribution of pupils and students enrolled in general and vocational programmes	Eurostat, Regional Statistics (EU)	2013-2020	Percentage
Pomorskie	Distribution of pupils and students enrolled in general and vocational programmes	Eurostat, Regional Statistics (EU)	2013-2021	Percentage
Centro	Distribution of pupils and students enrolled in general and vocational programmes	Eurostat, Regional Statistics (EU)	2013-2021	Percentage
Nord-Vest	Not available			
TR33	Distribution of pupils and students enrolled in general and vocational programmes	Eurostat, Regional Statistics (EU)	2013-2021	Percentage

Source: authors' own elaboration

SDG Target 4.5 GENDER AND OTHER DISPARITIES IN EDUCATION, 4.6 YOUTH AND ADULT LITERACY

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.

Indicator: Women 30-34 years old with higher education level

Women with tertiary education attainment level. Tertiary education covers ISCED 2011 levels 5, 6, 7 and 8 (short-cycle tertiary education, bachelor's or equivalent level, master's or equivalent level, doctoral or equivalent level, online code ED5-8 'tertiary education').

Table 48 - Women 30-34 years old with higher education level

SDG 4 ENSURE INCLUSIVE AND EQUITABLE QUALITY EDUCATION AND PROMOTE LIFELONG LEARNING OPPORTUNITIES FOR ALL				
From the JRC dataset	SDG Target(s)	4.5 (gender and other disparities in education), 4.6 (youth and adult literacy)		
	Indicator Name	Women 30-34 years old with higher education level		
	Type	Official		
	Coverage	Basque county		
	Source	Eustat (Instituto Vasco de Estadística)		
	Unit of measurement	Percentage		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Women 30-34 years old with higher education level	Eurostat, Regional Statistics (EU)	2001-2021	Percentage
<i>Western Macedonia</i>	Women 30-34 years old with higher education level	Eurostat, Regional Statistics (EU)	2010-2021	Percentage
<i>Navarra</i>	Women 30-34 years old with higher education level	Eurostat, Regional Statistics (EU)	2000-2021	Percentage
<i>Andalucia</i>	Women 25-34 years old with higher education level 3	IECA (N/R)	2004-2022	Percentage
<i>Piemonte</i>	Women 30-34 years old with higher education level - Tertiary education	Eurostat, Regional Statistics (EU)	1994-2021	Percentage
<i>Puglia</i>	Women 30-34 years old with higher education level	Eurostat, Regional Statistics (EU)	2000-2021	Percentage
<i>Pomorskie</i>	Women 30-34 years old with higher education level	Local Data Bank (N/R)	2011	Number
<i>Centro</i>	Proportion of women aged between 25 and 34 years old with at least higher education completed	Statistics Portugal, Labour force survey (N/R)	2011-2022	Percentage
<i>Nord-Vest</i>	Not available			
<i>TR33</i>	Female and 30-34 and Universities And Other Higher Educational Institutions	TurkStat (Turkish Statistical Institute) (N/R)	2008-2021	Number

Source: authors' own elaboration

SDG Target 4.6 YOUTH AND ADULT LITERACY

By 2030, ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy

Indicator: Early leavers from education and training

Percentage of the population aged 18 to 24 who has completed at most lower secondary education and is not involved in further education or training; the indicator 'early leavers from education and training' is expressed as a percentage of the people aged 18 to 24 with such criteria out of the total population aged 18 to 24.

Table 49 - Early leavers from education and training

SDG 4 ENSURE INCLUSIVE AND EQUITABLE QUALITY EDUCATION AND PROMOTE LIFELONG LEARNING OPPORTUNITIES FOR ALL				
From the JRC dataset	SDG Target(s)	4.6 (youth and adult literacy)		
	Indicator Name	Early leavers from education and training		
	Type	Official		
	Coverage	EU-27 plus others		
	Source	Eurostat, Regional Statistics		
	Unit of measurement	Percentage		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Early leavers from education and training	Eurostat, Regional Statistics (EU)	2000-2017	Percentage
<i>Western Macedonia</i>	Early leavers from education and training	ELSTAT (N/R)	2010-2021	Percentage
<i>Navarra</i>	Early leavers from education and training	Eurostat, Regional Statistics (EU)	2000-2021	Percentage
<i>Andalucia</i>	Early leavers from education and training	IECA (N/R)	2000-2021	Percentage
<i>Piemonte</i>	Early leavers from education and training	Eurostat, Regional Statistics (EU)	2000-2021	Percentage
<i>Puglia</i>	Early leavers from education and training	Eurostat, Regional Statistics (EU)	2000-2021	Percentage
<i>Pomorskie</i>	Early leavers from education and training	Eurostat, Regional Statistics (EU)	2001-2019	Percentage
<i>Centro</i>	Early leavers from education and training	Statistics Portugal, Labour force survey (N/R)	2011-2021	Percentage
<i>Nord-Vest</i>	Early leavers from education and training	Eurostat, Regional Statistics (EU)	2015-2020	Percentage
<i>TR33</i>	Early leavers from education and training	Eurostat, Regional Statistics (EU)	2006-2020	Percentage

Source: authors' own elaboration



SDG 5 – GENDER EQUALITY

For the SDG5 the JRC suggested seven indicators, which cover four SDG targets:

- Target 5.1 gender discrimination, 1 indicator: Female achievement/disadvantage index
- Target 5.2 gender violence, 2 indicators: Fatal victims of gender-based violence at the hands of their partners or ex-partners and Victims of violence against women
- Target 5.4 unpaid work, 2 indicators: Inactive population rate due to caregiving responsibilities and Gender gap in part-time employment incidence
- Target 5.5 gender and other disparities in education, 2 indicators: Female research and development personnel and Women in parliament and government

The proposal of JRC includes seven indicators, four of them are official and three experimental, not all are available from European sources. The official ones come from national sources (four of them); the experimental ones come from European sources, two from OECD and one from the European Commission.

Female achievement/disadvantage index (5.1). This is an experimental indicator, available from DG REGIO (European Commission). All the regions found this indicator fit for purpose with available data at Nuts2 level. Only for T33 region data are not available.

Fatal victims of gender-based violence at the hands of their partners or ex-partners (5.2). In the JRC proposal, this is an official indicator but without a European source as a reference. However, Navarra, Andalucia, Piemonte, Puglia, Centro found available data at the regional level from national sources. No data for Nord-Vest, North Aegean, Western Macedonia, Pomorskie and T33 region.

Centro, in particular, analysed the number of Women victims of homicide in the context of a current/past intimate relationship: the regional values were derived by aggregating data from the municipalities within the Centro Region but the methodology used by the local Observatory relies on national newspapers (print and/or online), national and local television and radio stations, and other considered sources; therefore, for the region this information as low quality.

Victims of violence against women (5.2). Also in this case, from the JRC proposal, this is an official indicator, but without a European source as a reference. However, Navarra, Andalucia, Piemonte, Puglia, North Aegean and Centro found available data at the regional level from national/regional sources. No data for Nord-Vest, Western Macedonia, Pomorskie and T33 region.

Centro analysed the Proportion of victims in crimes registered as domestic violence by the partner or similar, however these data only include victims of domestic violence who have been reported to the relevant authorities. It may not reflect all victims of gender-based violence. North Aegean proposed Number of domestic violence incidents as alternative (this alternative indicator could provide some insights into the prevalence of domestic violence in the region, although it may not capture the full scope of violence against women).

Gender gap in part-time employment incidence (5.4). This is an experimental indicator, available from European source, OECD regional database. All the regions found this indicator fit for purpose with available data at Nuts2 level. Only for North Aegean and Pomorskie data are not available. Andalucia and Centro opted for national sources.

Inactive population rate due to caregiving responsibilities (5.4). This is a particular indicator, official, but without a European reference source. Therefore, the regions used different approaches: Navarra, Andalucia and Centro analysed the same indicator from national or regional sources.

Puglia chose an alternative indicator: Ratio of employment rate for women; it could be useful to fit the proportion of time spent on unpaid domestic and care work. As Puglia suggests, in the context of couples with young children, the difficulties of reconciling family needs and work schedules are generally greater for women. The

lack of adequate social services may also lead them to choose to leave work when a child is born (this is one of the national indicators for the sustainable strategy of Italy). Also T33 used an alternative indicator, the number of Population not in labour force (1000) due to domestic work (Female/ 15-64 ages).

North Aegean suggested Inactive population due to personal or family reasons. This alternative indicator may provide some understanding of the portion of the population that is not engaged in the workforce due to personal or family-related obligations.

This indicator is not available for Piemonte, data are only available at national level; no data also for Nord-Vest, Western Macedonia and Pomorskie.

Female research and development personnel (5.5). This is an experimental indicator, with available data from OECD at the European level. All the regions analysed data at the regional level from OECD, except Andalusia and Centro. Western Macedonia opted for an alternative indicator, Unemployment rate of women, from national source.

Women in parliament and government (5.5). This is an official indicator, but the regional data are only available from local or national sources.

This indicator is not available for Nord-Vest because at present, all 24 members of the Nord-Vest Regional Development Council (RDC) are men; in what concerns women representatives from the region in the Romanian Parliament, data are available only at NUTS 1 level.

Since the regional authorities in Portugal are not directly elected, the proposed indicator, by the Centro region, may not be suitable. Similar situations may exist in other countries as well. However, as it is important to monitor women's representation in political leadership, Centro recommended monitoring the proportion of women in local governments instead. The regional values were derived by aggregating data from the municipalities within the Centro Region.

North Aegean analysed the indicator of the first proposal, Women in parliament and government, but the region proposed also another indicator: Women in regional council. This indicator suggests evaluating the representation and participation of women in regional councils, which can provide insights into gender diversity and inclusion in regional decision-making bodies. In particular, out of the 300 members of the Greek Parliament, only 6 are elected from the North Aegean Region and only one of them is a woman. There is a quota system in place for both national and regional elections, requiring a minimum of 40% of male or female candidates on the ballots. This quota aims to ensure a certain level of gender diversity among the candidates. However, it appears that this quota is not applied to the elected members themselves (Strogylopoulos, G. 2023).

SDG Target 5.1 GENDER DISCRIMINATION

End all forms of discrimination against all women and girls everywhere

Indicator: Female achievement/disadvantage index

The Female Disadvantage Index (FemDI) measures the difference between the performance of men and women in a region. The best score is 0 (no disadvantage) and the worst is 100 (largest disadvantage). FemDI is built out of 30 indicators of 7 domains: Work and Money, Knowledge, Time, Power, Health, Safety and Trust, and Quality of Life. Inverse indicator.

The Female Achievement Index (FemAI) measures the level of female achievement relative to the region with the highest female achievements. It varies between 0 (lowest achievements) and 100 (highest achievements). FemAI is built out of 33 indicators of 7 domains: Work and Money, Knowledge, Time, Power, Health, Safety and Trust, and Quality of Life. Direct indicator.

Table 50 - Female achievement/disadvantage index

SDG 5 ACHIEVE GENDER EQUALITY AND EMPOWER ALL WOMEN AND GIRLS				
From the JRC dataset	SDG Target(s)	5.1 (gender discrimination)		
	Indicator Name	Female achievement/disadvantage index		
	Type	Experimental		
	Coverage	EU-27		
	Source	European Commission, DG REGIO		
	Unit of measurement	Percentage		
	Frequency			
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	Female achievement/disadvantage index	European Commission, DG REGIO (EU)	2021	Index
Western Macedonia	Female achievement/disadvantage index	European Commission, DG REGIO (EU)	2021	Percentage
Navarra	Female achievement/disadvantage index	European Commission, DG REGIO (EU)	2021	Index [0,100]
Andalucia	Female achievement/disadvantage index	European Commission, DG REGIO (EU)	2021	Percentage
Piemonte	Female achievement/disadvantage index	European Commission, DG REGIO (EU)	2021	Percentage
Puglia	Female achievement/disadvantage index	European Commission, DG REGIO (EU)	2021	Percentage
Pomorskie	Female achievement/disadvantage index	European Commission, DG REGIO (EU)	2021	Percentage
Centro	Female achievement/disadvantage index	European Commission, DG REGIO (EU)	2021	Percentage
Nord-Vest	Female achievement/disadvantage index	European Commission, DG REGIO (EU)	2021	Percentage
TR33	Not available			

Source: authors' own elaboration

SDG Target 5.2 GENDER VIOLENCE

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.

Indicator: Fatal victims of gender-based violence at the hands of their partners or ex-partners

Women fatal victims of gender-based violence.

Table 51 - Fatal victims of gender-based violence at the hands of their partners or ex-partners

SDG 5 ACHIEVE GENDER EQUALITY AND EMPOWER ALL WOMEN AND GIRLS				
From the JRC dataset	SDG Target(s)	5.2 (gender violence)		
	Indicator Name	Fatal victims of gender-based violence at the hands of their partners or ex-partners		
	Type	Official		
	Coverage	Spain		
	Source	INE (National Statistics Institute)		
	Unit of measurement	Number		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Not available			
<i>Western Macedonia</i>	Not available			
<i>Navarra</i>	Fatal victims of gender-based violence at the hands of their partners or ex-partners	Ministry of equality (N/R)	2003-2022	Number
<i>Andalucia</i>	Fatal victims of gender-based violence at the hands of their partners or ex-partners	Women's Institute. Ministry of equality (N/R)	2005-2022	Number
<i>Piemonte</i>	Fatal victims of gender-based violence at the hands of their partners or ex-partners	Istat, Regional Statistics (N/R)	2014	Percentage
<i>Puglia</i>	Fatal victims of gender-based violence at the hands of their partners or ex-partners	Istat, Regional Statistics (N/R)	2019-2021	Number
<i>Pomorskie</i>	Not available			
<i>Centro</i>	Women victims of homicide in the context of a current/past intimate relationship	APAV-Observatory of Homicide Crimes (N/R)	2014-2021	Number
<i>Nord-Vest</i>	Not available			
<i>TR33</i>	Not available			

Source: authors' own elaboration

SDG Target 5.2 GENDER VIOLENCE

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.

Indicator: Victims of violence against women

Number of victims of gender violence.

Table 52 - Victims of violence against women

SDG 5 ACHIEVE GENDER EQUALITY AND EMPOWER ALL WOMEN AND GIRLS				
From the JRC dataset	SDG Target(s)	5.2 (gender violence)		
	Indicator Name	Victims of violence against women		
	Type	Official		
	Coverage	Spain		
	Source	Ministry of Equality (Spain)		
	Unit of measurement	Percentage		
	Frequency	Monthly		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	Number of domestic violence incidents	Police (N/R)	2016-2021	Number
Western Macedonia	Not available			
Navarra	Women victims of violence	Ministry of equality (N/R)	2009-2022	Number
Andalucia	Women victims of violence	Women's Institute. Ministry of equality (N/R)	2005-2022	Number
Piemonte	Women victims of violence	Istat, Regional Statistics (N/R)	2013-2021	Rate per 100,000 women
Puglia	Women victims of violence	Istat, Regional Statistics (N/R)	2013-2021	Number per 100,000 women
Pomorskie	Not available			
Centro	Proportion of victims in crimes registered as Domestic violence by the partner or similar	Directorate-General for Justice Policy (N/R)	2011-2021	Rate
Nord-Vest	Not available			
TR33	Not available			

Source: authors' own elaboration

SDG Target 5.4 UNPAID WORK

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.

Indicator: Gender gap in part-time employment incidence

Men's and women's part-time employment rates, defined as part-time employment as a percentage of total employment. The gender gap is calculated as the percentage point difference between the male and the female rate.

Table 53 - Gender gap in part-time employment incidence

SDG 5 ACHIEVE GENDER EQUALITY AND EMPOWER ALL WOMEN AND GIRLS				
From the JRC dataset	SDG Target(s)	5.4 (unpaid work)		
	Indicator Name	Gender gap in part-time employment incidence		
	Type	Experimental		
	Coverage	OECD countries and other European countries		
	Source	Organisation for Economic Cooperation and Development (OECD)		
	Unit of measurement	Percentage		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Gender gap for the employment rate	Eurostat (EU)	2014-2022	Percentage
<i>Western Macedonia</i>	Gender gap in part-time employment incidence	OECD, Regional Statistics (EU)	2001-2019	Percentage
<i>Navarra</i>	Gender gap in part-time employment incidence	OECD, Regional Statistics (EU)	2001-2019	Percentage
<i>Andalucia</i>	Gender gap in part-time employment incidence	IECA (N/R)	2006-2021	Percentage
<i>Piemonte</i>	Gender gap in part-time employment incidence - Part-Time employment Incidence, 15-64years old	OECD, Regional Statistics (EU)	2001-2021	Percentage
<i>Puglia</i>	Gender gap in part-time employment incidence	OECD, Regional Statistics (EU)	2001-2019	Percentage
<i>Pomorskie</i>	No data			
<i>Centro</i>	Gender gap in part-time employment incidence	Statistics Portugal, Labour force survey (N/R)	2011-2022	Percentage
<i>Nord-Vest</i>	Gender gap in part-time employment incidence	OECD, Regional Statistics (EU)	2015	Percentage
<i>TR33</i>	Gender gap in part-time employment incidence	OECD, Regional Statistics (EU)	2001-2019	Percentage

Source: authors' own elaboration

SDG Target 5.4 UNPAID WORK

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.

Indicator: Inactive population rate due to caregiving responsibilities

Percentage of persons not actively seeking work, thus neither employed nor unemployed and considered to be out of the labour force due to "Inactivity due to caregiving responsibilities" which refers to the reasons of "caring for children or disabled adults" and "other family or personal responsibilities".

Table 54 - Inactive population rate due to caregiving responsibilities

SDG 5 ACHIEVE GENDER EQUALITY AND EMPOWER ALL WOMEN AND GIRLS				
From the JRC dataset	SDG Target(s)	5.4 (unpaid work)		
	Indicator Name	Inactive population rate due to caregiving responsibilities		
	Type	Official		
	Coverage	Andalusia		
	Source	Institute of Statistics and Cartography		
	Unit of measurement	Percentage		
	Frequency			
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	Inactive population due to personal or family reasons	ELSTAT (N/R)	2006-2022	thousands of persons
Western Macedonia	Not available			
Navarra	Inactive population rate due to caregiving responsibilities	Labour Force Survey, ODS Navarra (N/R)	2015-2021	Percentage
Andalucia	Inactive population rate due to caregiving responsibilities	IECA (N/R)	2006-2021	Percentage
Piemonte	Not available			
Puglia	Ratio of employment rate for women aged 25-49 with at least one child aged 0-5 to the employment rate of women 25-49 years without children, multiplied by 100	Istat, Regional Statistics (N/R)	2018-2021	Percentage
Pomorskie	Not available			
Centro	Inactive women rate due to caregiving responsibilities	Statistics Portugal, Labour force survey (N/R)	2011-2021	Percentage
Nord-Vest	Not available			
TR33	Population not in labour force (1000) due to domestic work (Female/ 15-64 ages)	TurkStat (Turkish Statistical Institute) (N/R)	2014-2022	Number (Thousand)

Source: authors' own elaboration

SDG Target 5.5 WOMEN PARTICIPATION AND LEADERSHIP

Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life.

Indicator: Female research and development personnel

Share of R&D female in R&D total personnel.

Table 55 - Female research and development personnel

SDG 5 ACHIEVE GENDER EQUALITY AND EMPOWER ALL WOMEN AND GIRLS				
From the JRC dataset	SDG Target(s)	5.5 (women participation and leadership)		
	Indicator Name	Female research and development personnel		
	Type	Experimental		
	Coverage	OECD countries and other European countries		
	Source	Organisation for Economic Cooperation and Development (OECD)		
	Unit of measurement	Percentage		
	Frequency	Biennial		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Not available			
<i>Western Macedonia</i>	Unemployment rate of women	Eurostat, Regional Statistics (EU)	2011-2022	Percentage
<i>Navarra</i>	Female research and development personnel	OECD, Regional Statistics (EU)	2002-2018	Percentage
<i>Andalucia</i>	Female research and development personnel	INE (N/R)	2008-2021	Percentage
<i>Piemonte</i>	Female research and development personnel	OECD, Regional Statistics (EU)	2003-2020	Percentage
<i>Puglia</i>	Female research and development personnel	OECD, Regional Statistics (EU)	2003-2018	Percentage
<i>Pomorskie</i>	Female research and development personnel	OECD, Regional Statistics (EU)	2017-2021	Percentage
<i>Centro</i>	Proportion of female in research and development personnel	Directorate-General for Education and Science Statistics (N/R)	2017-2021	Percentage
<i>Nord-Vest</i>	Female research and development personnel	OECD, Regional Statistics (EU)	2015	Percentage
<i>TR33</i>	Female research and development personnel	OECD, Regional Statistics (EU)	2011-2015	Percentage

Source: authors' own elaboration

SDG Target 5.5 WOMEN PARTICIPATION AND LEADERSHIP

Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life.

Indicator: Women in parliament and government

Proportion of seats held by women in regional parliaments. Number of seats occupied by women with respect to the total number of seats in the autonomous parliaments

Proportion of mayor's offices held by women in local government. Number of mayor's offices held by women out of the total number of mayor's offices in local governments.

Table 56 - Women in parliament and government

SDG 5 ACHIEVE GENDER EQUALITY AND EMPOWER ALL WOMEN AND GIRLS				
From the JRC dataset	SDG Target(s)	5.5 (women participation and leadership)		
	Indicator Name	Women in parliament and government		
	Type	Official		
	Coverage	Spain		
	Source	INE (National Statistics Institute)		
	Unit of measurement	Percentage		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Women in parliament and government	Hellenic Ministry of Interior Affairs (N/R)	2012-2022	Number
<i>Western Macedonia</i>	Women in parliament and government	Region of Western Macedonia (N/R)	2010-2019	Percentage
<i>Navarra</i>	Women in parliament and government	OCECAS (N/R)	2010-2021	Percentage
<i>Andalucia</i>	Women in parliament and government	IECA (N/R)	2010-2022	Percentage
<i>Piemonte</i>	Women in parliament	Istat, Regional Statistics (N/R)	2008, 2014, 2018	Percentage
<i>Puglia</i>	Women in parliament and government	Istat, Regional Statistics (N/R)	2012-2021	Percentage
<i>Pomorskie</i>	Women in parliament and government	Local Data Bank, ECO (N/R)	2005-2021	Percentage
<i>Centro</i>	Women in local government	Ministry of Internal Administration (N/R)	2017-2021	Percentage
<i>Nord-Vest</i>	Not available			
<i>TR33</i>	Parliamentary General Election - Number of female candidates	TurkStat (Turkish Statistical Institute) (N/R)	2011-2018	Number

Source: authors' own elaboration



SDG 6 – CLEAN WATER AND SANITATION

For the SDG6 the JRC suggested four indicators, which cover two SDG targets:

- Target 6.1 universal access to water, 1 indicator: Population served by safely managed drinking water supply services
- Target 6.3 water quality, 3 indicators: Water bodies that exceed a standardized quality rating, Groundwater that exceed a standardized quality rating and Population connected to wastewater with at least secondary treatment

In the proposal of JRC all the indicators are official, but data are not available from European sources, all the data (when available) come from local sources. In particular, the main source of data provided in the JRC proposal is Nilsa, a public organization from Navarre (Navarra de Infraestructuras Locales).

Population served by safely managed drinking water supply services (6.1). Considering the target universal access to water, this indicator fits this purpose for all the regions. However, there are no data available at the European level. In this case Navarra, Andalusia and Pomorskie analysed the same indicator (of the JRC proposal) from national sources.

The other regions chose alternative indicators, from national sources: Efficiency of drinking water distribution networks (Piemonte); Households who report irregularities in water supply (Puglia); Proportion of dwellings served by water supply (Centro) and Drinking water networks and water treatment plants: Rate of population served by water supply network in total municipal population (T33 region).

Data are not available for North Aegean, Western Macedonia and Nord-Vest.

Water bodies that exceed a standardized quality rating (6.3). As suggested by Western Macedonia the European Environmental Agency monitors Water bodies that exceed a standardized quality rating. This source could be useful for many other regions to monitor water status and quality.

Piemonte and Puglia chose a “proxy” Percentage of water bodies achieving the ecological quality objective (high or good) from national source. The ecological state of inland surface waters, in accordance with Legislative Decree 152/2006, is an index that describes the quality of the structure and functioning of aquatic ecosystems. The legislation includes a selection of the Biological Quality Elements (EQB) to be monitored in the different water bodies based on the objectives and the assessment of the pressures and impacts. The EQB provided for surface waters are: macrobenthos, macrophytes and fish fauna. In addition, fitobenthos (diatoms) for rivers, and phytoplankton for lakes. In order to allow a better understanding of the status and management of water bodies, in addition to the EQB, other supporting elements are monitored: the quality index of the chemical-physical components of rivers (LIMeco) or lakes (LTLeeco), specific pollutants not included in the priority list (Table 1 / B) and the hydromorphological elements.

The synthetic version of the indicator proposed by the Italian regions aims to highlight only the percentage of water bodies that have achieved the objective of ecological quality (high and good) on the total number of water bodies of surface waters (rivers and lakes).

Data are not available for Pomorskie and T33 region.

Groundwater that exceed a standardized quality rating (6.3). Also in this case, the European Environmental Agency, as suggested by Western Macedonia, monitors Groundwater that exceed a standardized quality rating. This source could be useful for many other regions to monitor the quality of groundwater in Europe. Andalusia and Centro analysed this indicator from national source.

Piemonte chose a proxy to analyse the Groundwater monitoring in relation to the chemical status of the water (good status or poor status); data are available from regional source (Regional Environmental Protection Agency) that monitors groundwater quality status and assigns a standardized overall quality score (e.g. good, sufficient, poor quality). There are many data, but these are available for individual stream and for individual type of pollutant parameters; there isn't a total quantitative data, but only a qualitative classification.

Puglia analysed the share (%) of groundwater that reached chemical quality standards (good) over the entire groundwater” index is released by the National Institute for Environmental Research (ISPRA). The index answers a EU-directive; it is surveyed every 7 years, which emphasises the importance of groundwater. They are the major source of drinking water for many EU citizens and provides the steady base flow of rivers and wetlands; keeping groundwater free of pollution is vital for humans and river and wetland ecosystems. Once pollutants are in groundwater, recovery can take years or even many decades because of residence times and the slow degradation of pollutants.

In this case, data are not available for North Aegean, Navarra, Pomorskie, Nord-Vest and T33 region.

Population connected to wastewater with at least secondary treatment (6.3). Piemonte and Puglia chose a “proxy” Urban waste water system with secondary or advanced treatment from national source. In particular, according to the information coming from this indicator, waste water from urban sources or elsewhere is treated by a process generally involving biological treatment with a secondary settlement or other process, resulting in a removal of organic material that reduces the biochemical oxygen demand (BOD) by at least 70% and the chemical oxygen demand (COD) by at least 75%. The indicator “Urban water treatment plants in operation by type of secondary/advanced treatment” is calculated as the number of urban wastewater treatment plants with secondary or advanced treatment for 1000 inhabitants.

As alternatives to this indicator, Nord-Vest, suggests for the Romanian regions, the Romanian Statistical Yearbook, National Institute of Statistics – NIS that publishes annual data also at NUTS2 regional level on the length of the public sewerage system and on the number of settlements served by the public sewerage system.

T33 also used an alternative indicator: Rate of municipal population served by sewerage system in total municipal population; Andalusia and Pomorskie analysed the same indicator (of the JRC proposal) Population connected to wastewater with at least secondary treatment but using national/local sources.

Data are not available for North Aegean and Navarra.

For Western Macedonia this indicator is not fit for purpose.: according to the National Operational Plan for Urban Wastewater Management (Western Macedonia) there were only 3 settlements of Priority C in 2019, with missing secondary treatment facilities. However, funding is secured and construction works are under way and/or completed. Target 6.3 “water quality” is covered by 2 other indicators of the SDG. Furthermore, Population connected to wastewater with at least secondary treatment is not part of the National Monitoring Indicators for SDG6.

North Aegean proposed Population connected to urban wastewater collection system. As explained by the region, Municipal Water and Sewerage Utilities (ΔΕΥΑ in Greek) are responsible for the operation of the wastewater treatment plans (WWTPs) operating in the North Aegean islands. At the moment there is not any official and open database explaining the number of the plans, their type and their operational capacity. It is suggested the creation of a database to include such information of the monitoring of the operation of the WWTPs. By tracking the percentage of the population connected to urban wastewater collection systems, regional authorities can gain insights into the region's sanitation infrastructure and its capacity to manage and treat wastewater effectively. This information is essential for identifying gaps, implementing targeted interventions, and ensuring sustainable and resilient urban development in line with the SDG6 (Strogylopoulos, G. 2023).

SDG Target 6.1 UNIVERSAL ACCESS TO WATER

By 2030, achieve universal and equitable access to safe and affordable drinking water for all.

Indicator: Population served by safely managed drinking water supply services

Proportion of people receiving water supply covered by the National Drinking Water System.

Table 57 - Population served by safely managed drinking water supply services

SDG 6 ENSURE AVAILABILITY AND SUSTAINABLE MANAGEMENT OF WATER AND SANITATION FOR ALL				
From the JRC dataset	SDG Target(s)	6.1 (universal access to water)		
	Indicator Name	Population served by safely managed drinking water supply services		
	Type	Official		
	Coverage	Flanders		
	Source	Flanders Environment Agency		
	Unit of measurement	Percentage		
	Frequency	Biennial		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	Not available			
Western Macedonia	Not available			
Navarra	Population served by safely managed drinking water supply services	OCECAS (N/R)	2016-2021	Percentage
Andalucia	Population served by safely managed drinking water supply services	IECA (N/R)	2015-2021	Percentage
Piemonte	Efficiency of drinking water distribution networks	Istat, Regional Statistics (N/R)	2005-2018	Percentage
Puglia	Households who report irregularities in water supply	Istat, Regional Statistics (N/R)	2006-2021	Percentage
Pomorskie	Population served by safely managed drinking water supply services	Local Data Bank (N/R)	2002-2021	Percentage
Centro	Proportion of dwellings served by water supply	Statistics Portugal/ERSAR, Urban public systems of water services (N/R)	2011-2020	Percentage
Nord-Vest	Not available			
TR33	Drinking water networks and water treatment plants : Rate of population served by water supply network in total municipal population	TurkStat (Turkish Statistical Institute) (N/R)	1998-2020	Percentage

Source: authors' own elaboration

SDG Target 6.3 WATER QUALITY

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.

Indicator: Water bodies that exceed a standardized quality rating

Percentage of samples comply with drinking water potability standards. Compliance with drinking water regulations. It does not specify whether it comes from water bodies or groundwater.

Table 58 - Water bodies that exceed a standardized quality rating

SDG 6 ENSURE AVAILABILITY AND SUSTAINABLE MANAGEMENT OF WATER AND SANITATION FOR ALL				
From the JRC dataset	SDG Target(s)	6.3 (water quality)		
	Indicator Name	Water bodies that exceed a standardized quality rating		
	Type	Official		
	Coverage	Navarra		
	Source	NILSA (Navarra de Infraestructuras Locales)		
	Unit of measurement	Rate		
	Frequency			
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Water bodies	Eurostat, Regional Statistics (EU)	2018	Percentage
<i>Western Macedonia</i>	Water bodies that exceed a standardized quality rating	European Environmental Agency (EU)	2010, 2016	Percentage
<i>Navarra</i>	Water bodies that exceed a standardized quality rating	Nilsa (N/R)	2016-2020	Percentage
<i>Andalucia</i>	Water bodies that exceed a standardized quality rating	REDIAM (N/R)	2011-2021	Percentage
<i>Piemonte</i>	Water bodies achieving the ecological quality objective (high or good) out of the total number of surface water bodies (rivers and lakes)	Istat, Regional Statistics from ISPRA data (N/R)	2015	Percentage
<i>Puglia</i>	Water bodies that reached ecological quality standards (high or fair) over the entire surface water bodies (rivers and lakes)	Istat, Regional Statistics from ISPRA data (N/R)	2015	Percentage
<i>Pomorskie</i>	Not available			
<i>Centro</i>	Proportion of surface water bodies with lower quality	Portuguese Environment Agency (N/R)	2015-2021	Percentage
<i>Nord-Vest</i>	Surface water quality for Hydrographic basins	Romanian Statistical Yearbook (N/R)	2009-2021	km
<i>TR33</i>	Not available			

Source: authors' own elaboration

SDG Target 6.3 WATER QUALITY

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.

Indicator: Groundwater that exceed a standardized quality rating

Proportion of groundwater bodies in good status, with respect to the total number of inland surface water bodies in the basin. The status of groundwater bodies is determined by the worst value of their quantitative and chemical status.

For the assessment of the status of groundwater bodies, in Andalusia (the Region has proposed a useful method that can be used for analysis in other European regions) the inventory of pressures (Annex VII of the report of the hydrological plans of the basins) has been used as a starting point, following the DPSIR approach described in the guide of the Common Strategy for the Implementation of the WFD on pressures and impacts (European Commission, 2002). The identification of pressures should explain the current status of water bodies and, in particular, should explain the possible deterioration of water bodies due to the effects of human activities responsible for the pressures. This deterioration situation is evidenced through the recognisable impacts on the water bodies, which is determined through the data obtained from the monitoring programmes.

Table 59 - Groundwater that exceed a standardized quality rating

SDG 6 ENSURE AVAILABILITY AND SUSTAINABLE MANAGEMENT OF WATER AND SANITATION FOR ALL				
From the JRC dataset	SDG Target(s)	6.3 (water quality)		
	Indicator Name	Groundwater that exceed a standardized quality rating		
	Type	Official		
	Coverage	Navarra		
	Source	NILSA (Navarra de Infraestructuras Locales)		
	Unit of measurement	Rate		
	Frequency			
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	Not available			
Western Macedonia	Groundwater that exceed a standardized quality rating	European Environmental Agency (EU)	2010, 2016	Percentage
Navarra	Groundwater that exceed a standardized quality rating	NILSA (N/R)	2016-2020	Percentage
Andalusia	Groundwater that exceed a standardized quality rating	REDIAM (N/R)	2011-2021	Percentage
Piemonte	Groundwater monitoring: chemical status (good status) of groundwater of the surface aquifer system and groundwater in the deep aquifer system	Piemonte Region – ARPA Piemonte (N/R)	2009-2014	Rate
Puglia	Groundwater that reached chemical quality standards (good) over the entire groundwater	ISPRA, Regional Statics (N/R)	2015	Rate
Pomorskie	Not available			
Centro	Proportion of groundwater bodies with lower quality	Portuguese Environment Agency (N/R)	2012-2021	Percentage
Nord-Vest	Not available			
TR33	Not available			

Source: authors' own elaboration

SDG Target 6.3 WATER QUALITY

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.

Indicator: Population connected to wastewater with at least secondary treatment

Proportion of people connected to wastewater treatment systems with at least secondary treatment. Wastewater from urban or other sources is treated by a process that generally involves biological treatment with secondary settlement or another process, resulting in a removal of organic material that reduces biochemical oxygen demand (BOD) by at least 70 per cent and chemical oxygen demand (COD) by at least 75 per cent.

Table 60 - Population connected to wastewater with at least secondary treatment

SDG 6 ENSURE AVAILABILITY AND SUSTAINABLE MANAGEMENT OF WATER AND SANITATION FOR ALL				
From the JRC dataset	SDG Target(s)	6.3 (water quality)		
	Indicator Name	Population connected to wastewater with at least secondary treatment		
	Type	Official		
	Coverage	Navarra		
	Source	NILSA (Navarra de Infraestructuras Locales)		
	Unit of measurement	Percentage		
	Frequency			
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	Population connected to urban wastewater collection system	SAMOS (N/R)	2011	Percentage
Western Macedonia	Not fit for purpose			
Navarra	Not available			
Andalucia	Population connected to wastewater with at least secondary treatment	IECA (N/R)	2000-2020	Percentage
Piemonte	Not available	Istat, Regional Statistics (N/R)	2005-2018	Number
Puglia	Urban water treatment plants in operation by type of secondary/advanced treatment	Istat, Regional Statistics (N/R)	2005-2018	Number
Pomorskie	Population connected to wastewater with at least secondary treatment	Local Data Bank (N/R)	2002-2021	Number
Centro	Proportion of dwellings served by wastewater treatment	Statistics Portugal/ERSAR, Urban public systems of water services (N/R)	2020	Percentage
Nord-Vest	Not available			
TR33	Municipal wastewater statistics : Rate of municipal population served by sewerage system in total municipal population	TurkStat (Turkish Statistical Institute) (N/R)	1998-2020	Percentage

Source: authors' own elaboration



SDG 7 – AFFORDABLE AND CLEAN ENERGY

For the SDG7 the JRC suggested four indicators, which cover three SDG targets:

- Target 7.1 access to energy, 1 indicator: People affected by energy poverty
- Target 7.2 share of renewable energy, 2 indicators: Electricity production that comes from nuclear power and Electricity production that comes from renewable sources
- Target 7.3 energy efficiency, 1 indicator: Energy intensity

In the proposal of JRC two indicators are official, but not available from European sources, and two are experimental indicators, available from European sources, both of them from the Organisation for Economic Cooperation and Development (OECD).

With regard to this SDG7 and the indicators proposed by the JRC, for the Nord-Vest region there is no data available at the regional level for any of these indicators, but only at the national level.

People affected by energy poverty (7.1). This indicator is available for Andalusia and Navarra from Spanish data sources and for North Aegean and Western Macedonia from Greek sources.

This is not available at the regional level for Piemonte, but only available at the national level. Puglia suggests an alternative indicator: Consumers' satisfaction about the Electricity providers' services" (SDG 7) could be a substitute for "People affected by energy poverty. The indicator proposed is available from the National Statistical institute (Istat) from a national survey in yearly time-series from 2010: "Survey on Aspects of daily life".

Centro used two *sub-indicators* which are part of a composite indicator that aims to comprehensively monitor the prevalence of energy poverty: 1) "Proportion of resident population living in households without economic capacity to keep the home adequately warm" (it is based on subjective data as it relies on people's opinions regarding their quality of life); 2) "Percentage of beneficiaries of the Social Tariff for Energy compared to the resident population" (this sub-indicator is based on objective data, as it relies on the number of beneficiaries of the Social Tariff for Energy, which is only accessible to people who meet certain economic criteria identified by the Tax and Customs Authority and the Social Security).

For Nord-Vest data are only available at the national level

Electricity production that comes from nuclear power (7.2). This is not applicable in all the regions, and it may not be a relevant measure of sustainable development at the regional level in Europe.

It is possible to use a different indicator, "Share of clean energy in energy production (%)", instead, as not all renewable energy sources are clean, and vice versa. This is a case of an additional indicator that could cover this target.

Electricity production that comes from renewable sources (7.2). This indicator is an experimental indicator with data available from the Organisation for Economic Cooperation and Development (OECD), but only T33 used the European source. The others opted for national sources and, in general, for official indicators. Data are not available for North Aegean and Nord-Vest.

For Nord-Vest data are only available at the national level (the Romanian Energy Regulatory Authority publishes monthly country reports on the generation structure of the National Power System by type of resources).

Energy intensity (7.3). This is an official indicator with data available only from national sources. For Navarra, Andalusia, Piemonte, Puglia, Pomorskie and T33 data are available.

For Nord-Vest data are only available at the national level (data on energy emissions are available annually in the United Nations Framework Convention on Climate Change - UNFCCC reports on GHG emissions).

Also for the Greek regions, North Aegean and Western Macedonia there are no available data at the regional level. The indicator is considered relevant and appropriate to be included in the regional SDG monitoring system, even though at the moment there are no published data at regional level in Greece. Data at national level are calculated and published by ELSTAT in the framework of the National SDGs Monitoring System.

SDG Target 7.1 ACCESS TO ENERGY

By 2030, ensure universal access to affordable, reliable and modern energy services.

Indicator: People affected by energy poverty

Energy poverty is defined as the condition of a household in which basic energy supply needs cannot be met, because of an insufficient level of income, and which may possibly be aggravated by energy inefficient housing. To parametrize fuel poverty situations, the 4 official indicators of the European Monitoring Centre on Energy Poverty (EPOV) have been used: disproportionate expenditure, hidden energy poverty, inability to keep the dwelling at an adequate temperature and delays in the payment of utility bills.

Table 61 - People affected by energy poverty

SDG 7 ENSURE ACCESS TO AFFORDABLE, RELIABLE, SUSTAINABLE AND MODERN ENERGY FOR ALL				
From the JRC dataset	SDG Target(s)	7.1 (access to energy)		
	Indicator Name	People affected by energy poverty		
	Type	Official		
	Coverage	Spain		
	Source	Ministry for the Ecological Transition and the Demographic Challenge		
	Unit of measurement	Percentage		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	People affected by energy poverty	Ministry of Environment and Energy (N/R)	2019-2020	Index
Western Macedonia	People affected by energy poverty	Ministry of Environment and Energy (N/R)	2019, 2020	Percentage
Navarra	People affected by energy poverty	Ministry for Ecological Transition (MITECO). Energy Poverty Advisory Hub (EPAH) (N/R)	2017-2021	Percentage
Andalucia	People affected by energy poverty	Ministry for Ecological Transition (MITECO) (N/R)	2017-2021	Percentage
Piemonte	Not available			
Puglia	Consumers' satisfaction about the Electricity providers' services	GSE S.p.A. - Gestore dei Servizi Energetici (N/R)	2012-2020	Percentage
Pomorskie	Not available			
Centro	Proportion of resident population living in households without economic capacity to keep the home adequately warm; Percentage of beneficiaries of the Social Tariff for Energy compared to the resident population	Statistics Portugal, Statistics on income and living conditions (N/R)	2018-2022 2016-2022	Rate
Nord-Vest	Not available			
TR33	Not available			

Source: authors' own elaboration

SDG Target 7.2 SHARE OF RENEWABLE ENERGY

By 2030, increase substantially the share of renewable energy in the global energy mix.

Indicator: Electricity production that comes from nuclear power

Proportion of electricity generated from nuclear power (measurable only for Andalucía).

Table 62 - Electricity production that comes from nuclear power

SDG 7 ENSURE ACCESS TO AFFORDABLE, RELIABLE, SUSTAINABLE AND MODERN ENERGY FOR ALL				
From the JRC dataset	SDG Target(s)	7.2 (share of renewable energy)		
	Indicator Name	Electricity production that comes from nuclear power		
	Type	Experimental		
	Coverage	OECD countries and other European countries		
	Source	Organisation for Economic Cooperation and Development (OECD)		
	Unit of measurement	Percentage		
	Frequency			
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	Non-fit for purpose			
Western Macedonia	Non-fit for purpose			
Navarra	Non-fit for purpose			
Andalucía	Electricity production that comes from nuclear power	AAE (Andalusian Energy Agency) (N/R)*	2005-2021	Percentage
Piemonte	Non-fit for purpose			
Puglia	Consumption of electricity from renewable resources in for transports (share of the final gross energy consumption)**	Istat, Regional Statics (N/R)	2010-2021	Percentage
Pomorskie	Non-fit for purpose			
Centro	Non-fit for purpose			
Nord-Vest	Non-fit for purpose			
TR33	Non-fit for purpose			

Source: authors' own elaboration

* There is no nuclear production in Andalucía, nor plans to implement it in the near future. The Regional Government has expressed its commitment to renewable energies as a source of electricity generation, and has drawn up the Andalucía Energy Guidelines, which guide the policy on the promotion of clean energies, energy saving and efficiency.

** Puglia suggests the indicator "Consumption of electricity from renewable resources in for transports (share of the final gross energy consumption)" as an alternative indicator in relation to the Target 7.2 share of renewable energy, but in this final report we consider this indicator as a complementary, it complements Electricity production that comes from renewable sources (next page).

SDG Target 7.2 SHARE OF RENEWABLE ENERGY

By 2030, increase substantially the share of renewable energy in the global energy mix.

Indicator: Electricity production that comes from renewable sources

Share of electric power generation from renewable energy sources (biomass, aeolic, hydraulic, oceanothermal, solar photovoltaic and solar thermal).

Table 63 - Electricity production that comes from renewable sources

SDG 7 ENSURE ACCESS TO AFFORDABLE, RELIABLE, SUSTAINABLE AND MODERN ENERGY FOR ALL				
From the JRC dataset	SDG Target(s)	7.2 (share of renewable energy)		
	Indicator Name	Electricity production that comes from renewable sources		
	Type	Experimental		
	Coverage	OECD countries and other European countries		
	Source	Organisation for Economic Cooperation and Development (OECD)		
	Unit of measurement	Percentage		
	Frequency			
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Not available			
<i>Western Macedonia</i>	Installed power that comes from renewable energy sources	Administrator of Renewable Energy Sources and Guarantees of Origin SA (DAEEP SA) (N/R)	2016-2022	Number
<i>Navarra</i>	Electricity production that comes from renewable sources	OCECAS (N/R)	2011-2021	Percentage
<i>Andalucia</i>	Electricity production that comes from renewable sources	AAE (Andalusian Energy Agency) (N/R)	2005-2021	Percentage
<i>Piemonte</i>	Electricity production that comes from renewable sources	Istat, Regional Statistics from GSE S.p.A. data (N/R)	2012-2020	Percentage
<i>Puglia</i>	Electricity production that comes from renewable sources	Istat, Regional Statistics on Terna data (N/R)	2004-2020	Percentage
<i>Pomorskie</i>	Electricity production that comes from renewable sources	Local Data Bank (N/R)	2005-2021	Percentage
<i>Centro</i>	Share of renewable energy in electricity production	Directorate-General for Energy and Geology, Statistics on coal, oil, electric power and natural gas (N/R)	2009-2021	Percentage
<i>Nord-Vest</i>	Not available			
<i>TR33</i>	Electricity production that comes from renewable sources (Share of renewable energy sources in electricity generation)	OECD, Regional Statistics (EU)	2019	Percentage

Source: authors' own elaboration

SDG Target 7.3 ENERGY EFFICIENCY

By 2030, double the global rate of improvement in energy efficiency

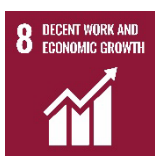
Indicator: Energy intensity

Electricity consumption per unit of real GDP.

Table 64 - Energy intensity

SDG 7 ENSURE ACCESS TO AFFORDABLE, RELIABLE, SUSTAINABLE AND MODERN ENERGY FOR ALL				
From the JRC dataset	SDG Target(s)	7.3 (energy efficiency)		
	Indicator Name	Energy intensity		
	Type	Official		
	Coverage	Basque county		
	Source	Euskadi Energia		
	Unit of measurement	Index		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	Not available			
Western Macedonia	Not available			
Navarra	Energy intensity	OCECAS (N/R)	2011-2021	Tons of oil equivalent (toe) per million euros
Andalucia	Energy intensity	AAE (Andalusian Energy Agency) (N/R)	2005-2021	Percentage
Piemonte	Energy intensity	Istat, Regional Statistics from ENEA data (N/R)	2009-2019	Index (tons of oil equ per million €)
Puglia	Energy intensity	Istat, Regional Statistics from ENEA data (N/R)	2009-2019	Index (tons of oil equ per million €)
Pomorskie	Energy intensity	Local Data Bank (N/R)	2005-2021	Number (Millions PLN)
Centro	Energy intensity of the economy in final energy	Directorate-General for Energy and Geology, Statistics on coal, oil, electric power and natural gas (N/R)	2011-2018	Tonne of oil equivalent / Euro
Nord-Vest	Not available			
TR33	Not available			

Source: authors' own elaboration



SDG 8 – DECENT AND INCLUSIVE WORK AND SUSTAINABLE ECONOMIC GROWTH

SDG 8 has the largest number of indicators in the JRC proposal, ten indicators, which cover the largest number of SDG targets, five in total:

- Target 8.1 economic growth, 1 indicator: GDP at current market prices
- Target 8.2 economic productivity, 1 indicator: GVA at basic prices
- Target 8.3 job creation, 1 indicator: Firm creation
- Target 8.5 productive employment, 5 indicators: Economic activity, Unemployment, Employment, Long-term unemployment (12 months and more) and Compensation of employees
- Target 8.6 youth not in employment, education or training, 1 indicator: Young people neither in employment nor in education and training
- Target 8.8 labour rights, 1 indicator: Occupational accidents

Nine out of ten indicators are official, and data for seven of them are available from European sources (Eurostat); one experimental indicator, with available data from OECD. For the other two official indicators there is no official data source at the European level.

GDP at current market prices (8.1). This indicator (official, from Eurostat) can be defined in three ways: 1) Supply-side approach: GDP is equal to the sum of the gross value added of the various institutional sectors or different branches of activity, plus taxes minus subsidies on products; 2) Demand approach: GDP is equal to the sum of final uses of goods and services by resident institutional units (final consumption expenditure and gross capital formation), plus exports minus imports of goods and services; 3) Income approach: GDP is equal to the sum of compensation of employees, taxes less subsidies on production and imports, gross operating surplus and gross mixed income of the total economy.

As Centro suggests, if we want to assess the economic well-being of a region's population, using the GDP per capita could be a more relevant indicator than just the GDP alone.

In general, this indicator is available for all the regions from European source (Eurostat) In most regions; Andalusia, Pomorskie and Centro chose national/regional sources.

GVA at basic prices (8.2). Related to the previous point, this indicator is official and published by Eurostat.

Also in this case Andalusia, Pomorskie chose national/regional sources. Considering that GDP is already contemplated in this indicator set, for Centro region, adding GVA as another metric might not provide substantial value, as it could be seen as redundant, therefore this indicator is excluded for the Centro Region set.

As suggested by Navarra region this two targets (8.1 and 8.2), economic growth and economic productivity, the indicator proposed is GDP at current prices and for the second GVA at basic prices. Both macro magnitudes differ basically in taxes. This means that both indicators have equal trends. GDP is a good indicator for measuring economic growth. However, for it to truly reflect economic growth it must be shown at constant prices or volumes. Similarly, in order to address economic productivity, it would be more informative to consider GVA at constant prices. Moreover, this indicator should be complemented by GVA per worker (Osés-Eraso, 2023).

Firm creation (8.3). Even though the JRC proposal suggested an indicator published annually by OECD (experimental indicator), only Piemonte chose the same source. Puglia also utilized a European source, specifically Eurostat. The others regions, when possible (North Aegean, Western Macedonia, Andalusia and Centro), opted for data from national/regional sources. There is no available data for Nord-Vest and the T33 region.

Economic activity, Unemployment, Employment, Long-term unemployment (12 months and more) and Compensation of employees (8.5). These five indicators were selected to target productive employment (8.5). They monitor the primary variables of the labor market: activity, employment, and unemployment, and their corresponding rates, which are well-known indicators. All of them are official indicators available annually from Eurostat statistics. Generally, the regions maintained the European source, except for Andalusia, and occasionally Centro and Pomorskie.

Unemployment and Employment are two distinct yet strongly related indicators. Specifically, for the Centro region, since unemployment rates are already being monitored, the employment indicator appears redundant and may not offer additional insights or value. Consequently, the region excluded the employment indicator from its set.

The only indicator not available for one region is Long-term Unemployment (12 months and more) for Nord-Vest. There are different breaks in the data for this variable at the NUTS2 level, particularly for 2021, marked as unreliable. Additionally, the percentage could refer to either the Percent of Unemployed or the Percent of Unemployed in the labor force. Consequently, this indicator was excluded from the region's set.

Young people neither in employment nor in education and training (8.6). Data for this indicator are available from European sources, such as Eurostat (utilized by North Aegean, Western Macedonia, Puglia and Pomorskie) and OECD (as suggested by T33). Andalusia, Navarra, Piemonte and Centro chose national/regional sources. However, for Nord-Vest, data are not available at the regional level but only at the national level.

Some regions have used the age range for young NEETs as 15 to 24 years, while other regions have chosen 18 to 24 years.

Occupational accidents (8.8). The last target considered in the JRC proposal is labor rights, and the chosen indicator is occupational accidents. In this case, each region selected a different indicator of its own since there isn't an official European data source. Data for this indicator are not available only for the T33 region.

SDG Target 8.1 ECONOMIC GROWTH

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.

Indicator: GDP -Gross domestic product - at current market prices

It is the final outcome of the productive activity of resident production units. It can be defined in three ways:

- (a) Supply-side approach: GDP is equal to the sum of the gross value added of the various institutional sectors or different branches of activity, plus taxes minus subsidies on products.
- (b) Demand approach: GDP is equal to the sum of final uses of goods and services by resident institutional units (final consumption expenditure and gross capital formation), plus exports minus imports of goods and services.
- (c) Income approach: GDP is equal to the sum of compensation of employees, taxes less subsidies on production and imports, gross operating surplus and gross mixed income of the total economy.

Table 65 - GDP -Gross domestic product - at current market prices

SDG 8 PROMOTE SUSTAINED, INCLUSIVE AND SUSTAINABLE ECONOMIC GROWTH, FULL AND PRODUCTIVE EMPLOYMENT AND DECENT WORK FOR ALL				
From the JRC dataset	SDG Target(s)	8.1 (economic growth)		
	Indicator Name	GDP at current market prices		
	Type	Official		
	Coverage	EU-27 plus others		
	Source	Eurostat, Regional Statistics		
	Unit of measurement	Number		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	GDP at current market prices	Eurostat, Regional Statistics (EU)	2000-2021	Number
Western Macedonia	GDP at current market prices	Eurostat, Regional Statistics (EU)	2000-2020	Number
Navarra	GDP at constant prices or volume	Eurostat, Regional Statistics (EU)	2000-2021	Number - Constant prices
Andalucia	GDP at current market prices	INE (N/R)	2000-2021	x1000 €
Piemonte	GDP at current market prices	Eurostat, Regional Statistics (EU)	2000-2020	Number (Million euro)
Puglia	GDP at current market prices	Eurostat, Regional Statistics (EU)	2000-2020	Number (Million euro)
Pomorskie	GDP at current market prices	Local Data Bank (N/R)	2000-2021	Number (Millions PLN)
Centro	Gross domestic product (B.1*g) at current prices	Statistics Portugal, Regional economic accounts (N/R)	1995-2021	Euros
Nord-Vest	GDP at current market prices	Eurostat, Regional Statistics (EU)	2007-2021	Number (Million euro)
TR33	GDP at current market prices	Eurostat, Regional Statistics (EU)	2004-2021	Percentage (€ per inhab. in % of the EU27 average - from 2020)

Source: authors' own elaboration

SDG Target 8.2 ECONOMIC PRODUCTIVITY

Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labour-intensive sectors.

Indicator: GVA - Gross value added - at basic prices

It is the net result of production at basic prices minus intermediate consumption at purchasers' prices used in production.

Table 66 - Gross value added - at basic prices

SDG 8 PROMOTE SUSTAINED, INCLUSIVE AND SUSTAINABLE ECONOMIC GROWTH, FULL AND PRODUCTIVE EMPLOYMENT AND DECENT WORK FOR ALL				
From the JRC dataset	SDG Target(s)	8.2 (economic productivity)		
	Indicator Name	GVA at basic prices		
	Type	Official		
	Coverage	EU-27 plus others		
	Source	Eurostat, Regional Statistics		
	Unit of measurement	Number		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	GVA at basic prices	Eurostat, Regional Statistics (EU)	2000-2021	Number
Western Macedonia	GVA at basic prices	Eurostat, Regional Statistics (EU)	2000-2021	Number
Navarra	GVA per worker at constant prices or volume	Eurostat, Regional Statistics (EU)	2000-2021	Number - Constant prices
Andalucia	GVA at basic prices	INE (N/R)	2000-2021	x1000 €
Piemonte	GVA at basic prices	Eurostat, Regional Statistics (EU)	1995-2020	Number (Million euro)
Puglia	GVA at basic prices	Eurostat, Regional Statistics (EU)	1995-2020	Number (Million euro)
Pomorskie	GVA at basic prices	Local Data Bank (N/R)	2000-2021	Number (Millions PLN)
Centro	Gross value added (B.1g) at current prices – not fit for purpose - redundant	Statistics Portugal, Regional economic accounts (N/R)	1995-2021	Euros
Nord-Vest	GVA at basic prices	Eurostat, Regional Statistics (EU)	2007-2021	Number (Million euro)
TR33	GVA at basic prices	Eurostat, Regional Statistics (EU)	2017-2021	Number

Source: authors' own elaboration

SDG Target 8.3 JOB CREATION

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.

Indicator: Firm creation

Births as a percentage of the population of active enterprises (birth rates).

Enterprise births covering all enterprises, regardless of whether they are employers or not. No general threshold is applied to the size of the enterprise in terms of employment or any other characteristics. Enterprise births are defined (in Commission Regulation (EC) No 2700/98 of 17 December 1998 concerning the definitions of characteristics for structural business statistics) as follows: "A count of the number of births of enterprises registered to the population concerned in the business register corrected for errors. A birth amounts to the creation of a combination of production factors with the restriction that no other enterprises are involved in the event. Births do not include entries into the population due to: mergers, break-ups, split-off or restructuring of a set of enterprises. It does not include entries into a sub-population resulting only from a change of activity."

Table 67 - Firm creation

SDG 8 PROMOTE SUSTAINED, INCLUSIVE AND SUSTAINABLE ECONOMIC GROWTH, FULL AND PRODUCTIVE EMPLOYMENT AND DECENT WORK FOR ALL				
From the JRC dataset	SDG Target(s)	8.3 (job creation)		
	Indicator Name	Firm creation		
	Type	Experimental		
	Coverage	OECD countries and other European countries		
	Source	Organisation for Economic Cooperation and Development (OECD)		
	Unit of measurement	Rate		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	Firm creation	ELSTAT (N/R)	2019-2020	Number
Western Macedonia	Number of firms	ELSTAT (N/R)	2011-2020	Number
Navarra	Not available			
Andalucia	Firm creation	INE (N/R)	2008-2020	Percentage
Piemonte	Birth rate (in % of employer firms)*	OECD, Regional Statistics (EU)	2011-2017	Rate
Puglia	Firm creation	Eurostat, Regional Statistics (EU)	2011-2020	Rate
Pomorskie	Not available			
Centro	Births of Enterprises	Statistics Portugal, Business demography (N/R)	2008-2021	Rate
Nord-Vest	Not available			
TR33	Not available			

Source: authors' own elaboration

*aggregate 3 (industry, construction and services exc. insurance activities of holding companies)

SDG Target 8.5 PRODUCTIVE EMPLOYMENT

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.

Indicator: Economic activity

Ratio between the total active population and the population aged 16 and over. The active population comprises employed and unemployed persons during the reference week, according to ILO (International Labour Organization) criteria.

Table 68 - Economic activity

SDG 8 PROMOTE SUSTAINED, INCLUSIVE AND SUSTAINABLE ECONOMIC GROWTH, FULL AND PRODUCTIVE EMPLOYMENT AND DECENT WORK FOR ALL				
From the JRC dataset	SDG Target(s)	8.5 (productive employment)		
	Indicator Name	Economic activity		
	Type	Official		
	Coverage	EU-27 plus others		
	Source	Eurostat, Regional Statistics		
	Unit of measurement	Rate		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Economic activity	Eurostat, Regional Statistics (EU)	1999-2021	Number
<i>Western Macedonia</i>	Economic activity	Eurostat, Regional Statistics (EU)	1999-2021	Rate
<i>Navarra</i>	Economic activity	Eurostat, Regional Statistics (EU)	1999-2021	Percentage
<i>Andalucia</i>	Economic activity	INE (NR)	2006-2022	Percentage
<i>Piemonte</i>	Economic activity -Economically active population - from 15 to 74 years	Eurostat, Regional Statistics (EU)	1999-2021	Rate (Thousand persons)
<i>Puglia</i>	Economic activity	Eurostat, Regional Statistics (EU)	1999-2021	Rate (Thousand persons)
<i>Pomorskie</i>	Economic activity	Local Data Bank (N/R)	2010-2021	Rate (Thousand persons)
<i>Centro</i>	Activity rate of the working age population	Statistics Portugal, Labour force survey (N/R)	2011-2022	Rate
<i>Nord-Vest</i>	Economically active population -from 15 to 74 years (employed and unemployed)	Eurostat, Regional Statistics (EU)	2011-2020	Rate (Thousand persons)
<i>TR33</i>	Economically active population - from 15 to 64 years	Eurostat, Regional Statistics (EU)	2006-2020	Number

Source: authors' own elaboration

SDG Target 8.5 PRODUCTIVE EMPLOYMENT

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.

Indicator: Unemployment

Ratio between the number of unemployed and the number of active people.

It is calculated for both sexes and for each sex separately. Unemployed are all persons aged 16 and over who, according to ILO (International Labour Organization) criteria, during the reference week, were in the following three situations simultaneously:

- (d) out of work, i.e. they were not in paid employment or self-employment,
- (e) available for work, i.e. available for paid employment or self-employment within two weeks of the reference week,
- (f) actively seeking work during the month preceding the Sunday of the reference week. This last requirement is not necessary in the case of having found a job to be taken up within three months of the reference week.

The labour force comprises employed and unemployed persons during the reference week according to ILO criteria.

Table 69 - Unemployment

SDG 8 PROMOTE SUSTAINED, INCLUSIVE AND SUSTAINABLE ECONOMIC GROWTH, FULL AND PRODUCTIVE EMPLOYMENT AND DECENT WORK FOR ALL				
From the JRC dataset	SDG Target(s)	8.5 (productive employment)		
	Indicator Name	Unemployment		
	Type	Official		
	Coverage	EU-27 plus others		
	Source	Eurostat, Regional Statistics		
	Unit of measurement	Rate		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	Unemployment	Eurostat, Regional Statistics (EU)	2012-2022	Percentage
Western Macedonia	Unemployment	Eurostat, Regional Statistics (EU)	1999-2021	Rate
Navarra	Unemployment	Eurostat, Regional Statistics (EU)	1999-2021	Percentage
Andalucia	Unemployment	INE (N/R)	2002-2022	Percentage
Piemonte	Unemployment - from 15 to 74 years	Eurostat, Regional Statistics (EU)	1999-2021	Rate
Puglia	Unemployment	Eurostat, Regional Statistics (EU)	2011-2021	Rate
Pomorskie	Unemployment	Local Data Bank (N/R)	2004-2022	Percentage
Centro	Unemployment	Statistics Portugal, Labour force survey (N/R)	2011-2022	Percentage
Nord-Vest	Unemployment	Eurostat, Regional Statistics (EU)	2011-2020	Rate
TR33	Unemployment - from 15 to 64 years	Eurostat, Regional Statistics (EU)	2006-2020	Number

Source: authors' own elaboration

SDG Target 8.5 PRODUCTIVE EMPLOYMENT

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.

Indicator: Employment

The employment rate is the percentage of employed persons in relation to the comparable total population.

This is the ratio between the total number of employed persons and the population aged 16 and over.

Employed persons are all persons aged 16 and over who, according to ILO (International Labour Organization) criteria, during the reference week were in paid employment or self-employment, self-employed workers.

In relation to this employment or activity, they could have been found in the reference week: working for at least one hour in the said period for remuneration, wages, business profit or family gain, etc., or absent from it but with a strong link to this employment.

Table 70 - Employment

SDG 8 PROMOTE SUSTAINED, INCLUSIVE AND SUSTAINABLE ECONOMIC GROWTH, FULL AND PRODUCTIVE EMPLOYMENT AND DECENT WORK FOR ALL				
From the JRC dataset	SDG Target(s)	8.5 (productive employment)		
	Indicator Name	Employment		
	Type	Official		
	Coverage	EU-27 plus others		
	Source	Eurostat, Regional Statistics		
	Unit of measurement	Number		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	Employment	Eurostat, Regional Statistics (EU)	1999-2021	Percentage
Western Macedonia	Employment	Eurostat, Regional Statistics (EU)	1999-2021	Number
Navarra	Employment	Eurostat, Regional Statistics (EU)	1999-2021	Percentage
Andalucia	Employment	INE (N/R)	2002-2022	Percentage
Piemonte	Employment - from 15 to 64 years	Eurostat, Regional Statistics (EU)	1999-2021	Number
Puglia	Employment	Eurostat, Regional Statistics (EU)	1999-2021	Number (1000)
Pomorskie	Employment	Eurostat, Regional Statistics (EU)	1999-2021	Thousand persons
Centro	Employed population – not-fit for purpose - redundant*	Statistics Portugal, Labour force survey (N/R)	2011-2021	Number
Nord-Vest	Number of employed	Eurostat, Regional Statistics (EU)	2011-2020	Rate
TR33	Employment - from 15 to 64 years	Eurostat, Regional Statistics (EU)	2006-2020	Number

Source: authors' own elaboration

* Since unemployment rates are already being monitored, this indicator appears redundant for Centro region and may not provide any additional insights or value. Therefore, it is excluded from Centro Region monitoring set.

SDG Target 8.5 PRODUCTIVE EMPLOYMENT

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.

Indicator: Long-term unemployment (12 months and more)

Proportion of the unemployed population that has been actively looking for work for more than one year.

Unemployed are all persons aged 16 and over who, according to ILO (International Labour Organization) criteria, during the reference week, were in the following three situations simultaneously:

- (g) out of work, i.e. not in paid employment or self-employment,
- (h) available for work, i.e. available for paid employment or self-employment within two weeks of the reference week,
- (i) actively seeking work during the month preceding the Sunday of the reference week. This last requirement is not necessary in the case of having found a job to be taken up within three months of the reference week.

Table 71 - Long-term unemployment (12 months and more)

SDG 8 PROMOTE SUSTAINED, INCLUSIVE AND SUSTAINABLE ECONOMIC GROWTH, FULL AND PRODUCTIVE EMPLOYMENT AND DECENT WORK FOR ALL				
From the JRC dataset	SDG Target(s)	8.5 (productive employment)		
	Indicator Name	Long-term unemployment (12 months and more)		
	Type	Official		
	Coverage	EU-27 plus others		
	Source	Eurostat, Regional Statistics		
	Unit of measurement	Rate		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	Long-term unemployment (12 months and more)	Eurostat, Regional Statistics (EU)	1999-2021	Number
Western Macedonia	Long-term unemployment (12 months and more)	Eurostat, Regional Statistics (EU)	1999-2021	Rate
Navarra	Long-term unemployment (12 months and more)	Eurostat, Regional Statistics (EU)	1999-2021	Percentage
Andalucia	Long-term unemployment	INE (N/R)	2002-2022	Percentage
Piemonte	Long-term unemployment (12 months and more) - from 15 to 74 years	Eurostat, Regional Statistics (EU)	1999-2021	Rate (Thousand)
Puglia	Long-term unemployment (12 months and more)	Eurostat, Regional Statistics (EU)	1999-2021	Rate
Pomorskie	Long-term unemployment (12 months and more)	Local Data Bank (N/R)	2001-2020	Percentage
Centro	Long-term unemployment rate	Eurostat, Regional Statistics (EU)	1999-2022	Rate
Nord-Vest	Not available			
TR33	Long-term unemployment (12 months and more)	Eurostat, Regional Statistics (EU)	2013-2020	Number

Source: authors' own elaboration

SDG Target 8.5 PRODUCTIVE EMPLOYMENT

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.

Indicator: Compensation of employees

The compensation of employees consists of all remuneration, in cash and in kind, which employees receive from their employers in return for work done during the relevant accounting period. The payments cover: gross (pre-tax) wages and salaries; employers' actual social contributions; imputed social contributions.

Table 72 - Compensation of employees

SDG 8 PROMOTE SUSTAINED, INCLUSIVE AND SUSTAINABLE ECONOMIC GROWTH, FULL AND PRODUCTIVE EMPLOYMENT AND DECENT WORK FOR ALL				
From the JRC dataset	SDG Target(s)	8.5 (productive employment)		
	Indicator Name	Compensation of employees		
	Type	Official		
	Coverage	EU-27 plus others		
	Source	Eurostat, Regional Statistics		
	Unit of measurement	Number		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	Compensation of employees	Eurostat, Regional Statistics (EU)	2000-2020	Number
Western Macedonia	Compensation of employees	Eurostat, Regional Statistics (EU)	2000-2020	Number
Navarra	Compensation of employees at constant prices	Eurostat, Regional Statistics (EU)	2000-2021	Number (Million euro)
Andalucia	Compensation of employees	INE (N/R)	2000-2021	x1000€
Piemonte	Compensation of employees	Eurostat, Regional Statistics (EU)	1995-2019	Number (Million euro)
Puglia	Compensation of employees	Eurostat, Regional Statistics (EU)	1995-2019	Number (Million euro)
Pomorskie	Compensation of employees	Eurostat, Regional Statistics (EU)	2000-2020	Number (euro)
Centro	Compensation of employees	Eurostat, Regional Statistics (EU)	1995-2020	Euros
Nord-Vest	Compensation of employees	Eurostat, Regional Statistics (EU)	2007-2020	Number (Million euro)
TR33	Compensation of employees	Eurostat, Regional Statistics (EU)	1995-2020	Number

Source: authors' own elaboration

SDG Target 8.6 YOUTH NOT IN EMPLOYMENT, EDUCATION OR TRAINING

By 2020, substantially reduce the proportion of youth not in employment, education or training.

Indicator: Young people neither in employment nor in education and training - NEET

Share of 15-24 year-olds not in employment, education or training (formal or non-formal) in the last four weeks out of all 15-24 year-olds.

The indicator on young people neither in employment nor in education and training (NEET) corresponds to the percentage of the population of a given age group and sex who is not employed and not involved in further education or training. The numerator of the indicator refers to persons who meet the following two conditions: (a) they are not employed (i.e. unemployed or inactive according to the International Labour Organisation definition) and (b) they have not received any education or training (i.e. neither formal nor non-formal) in the four weeks preceding the survey.

Table 73 - Young people neither in employment nor in education and training - NEET

SDG 8 PROMOTE SUSTAINED, INCLUSIVE AND SUSTAINABLE ECONOMIC GROWTH, FULL AND PRODUCTIVE EMPLOYMENT AND DECENT WORK FOR ALL				
From the JRC dataset	SDG Target(s)	8.6 (youth not in employment, education or training)		
	Indicator Name	Young people neither in employment nor in education and training		
	Type	Official		
	Coverage			
	Source	JRC elaboration (regional government)		
	Unit of measurement			
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	Young people neither in employment nor in education and training	Eurostat, Regional Statistics (EU)	2000-2022	Percentage
Western Macedonia	Young people neither in employment nor in education and training	Eurostat, Regional Statistics (EU)	2000-2021	Rate
Navarra	Young people neither in employment nor in education and training	OCECAS (N/R)	2000-2021	Percentage
Andalucia	Young people neither in employment nor in education and training	IECA (N/R)	2010-2021	Percentage
Piemonte	Young people neither in employment nor in education and training (15-24 years)	Istat, Regional Statistics (N/R)	2004-2021	Percentage
Puglia	Young people neither in employment nor in education and training	Eurostat, Regional Statistics (EU)	2000-2021	Rate
Pomorskie	Young people neither in employment nor in education and training	Eurostat, Regional Statistics (EU)	2001-2020	Percentage
Centro	Rate of young people aged between 16 and 34 years old neither in employment nor in education and training	Statistics Portugal, Labour force survey (N/R)	2011-2021	Rate
Nord-Vest	Not available			
TR33	Young people neither in employment nor in education and training (18-24 years)	OECD, Regional Statistics (EU)	2005-2021	Rate

Source: authors' own elaboration

SDG Target 8.8 LABOUR RIGHTS

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.

Indicator: Occupational accidents

Work accidents that have resulted in sick leave (for at least 1 day, not counting the day of the accident) or the death of the injured worker. Work accidents can occur either during the working day or during the trip between the worker's home and the place of work or vice versa (in itinerary).

Table 74 - Occupational accidents

SDG 8 PROMOTE SUSTAINED, INCLUSIVE AND SUSTAINABLE ECONOMIC GROWTH, FULL AND PRODUCTIVE EMPLOYMENT AND DECENT WORK FOR ALL				
From the JRC dataset	SDG Target(s)	8.8 (labour rights)		
	Indicator Name	Occupational accidents		
	Type	Official		
	Coverage	Spain		
	Source	National Institute for Occupational Safety and Health		
	Unit of measurement	Rate		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	Occupational accidents	ELSTAT (N/R)	2012-2020	Number
Western Macedonia	Occupational accidents	ELSTAT (N/R)	2000-2020	Rate
Navarra	Occupational accidents	Ministry of Labour and Social Economy (MITES) (N/R)	1988-2021	Accidents per 100000 workers
Andalucia	Occupational accidents	MITES (N/R)	1988-2021	per 100000 workers
Piemonte	Occupational accidents: Fatal accidents and permanent disability	Istat, Reginal Statistics from Inail data (N/R)	2008-2020	Rate (per 10.000 employees)
Puglia	Occupational accidents	Istat, Reginal Statistics from Inail data (N/R)	2008-2020	Rate (per 10.000 employees)
Pomorskie	Occupational accidents: fatal accidents and permanent disability	Local Data Bank (N/R)	2002-2021	Number
Centro	Proportion of accidents at work	Office for Strategy and Planning in the Ministry of Labour, Solidarity and Social Security (N/R)	2009-2020	Rate
Nord-Vest	Injured at work	Romanian Statistical Yearbook, National Institute of Statistics (N/R)	2009-2021	Number; Rates per thousands
TR33	Not available			

Source: authors' own elaboration



SDG 9 – RESILIENT INFRASTRUCTURE, SUSTAINABLE INDUSTRIALIZATION AND INNOVATION

From the dataset proposed by the JRC, for SDG9, five indicators are suggested, which cover two SDG targets:

- Target 9.2 sustainable industrialization, 1 indicator: GVA of the industry with respect to the GVA of the total sectors (current price)
- Target 9.5 promote innovation, 4 indicators: Gross Domestic Expenditure on R&D, R&D personnel and researchers, Employment in high-technology manufacturing as a percentage of total manufacturing employment, Patent applications to the EPO – European Patent Office

All of them are official indicators, in particular Gross Domestic Expenditure on R&D, R&D personnel and researchers and Patent applications to the EPO there are available data from European source (Eurostat); Employment in high-technology manufacturing is an experimental indicator, available from European source (OECD – Organisation for Economic Cooperation and Development).

GVA of the industry with respect to the GVA of the total sectors (current price) (9.2). There is no associated European source for this indicator (in the JRC proposal), however there is data available at European level, published by Eurostat and OECD. North Aegean, Western Macedonia, Navarra used the Eurostat database; Puglia OECD. Andalucia, Piemonte, Pomorskie, Nord-Vest and Centro chose national sources. Only for T33 region, data are not available.

Gross Domestic Expenditure on R&D (9.5). In the JRC proposal, this is an official indicator available from Eurostat. Seven regions chose to maintain the European source; Andalucia and Pomorskie opted for national sources. Data are not available for T33 region.

R&D personnel and researchers (9.5). Also in this case, in the JRC proposal, this official indicator is available from Eurostat. All the regions analysed data from the European source except Andalucia, Pomorskie and T33.

Employment in high-technology manufacturing as a percentage of total manufacturing employment (9.5). This is an experimental indicator published by OECD. Navarra, Piemonte, Pomorskie, Nord-Vest and T33 opted for this European source; Puglia analysed the same indicator from Eurostat. Western Macedonia, Andalucia and Centro chose a national source.

Patent applications to the EPO – European Patent Office (9.5). Navarra, Piemonte, Puglia and Pomorskie analysed data from Eurostat database, as in the JRC proposal; Andalucia chose a national source.

Centro analysed data from the official source, European Patent Office (EPO) but, as suggested by the region, due to the limited number of applicants considered, the data collected may be incomplete

No data for Nord-Vest and T33. For Western Macedonia, this indicator is not fit for purpose, it is collected only at national level by Eurostat and it is not part of the National Monitoring Indicators for SDG3; however, the same target is covered by 3 other indicators, available at the regional level.

SDG Target 9.2 SUSTAINABLE INDUSTRIALIZATION

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

Indicator: GVA of the industry with respect to the GVA of the total sectors (current price)

Gross value added - GVA at basic prices of the industrial sector as a percentage of the GVA of all sectors.

Table 75 - GVA of the industry with respect to the GVA of the total sectors (current price)

SDG 9 BUILD RESILIENT INFRASTRUCTURE, PROMOTE INCLUSIVE AND SUSTAINABLE INDUSTRIALIZATION AND FOSTER INNOVATION				
From the JRC dataset	SDG Target(s)	9.2 (sustainable industrialization)		
	Indicator Name	GVA of the industry with respect to the GVA of the total sectors (current price)		
	Type	Official		
	Coverage	Spain		
	Source	INE (National Statistics Institute)		
	Unit of measurement	Percentage		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	GVA of the industry with respect to the GVA of the total sectors (current price)	Eurostat, Regional Statistics (EU)	2000-2021	Number
<i>Western Macedonia</i>	GVA of the industry with respect to the GVA of the total sectors (current price)	Eurostat, Regional Statistics (EU)	2000-2020	Rate
<i>Navarra</i>	GVA of the industry with respect to the GVA of the total sectors	Eurostat, Regional Statistics (EU)	2000-2021	Percentage
<i>Andalucia</i>	GVA of the industry with respect to the GVA of the total sectors (current price)	IECA (N/R)	2006-2021	Percentage
<i>Piemonte</i>	Added value of manufacturing industry to total economy	Istat, Regional Statistics (N/R)	2004-2019	Percentage
<i>Puglia</i>	GVA of the industry with respect to the GVA of the total sectors (current price)	OECD, Regional Statics (EU)	2005-2019	Percentage
<i>Pomorskie</i>	GVA of the industry with respect to the GVA of the total sectors (current price)	Local Data Bank (N/R)	2000-2020	Rate
<i>Centro</i>	Proportion of Gross Value Added of the industry sector in relation to the total of the region	Statistics Portugal, Regional economic accounts (N/R)	1995-2020	Percentage
<i>Nord-Vest</i>	GVA of the industry with respect to the GVA of the total sectors (current price)	Romanian Statistical Yearbook, National Institute of Statistics (N/R)	2007-2019	Million lei current prices
<i>TR33</i>	Not available			

Source: authors' own elaboration

SDG Target 9.5 PROMOTE INNOVATION

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.

Indicator: Gross Domestic Expenditure on R&D

Gross domestic expenditure on R&D (GERD) includes expenditure on research and development by business enterprises, higher education institutions, as well as government and private non-profit organisations.

Table 76 - Gross Domestic Expenditure on R&D

SDG 9 BUILD RESILIENT INFRASTRUCTURE, PROMOTE INCLUSIVE AND SUSTAINABLE INDUSTRIALIZATION AND FOSTER INNOVATION				
From the JRC dataset	SDG Target(s)	9.5 (promote innovation)		
	Indicator Name	Gross Domestic Expenditure on R&D		
	Type	Official		
	Coverage	EU-27 plus others		
	Source	Eurostat, Regional Statistics		
	Unit of measurement	Number		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Gross domestic expenditure on R&D	Eurostat, Regional Statistics (EU)	1986-2020	Number
<i>Western Macedonia</i>	Gross domestic expenditure on R&D	Eurostat, Regional Statistics (EU)	1986-2020	Number
<i>Navarra</i>	Gross domestic expenditure on R&D	Eurostat, Regional Statistics (EU)	1987-2021	Percentage of GDP and Million €
<i>Andalucia</i>	Gross domestic expenditure on R&D	IECA (N/R)	2000-2021	Percentage
<i>Piemonte</i>	Gross domestic expenditure on R&D (GERD) by sector of performance - all sectors	Eurostat, Regional Statistics (EU)	1994-2020	Number (Million euro)
<i>Puglia</i>	Gross domestic expenditure on R&D	Eurostat, Regional Statistics (EU)	1994-2020	Number (Million euro)
<i>Pomorskie</i>	Gross domestic expenditure on R&D	Local Data Bank (N/R)	2002-2021	Number (Thousands eur)
<i>Centro</i>	Gross domestic expenditure on R&D	Eurostat, Regional Statistics (EU)	1980-2020	Number (Thousands eur)
<i>Nord-Vest</i>	Gross Domestic Expenditure on R&D	Eurostat, Regional Statistics (EU)	2007-2021	Number (Million euro)
<i>TR33</i>	Not available			

Source: authors' own elaboration

SDG Target 9.5 PROMOTE INNOVATION

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.

Indicator: R&D personnel and researchers

Research and development (R&D) personnel consists of all individuals employed directly in the field of research and development (R&D), including persons providing direct services, such as managers, administrators, and clerical staff. A R&D researcher can be employed in the public or the private sector - including academia - to create new knowledge, products, processes and methods, as well as to manage the projects concerned.

For the purposes of measuring personnel, it is advisable to introduce the concept of full-time equivalence, since the R&D activity of personnel is often a partial or secondary activity.

Full-time R&D personnel are those persons who spend at least 90 per cent of their working time on R&D activities. Part-time R&D personnel are those persons who spend approximately 10 to 90 per cent of their working time on R&D activities and the rest on other activities. Also included as such are those persons who have carried out R&D activities for a period of time of less than one calendar year; Full-time equivalence of part-time personnel to the sum of the fractions of time that they have dedicated to R&D activities; Personnel employed in R&D activities in full-time equivalence to the sum of personnel working full-time plus the full-time equivalence of personnel working part-time. Additionally, the personnel employed in R&D activities is requested by gender.

Table 77 - R&D personnel and researchers

SDG 9 BUILD RESILIENT INFRASTRUCTURE, PROMOTE INCLUSIVE AND SUSTAINABLE INDUSTRIALIZATION AND FOSTER INNOVATION				
From the JRC dataset	SDG Target(s)	9.5 (promote innovation)		
	Indicator Name	R&D personnel and researchers		
	Type	Official		
	Coverage	EU-27 plus others		
	Source	Eurostat, Regional Statistics		
	Unit of measurement	Number		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	R&D personnel and researchers	Eurostat, Regional Statistics (EU)	2011-2020	Number
Western Macedonia	R&D personnel and researchers	Eurostat, Regional Statistics (EU)	1986-2020	Number
Navarra	R&D personnel and researchers	Eurostat, Regional Statistics (EU)	1988-2020	Head Count and Full Time Employment
Andalucia	R&D personnel and researchers	IECA (N/R)	2000-2021	x million inhab.
Piemonte	R&D personnel and researchers	Eurostat, Regional Statistics (EU)	1980-2020	Number (Head count)
Puglia	R&D personnel and researchers	Eurostat, Regional Statistics (EU)	1994-2020	Number
Pomorskie	R&D personnel and researchers	Local Data Bank (N/R)	2016-2021	Number
Centro	R&D personnel and researchers	Eurostat, Regional Statistics (EU)	2000-2020	Number
Nord-Vest	R&D personnel and researchers	Eurostat, Regional Statistics (EU)	2007-2020	Full-time equivalent

TR33

R&D personnel and researchers	TurkStat (Turkish Statistical Institute) (N/R)	2018-2021	Number
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Source: authors' own elaboration

SDG Target 9.5 PROMOTE INNOVATION

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.

Indicator: Employment in high-technology manufacturing as a percentage of total manufacturing employment

Share of employed in high-tech manufacturing sectors as a proportion of total employed in manufacturing sector.

Eurostat uses the general classification of economic activities of the European Communities (NACE Rev. 2) to define high-tech sectors. The classification of high-tech sectors results from the aggregation of the high- and medium-high technology manufacturing sector plus the high-tech services sector. NACE Rev. 2 is used at a three-digit level although in many cases, due to the restriction of the statistical sources used, the aggregation is done at a two-digit level.

Table 78 - Employment in high-technology manufacturing as a percentage of total manufacturing employment

SDG 9 BUILD RESILIENT INFRASTRUCTURE, PROMOTE INCLUSIVE AND SUSTAINABLE INDUSTRIALIZATION AND FOSTER INNOVATION				
From the JRC dataset	SDG Target(s)	9.5 (promote innovation)		
	Indicator Name	Employment in high-technology manufacturing as a percentage of total manufacturing employment		
	Type	Experimental		
	Coverage	OECD countries and other European countries		
	Source	Organisation for Economic Cooperation and Development (OECD)		
	Unit of measurement	Percentage		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	Not available			
Western Macedonia	Personnel on high-tech knowledge-intensive service as a percentage of total services employment	ELSTAT (N/R)	2010-2020	Percentage
Navarra	Employment in high-technology manufacturing as a percentage of total manufacturing employment	OECD, Regional Statistics (EU)	2008-2019	Percentage
Andalucia	Employment in high-technology manufacturing as a percentage of total manufacturing employment	INE (N/R)	2017-2021	Percentage
Piemonte	Employment in high-technology manufacturing as a percentage of total manufacturing employment	OECD, Regional Statistics (EU)	2008-2019	Percentage
Puglia	Employment in high-technology manufacturing as a percentage of total manufacturing employment	Eurostat, Regional Statistics (EU)	2008-2021	Percentage
Pomorskie	Employment in high-technology manufacturing as a percentage of total manufacturing employment	OECD, Regional Statistics (EU)	2006-2019	Percentage
Centro	Persons employed of high and medium-high technology manufacturing industries as a proportion of total personnel employed in manufacturing industry	Statistics Portugal, Integrated business accounts system (N/R)	2008-2021	Percentage
Nord-Vest	Employment in high-technology manufacturing as a percentage of total manufacturing employment	OECD, Regional Statistics (EU)	2015	Percentage

TR33

Employment in high-technology manufacturing as a percentage of total manufacturing employment	OECD, Regional Statistics (EU)	2008-2019	Percentage
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Source: authors' own elaboration

SDG Target 9.5 PROMOTE INNOVATION

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.

Indicator: Patent applications to the EPO (European Patent Office)

A patent application, the application for a patent, needs to be for an invention, i.e. a new solution to a technical problem, which satisfies the criteria of: novelty (the solution must be novel); inventiveness (it must involve a non-obvious inventive step); industrial applicability (it must be capable of industrial use).

The European Patent Office (EPO) examines European patent applications, enabling inventors, researchers and companies from around the world to obtain protection for their inventions in up to 44 countries through a centralised and uniform procedure that requires just one application.

Table 79 - Patent applications to the EPO (European Patent Office)

SDG 9 BUILD RESILIENT INFRASTRUCTURE, PROMOTE INCLUSIVE AND SUSTAINABLE INDUSTRIALIZATION AND FOSTER INNOVATION				
From the JRC dataset	SDG Target(s)	9.5 (promote innovation)		
	Indicator Name	Patent applications to the EPO		
	Type	Official		
	Coverage	EU-27 plus others		
	Source	Eurostat, Regional Statistics		
	Unit of measurement	Number		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Patent applications to the EPO	OECD, Regional Statistics (EU)	2004-2010	Number
<i>Western Macedonia</i>	Not-fit for purpose			
<i>Navarra</i>	Patent applications to the EPO	Eurostat, Regional Statistics (EU)	1979-2021	Number
<i>Andalucia</i>	Patent applications to the EPO	OEPM (N/R)	2017-2020	x 100000 inhab
<i>Piemonte</i>	Patent applications to the EPO	Eurostat, Regional Statistics (EU)	1977-2012	Number
<i>Puglia</i>	Patent applications to the EPO	Eurostat, Regional Statistics (EU)	1977-2012	Number
<i>Pomorskie</i>	Patent applications to the EPO	Eurostat, Regional Statistics (EU)	2008-2012	Number
<i>Centro</i>	Patent applications to the EPO by priority year	European Patent Office (EPO) (EU)	2009-2021	Number
<i>Nord-Vest</i>	Not available			
<i>TR33</i>	Not available			

Source: authors' own elaboration



SDG 10 - REDUCE INEQUALITY

For SDG10 there are two indicators, from the dataset proposed by the JRC, which cover two SDG targets:

- Target 10.2 inclusion irrespective of status, 1 indicator: Unemployment of people with disabilities
- Target 10.4 greater equality, 1 indicator: Gini index of disposable income (after taxes and transfers)

The first one, Unemployment of people with disabilities, is an official indicator but without data available from European source, the other one is an experimental indicator available from European source (OECD).

For Nord-Vest there are no data available at the regional level for SDG 10.

Unemployment of people with disabilities (10.2). This is a particular indicator, without references to European database. Therefore, regions have used different approaches: Navarra, Andalucia, T33 and Pomorskie analysed the same indicator (as in the JRC proposal) from national/regional sources. As suggested by Navarra this indicator does not measure inequality in the labour market unless compared with unemployment of people without disabilities., for that reason it is importante to include this complementary indicator in the analysis in relation of the first indicator.

Piemonte and Puglia used alternative data from regional research: Employees with disabilities (Piemonte) and Net Entry rate in the job market of people with disabilities (Puglia). The Piemonte Region, with the Piemonte Employment Agency, has been publishing since 2017 a report on "Targeted employment" to monitor the implementation of Law 68/1999 (for the protection of specific disadvantaged categories of workers, defined as protected categories, to facilitate their access to employment), focusing on employment rights of people with disabilities. The report monitors how many people with disabilities are looking for a job in Piemonte and what their characteristics are, through the databases of the Job Centers and the Region.

In the case of the Puglia proposal, the Administrative data are collected by the region and transmitted to the Ministry of the Interior. This data provides information on the number of activated and terminated contracts per time period of persons with disabilities. The proposed indicator is calculated as the number of new employment contracts of persons with disabilities over the sum of new contracts and new terminations.

Data are not available for the Greek regions, Centro and Nord-Vest.

Gini index of disposable income (after taxes and transfers) (10.4).

The Organisation for Economic Cooperation and Development (OECD) published annually this indicator (experimental); data are available for the European regions but Andalucia and Pomorskie opted for a national/regional source.

Centro analysed, from national source, the Gini coefficient of net monetary income per equivalent adult (gini coefficient of monetary income received by the household as a whole and by each of its members, from work - employee income and income from self-employment, from other private income sources - capital and property income, private transfers received - and from pensions and other social transfers, net of income taxes and social security contributions.

Also Western Macedonia (S80/S20 income distribution) and T33 region (Gini coefficient by equivalised household disposable income) used the national statistics. In particular Western Macedonia suggested S80/S20 income distribution: the indicator compares the total income held by the richest 20% with that held by the poorest 20% of the population. The indicator is not published by ELSTAT (Statistics on income and living conditions microdata) for regions, but only at national level. However, as suggested by the region, access to the Household Budget Survey microdata is free and can be derived from the variables of NUTS1 Region, equivalised income and income quantile.

For Nord-Vest data are only available at the national level. For North Aegean there is no available data for the Gini index of disposable income, however data for the disposable income are available.

SDG Target 10.2 INCLUSION IRRESPECTIVE OF STATUS

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

Indicator: Unemployment of people with disabilities

Ratio of unemployed persons to economically active persons in the population between 16 and 64 years of age with a degree of disability equal to or greater than 33%.

Table 80 - Unemployment of people with disabilities

SDG 10 REDUCE INEQUALITY WITHIN AND AMONG COUNTRIES				
From the JRC dataset	SDG Target(s)	10.2 (inclusion irrespective of status)		
	Indicator Name	Unemployment of people with disabilities		
	Type	Official		
	Coverage	Spain		
	Source	INE (National Statistics Institute)		
	Unit of measurement	Rate		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	Not available			
Western Macedonia	Not available			
Navarra	Unemployment of people with disabilities	OCECAS (N/R)	2014-2020	Percentage
Andalucia	Unemployment of people with disabilities	IECA (N/R)	2014-2021	Percentage
Piemonte	Employees with disabilities	Piemonte Region, Report: "Targeted employment" (N/R)	2017-2021	Number
Puglia	Net Entry rate in the job market of people with disabilities	Puglia Region (N/R)	2017-2021	Percentage
Pomorskie	Unemployment of people with disabilities	Local Data Bank (N/R)	2012-2022	Number
Centro	Not available			
Nord-Vest	Not available			
TR33	Unemployment of people with disabilities	TurkStat (Turkish Statistical Institute) (N/R)	2014-2022	Number

Source: authors' own elaboration

SDG Target 10.4 GREATER EQUALITY

Adopt policies, especially fiscal, wage and social protection policies, and progressively achieve greater equality

Indicator: Gini index of disposable income (after taxes and transfers)

The Gini coefficient measures the extent to which the distribution of income within a country deviates from a perfectly equal distribution. A coefficient of 0 expresses perfect equality where everyone has the same income, while a coefficient of 1 expresses full inequality where only one person has all the income.

Table 81 - Gini index of disposable income (after taxes and transfers)

SDG 10 REDUCE INEQUALITY WITHIN AND AMONG COUNTRIES				
From the JRC dataset	SDG Target(s)	10.4 (greater equality)		
	Indicator Name	Gini index of disposable income (after taxes and transfers)		
	Type	Experimental		
	Coverage	OECD countries and other European countries		
	Source	Organisation for Economic Cooperation and Development (OECD)		
	Unit of measurement	Number		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	Disposable income of private households (after taxes and transfers)	Eurostat (EU)	2010-2020	
Western Macedonia	S80/S20 income distribution	ELSTAT (N/R)	2018-2020	Rate
Navarra	Gini index of disposable income (after taxes and transfers)	OECD, Regional Statics (EU)	2013	Index
Andalucia	Gini index of disposable income (after taxes and transfers)	INE (N/R)	2015-2020	Index
Piemonte	Gini index of disposable income (after taxes and transfers)	OECD, Regional Statics (EU)	2013	Index
Puglia	Gini index of disposable income (after taxes and transfers)	OECD, Regional Statics (EU)	2013	Index
Pomorskie	Gini index of disposable income (after taxes and transfers)	Statics of Poland (N/R)	2004-2021	Index
Centro	Gini coefficient of net monetary income per equivalent adult	Statistics Portugal, income and living conditions (N/R)	2003-2020	Index
Nord-Vest	Not available			
TR33	Gini coefficient by equivalised household disposable income	TurkStat (Turkish Statistical Institute) (N/R)	2014-2022	Percentage

Source: authors' own elaboration



SDG11 – SUSTAINABLE CITIES AND COMMUNITIES

SDG 11 seeks to make cities and human settlements inclusive, safe, resilient and sustainable through the achievement of 10 more specific targets. JRC's initial proposal for regional monitoring of this SDG contains nine indicators spread across four of these targets. Specifically,

- Target 11.1 Access to housing. Indicator: Households expenses dedicated to housing costs.
- Target 11.2 Access to transport system. Indicator: Transport performance; Indicator: Daily accessibility; Indicator: Stock of vehicles (passenger cars), Indicator: Victims in road accidents.
- Target 11.3 Sustainable urbanization. Indicator: Difference between built-up area growth rate and population growth rate; Indicator: Land use.
- Target 11.6. Environmental impact. Indicator: PM2.5 Emissions; Household and commercial waste generation per inhabitant.

Of the nine proposed indicators, six are experimental indicators and the rest are official indicators. It is also interesting to note that for seven of these nine indicators a data source from what we call supranational sources is provided: three from JRC, two from OECD and two from Eurostat. This makes SDG11 one of the SDGs with more indicators from the initial proposal available for the different regions. It is also worth noting that one of the indicators included in the JRC proposal for SDG1, affected people due to disasters, could also be an indicator for target 11.5.¹¹ A useful tool for the monitoring of SDG11 is the LUISA platform hosted by JRC. LUISA is a dynamic spatial modelling platform that simulates future land-use changes based on biophysical and socioeconomic drivers and is specifically designed to assess landuse impacts of EU policies (Jacobs-Crisioni et al., 2014). Among a broad range of indicators, it gives information about future estimates on the transport system (daily accessibility), on sustainable urbanization (land use) and environmental impact (PM emissions).

Households' expenses dedicated to housing costs (11.1): This is an indicator that shows the weight of household expenses in the disposable income of families. It is available for all but one of the regions studied. Perhaps the most relevant problem with the indicator is the lack of updating in the supranational data source (OECD), which is used by four of the regions. The other five use national and/or regional data sources and the data is up to date. For an indicator to be useful in monitoring a target it needs to be updated on a regular basis.

Transport performance (11.2): This indicator lacks a precise definition and/or source in the initial proposal. This means that only four of the 10 regions present concrete data in their analysis. Perhaps the indicator that comes closest to the target to be monitored is the one proposed by the two Italian regions, seat-km offered by local public transport.

Daily accessibility (11.2): Accessibility deals with the level of service provided by transport networks, given the spatial distribution of activities (Jacobs-Crisioni et al., 2016). It is an experimental indicator and, as this indicator is based on the LUISA platform estimates, it is available for eight of the ten regions.

Stock of vehicles (passenger cars) (11.2): Target 11.2, for which this indicator is proposed, aims to improve road safety and access to public transportation. This indicator focuses on private means of transport, and it could be interesting to observe its evolution in return for the difficulty of measuring public transport. It could have more relevance as an indicator of sustainable transport if, in addition to its number, the type of vehicle was analyzed to observe whether combustion cars are being replaced in the regions by other types of engines considered more sustainable, such as electric ones. As this indicator is available at the NUT2 level in Eurostat, it is easily accessible to the regions. Only one region does not report data. It is worth noting that two of them use local data instead of the supranational source. Since the population factor is important for evaluating transportation, it may be more interesting to report this data as a value relative to population (number per 1000 inhabitants, for example) rather than as an absolute value. Both forms of measurement are available from Eurostat.

¹¹ According to UN (2015), the indicator number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population is included in target 1.2, 11.5 and 13.1.

Victims in road accidents (11.2): This indicator is interesting because of the transportation safety part included in target 11.2. It is important to consider both fatalities and injuries. The current passive safety measures built into vehicles may reduce the number of fatalities, but if the number of accidents is not reduced, the number of injuries could increase. This is an indicator that is available for all regions that have participated in the pilot project. All but one report information from Eurostat. Eight of them opt for the absolute value while two of them opt for the value relative to population. In this case, as in the previous indicator, the relative value may be more informative.

Difference between built-up area growth rate and population growth rate (11.3): The extent to which built-up land in cities changes with respect to population is an indicator included in the UN Sustainable Development Goals to promote efficient land use and prevent urban sprawl (UN, 2015; OECD, 2020). While housing and infrastructure for public services are crucial for well-being, extensive artificial surface cover can have major environmental impacts, such as diminishing biodiversity and deteriorating soil quality. In addition, low-density housing and urban sprawl can be associated with higher energy demand and transport-related CO₂ emissions (OECD, 2020).

Although the initial JRC proposal refers to the OECD regional database, only two of the participating regions provide this data. Other regions use either the same measure or alternative measures from national and/or regional data sources. In general, there is a single data that measures the difference in the growth of these two variables (build-up area and population) for a given time period.

Land use (11.3): Although the reference for this indicator in JRC, there is no specific definition. Six out of 10 regions provide information on this indicator but with different perspectives or changes in different types of land (artificial, arable, cultivated...). The LUISA platform focuses on land use and the drivers that lead to changes in land use. The platform provides information on six land uses: agricultural, forestry, unused or abandoned land, services and residential purposes, heavy environmental impact and fishing. Data is available at NUT2 level from Eurostat ([land use ovw](#)) for four years, 2009, 2012, 2015 and 2018.

PM_{2.5} Emissions (11.6): Air pollution is one of the major environmental problems in cities and two of the main contributing factors are emissions and concentrations of PM_{2.5} and PM₁₀. In fact, particulate matter (PM), nitrogen dioxide (NO₂) and ground-level ozone (O₃) are the pollutants that cause the greatest harm to human health and the environment in Europe (EEA, 2020). The proposed indicator comes from JRC and the LUISA platform and provides projections of PM_{2.5} emissions.

All regions participating in the pilot project provide information on this indicator, although three of them choose to provide data on the concentration of these emissions obtained from local sources instead of JRC projections.

Household and commercial waste generation per inhabitant (11.6): Although this indicator is interesting, the target for which it is proposed, target 11.6, aims to analyze the waste not only collected but also managed. Information on this indicator is available in all but one of the reporting regions. This gives us an idea of how much waste is generated but not how this waste is treated. Although it is widely calculated, the information it provides for monitoring this target is limited.

SDG Target 11.1 Access to housing.

By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums.

Indicator: Households expenses dedicated to housing costs

Share of housing costs (water, electricity, gas and other fuels) in percentage of household disposable income.

Table 82 - Households expenses dedicated to housing costs

SDG 11 MAKE CITIES AND HUMAN SETTLEMENTS INCLUSIVE, SAFE, RESILIENT AND SUSTAINABLE				
From the JRC dataset	SDG Target(s)	11.1 (access to housing)		
	Indicator Name	Households expenses dedicated to housing costs		
	Type	Experimental		
	Coverage	OECD countries and other European countries		
	Source	Organisation for Economic Cooperation and Development (OECD)		
	Unit of measurement	Percentage		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Households expenses dedicated to housing costs	ELSTAT (N/R)	2014-2021	€/month
<i>Western Macedonia</i>	Households expenses dedicated to housing costs	ELSTAT(N/R)	2014-2022	Percentage
<i>Navarra</i>	Households expenses dedicated to housing costs	OECD (EU)	2006-2015	Percentage
<i>Andalucia</i>	Households expenses dedicated to housing costs	INE (N/R)	2006-2021	Percentage
<i>Piemonte</i>	Share of Housing Cost	OECD (EU)	2000-2015	Percentage
<i>Puglia</i>	Households expenses dedicated to housing costs	OECD (EU)	2000-2015	Percentage
<i>Pomorskie</i>	Households expenses dedicated to housing costs	Local Data Bank (N/R)	2015-2021	Percentage
<i>Centro</i>	Median of housing cost burden	Statistics Portugal, Statistics on income and living conditions (N/R)	2004-2021	Percentage
<i>Nord-Vest</i>	Not available			
<i>TR33</i>	Households expenses dedicated to housing costs	OECD (EU)	2003-2013	Number

Source: authors' own elaboration

SDG Target 11.2 Access to transport systems.

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.

Indicator: Transport performance

No specific definition.

Table 83 - Transport performance

SDG 11 MAKE CITIES AND HUMAN SETTLEMENTS INCLUSIVE, SAFE, RESILIENT, AND SUSTAINABLE				
From the JRC dataset	SDG Target(s)	11.2 (access to transport systems)		
	Indicator Name	Transport performance		
	Type	Experimental		
	Coverage			
	Source	Own elaboration (regional government)		
	Unit of measurement			
	Frequency			
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Percentage of the total weight of cargo transported per region	ELSTAT (N/R)	2013-2020	Percentage
<i>Western Macedonia</i>	Not available			
<i>Navarra</i>	Not available			
<i>Andalucia</i>	Not available			
<i>Piemonte</i>	Seat-km offered by local public transport	Istat, Regional Statistics (N/R)	2004-2020	Number per inhab.
<i>Puglia</i>	Seats/ km offered by the local public transport service	Istat, Regional Statistics (N/R)	2004-2020	Number per inhab.
<i>Pomorskie</i>	Not available			
<i>Centro</i>	Not available			
<i>Nord-Vest</i>	Not available			
<i>TR33</i>	Number of motor vehicles : Minibus and bus	TurkStat (Turkish Statistical Institute) (N/R)	1995-2021	Number

Source: authors' own elaboration

SDG Target 11.2 Access to transport systems.

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.

Indicator: Daily accessibility

Daily accessibility indicates the amount of people that live within four hours of driving from the location at hand (Lavallo et al., 2015).

Table 84 - Daily accessibility

SDG 11 MAKE CITIES AND HUMAN SETTLEMENTS INCLUSIVE, SAFE, RESILIENT, AND SUSTAINABLE				
From the JRC dataset	SDG Target(s)	11.2 (access to transport systems)		
	Indicator Name	Daily accessibility		
	Type	Experimental		
	Coverage	EU-27		
	Source	European Commission, Joint Research Centre		
	Unit of measurement	Number		
	Frequency	Decade		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	Daily accessibility	European Commission, Joint Research Centre (EU)	2015-2020	Number
Western Macedonia	Daily accessibility	European Commission, Joint Research Centre (EU)	2015-2050	Number
Navarra	Daily accessibility	European Commission, Joint Research Centre (EU)	2015-2050	Number
Andalucia	Not available			
Piemonte	Daily accessibility	European Commission, Joint Research Centre (EU)	2015-2050	Number (M)
Puglia	Daily accessibility	European Commission, Joint Research Centre (EU)	2015-2050	Number
Pomorskie	Daily accessibility	European Commission, Joint Research Centre (EU)	2015-2050	Number
Centro	Daily accessibility	European Commission, Joint Research Centre (EU)	2015-2050	Number
Nord-Vest	Daily accessibility	European Commission, Joint Research Centre (EU)	2015-2050	Number
TR33	Not available			

Source: authors' own elaboration

SDG Target 11.2 Access to transport systems.

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.

Indicator: Stock of vehicles (passenger cars)

Quantity of passenger cars. A passenger car is a road motor vehicle, other than a moped or a motorcycle, intended for the carriage of passengers and designed to seat no more than nine persons (including the driver).

Table 85 - Stock of vehicles (passenger cars)

SDG 11 MAKE CITIES AND HUMAN SETTLEMENTS INCLUSIVE, SAFE, RESILIENT AND SUSTAINABLE				
From the JRC dataset	SDG Target(s)	11.2 (access to transport systems)		
	Indicator Name	Stock of vehicles (passenger cars)		
	Type	Official		
	Coverage	EU-27 plus others		
	Source	Eurostat, Regional Statistics		
	Unit of measurement	Number		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	Stock of vehicles (passenger cars)	Eurostat, Regional Statistics (EU)	2016-2020	Number
Western Macedonia	Stock of vehicles (passenger cars)	Eurostat, Regional Statistics (EU)	1990-2020	Number
Navarra	Stock of vehicles (passenger cars)	Eurostat, Regional Statistics (EU)	1990-2020	Number per 1000 inhab.
Andalucia	Stock of vehicles (passenger cars)	DGT (N/R)	2006-2021	Number
Piemonte	Stock of vehicles (passenger cars)	Eurostat, Regional Statistics (EU)	1990-2020	Number
Puglia	Stock of vehicles (passenger cars)	Eurostat, Regional Statistics (EU)	1990-2020	Number
Pomorskie	Stock of vehicles (passenger cars)	Local Data Bank (N/R)	2012-2021	Number
Centro	Not available			
Nord-Vest	Stock of vehicles (passenger cars)	Eurostat, Regional Statistics (EU)	2007-2021	Number per 1000 inhab.
TR33	Stock of vehicles (passenger cars)	Eurostat, Regional Statistics (EU)	1990-2020	Number

Source: authors' own elaboration

SDG Target 11.2 Access to transport systems.

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.

Indicator: Victims in road accidents

Injury accident is any accident involving at least one road vehicle in motion on a public road or private road to which the public has right of access, resulting in at least one injured or killed person.

Person killed is any person killed immediately or dying within 30 days because of an injury accident, excluding suicides.

Person injured is any person who as result of an injury accident was not killed immediately or not dying within 30 days, but sustained an injury, normally needing medical treatment, excluding attempted suicides.

Table 86 - Victims in road accidents

SDG 11 MAKE CITIES AND HUMAN SETTLEMENTS INCLUSIVE, SAFE, RESILIENT AND SUSTAINABLE				
From the JRC dataset	SDG Target(s)	11.2 (access to transport systems)		
	Indicator Name	Victims in road accidents		
	Type	Official		
	Coverage	EU-27 plus others		
	Source	Eurostat, Regional Statistics		
	Unit of measurement	Number		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	Victims in road accidents	Eurostat, Regional Statistics (EU)	2012-2021	Number
Western Macedonia	Victims in road accidents	Eurostat, Regional Statistics (EU)	1990-2020	Number
Navarra	Victims in road accidents	Eurostat, Regional Statistics (EU)	1990-2020	Number per million inhab.
Andalucia	Victims in road accidents	Eurostat, Regional Statistics (EU)	1990-2020	Number per million inhab.
Piemonte	Victims in road accidents	Eurostat, Regional Statistics (EU)	1990-2020	Number
Puglia	Victims in road accidents	Eurostat, Regional Statistics (EU)	1990-2020	Number
Pomorskie	Victims in road accidents	Local data bank (N/R)	2005-2021	Number
Centro	Victims in road accidents	Eurostat, Regional Statistics (EU)	2003-2021	Number
Nord-Vest	Victims in road accidents	Eurostat, Regional Statistics (EU)	2007-2020	Number
TR33	Victims in road accidents	Eurostat, Regional Statistics (EU)	1990-2020	Number

Source: authors' own elaboration

SDG Target 11.3 Sustainable urbanization.

By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries.

Indicator: Difference between built-up area growth rate and population growth rate

Difference between built-up area growth rate and population growth rate, change in built-up area per capita. The interpretation of this change should be made with caution, depending on the starting point from which it is being calculated (high or low initial levels of the built environment per capita) (OECD, 2020).

Table 87 - Difference between built-up area growth rate and population growth rate

SDG 11 MAKE CITIES AND HUMAN SETTLEMENTS INCLUSIVE, SAFE, RESILIENT AND SUSTAINABLE				
From the JRC dataset	SDG Target(s)	11.3 (sustainable urbanization)		
	Indicator Name	Difference between built-up area growth rate and population growth rate		
	Type	Experimental		
	Coverage	OECD countries and other European countries		
	Source	Organisation for Economic Cooperation and Development (OECD)		
	Unit of measurement	Percentage		
	Frequency			
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	Not available			
Western Macedonia	Not fit for purpose			
Navarra	Difference between built-up area growth rate and population growth rate	OECD (EU)	2000-2015	Percentage
Andalucia	Difference between built-up area growth rate and population growth rate	IECA (N/R)	2020-2021	m2 per inhab
Piemonte	Soil sealing per capita	Istat, Regional Statistics (N/R)	2012-2021	Rate (M2 per inhabitant)
Puglia	Not available			
Pomorskie	Not available			
Centro	Efficiency evaluation of the artificial land by inhabitant	INE, land use land cover statistics (N/R)	2015-2018	Percentage
Nord-Vest	Difference between built-up area growth rate and population growth rate	OECD (EU)	2014	Percentage
TR33	Not available	Not available		

Source: authors' own elaboration

SDG Target 11.3 Sustainable urbanization.

By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries.

Indicator: Land use

No specific definition.

Table 88 - Land use

SDG 11 MAKE CITIES AND HUMAN SETTLEMENTS INCLUSIVE, SAFE, RESILIENT AND SUSTAINABLE				
From the JRC dataset	SDG Target(s)	11.3 (sustainable urbanization)		
	Indicator Name	Land use		
	Type	Experimental		
	Coverage			
	Source	European Commission, Joint Research Centre		
	Unit of measurement			
	Frequency			
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Artificial surfaces	Copernicus (EU)	2000-2018	Number
<i>Western Macedonia</i>	Artificial surfaces	Copernicus (EU)	2000-2018	Percentage
<i>Navarra</i>	Not available			
<i>Andalucia</i>	Not available			
<i>Piemonte</i>	Urban land/Tota land	LUIA platform; European Commission, JRC (EU)	2020	Percentage
<i>Puglia</i>	Land use	LUCAS – EUROSTAT (EU)	2009-2018	km2
<i>Pomorskie</i>	Land use areas	Local Data Bank (N/R)	2019-2022	ha
<i>Centro</i>	Not fit for purpose			
<i>Nord-Vest</i>	Not available			
<i>TR33</i>	Land use : Arable land / Cultivated	TurkStat,Turkish Statistical Institute (N/R)	1995-2021	ha

Source: authors' own elaboration

SDG Target 11.6 Environmental impact.

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.

Indicator: PM2.5 Emissions

The indicator shows the spatial distribution of PM2.5 (sub-25µm particulate matter) emissions over Europe. The total emissions for each country/region are derived from the GAINS model ((Lavalley, Aurambout and Trombetti, 2015b).

Table 89 - PM2.5 Emissions

SDG 11 MAKE CITIES AND HUMAN SETTLEMENTS INCLUSIVE, SAFE, RESILIENT AND SUSTAINABLE				
From the JRC dataset	SDG Target(s)	11.6 (environmental impact)		
	Indicator Name	PM2.5 Emissions		
	Type	Experimental		
	Coverage	EU-27		
	Source	European Commission, Joint Research Centre		
	Unit of measurement	Number		
	Frequency	Decade		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	PM2.5 Emissions	European Commission, Joint Research Centre (EU)	2015-2030	Number
Western Macedonia	PM2.5 Emissions	European Commission, Joint Research Centre (EU)	2015-2030	Tons
Navarra	PM2.5 Emissions	European Commission, Joint Research Centre (EU)	2015-2030	Tons
Andalucia	PM2.5 Emissions	REDIAM (N/R)	2003-2019	Tons and µg/m ³
Piemonte	PM2.5 Emissions	European Commission, Joint Research Centre (EU)	2015-2030	Tons
Puglia	PM2.5 Emissions	Istat - Processing of data from Ispra (N/R)	2000-2020	µg/m ³
Pomorskie	PM2.5 Emissions	European Commission, Joint Research Centre (EU)	2015-2030	Tons
Centro	PM2.5 Emissions	Portuguese Environment Agency (N/R)	2015-2019	kt
Nord-Vest	PM2.5 Emissions	European Commission, Joint Research Centre (EU)	2015-2030	Tons
TR33	Air pollution in PM2.5 (average level in µg/m ³ experienced by the population)	OECD, Regional database (EU)	2001-2020	µg/m ³

Source: authors' own elaboration

SDG Target 11.6 Environmental impact.

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.

Indicator: Household and commercial waste generation per inhabitant

Domestic waste generated by households, commerce and services, from urban collection.

Table 90 - Household and commercial waste generation per inhabitant

SDG 11 MAKE CITIES AND HUMAN SETTLEMENTS INCLUSIVE, SAFE, RESILIENT AND SUSTAINABLE				
From the JRC dataset	SDG Target(s)	11.6 (environmental impact)		
	Indicator Name	Household and commercial waste generation per inhabitant		
	Type	Official		
	Coverage	Portugal		
	Source	Statistics Portugal		
	Unit of measurement	Rate		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	Household and commercial waste generation per inhabitant	PESDA (N/R)	2019	kg
Western Macedonia	Household and commercial waste generation per inhabitant	Waste Management Western Macedonia SA (N/R)	2012-2022	kg
Navarra	Household and commercial waste generation per inhabitant	Nastat, INE (N/R)	2010-2020	kg
Andalucia	Household and commercial waste generation per inhabitant	INE (N/R)	2010-2021	kg
Piemonte	Household and commercial waste generation per inhabitant	Istat, Regional Statistics (N/R)	2010-2020	kg
Puglia	Household and commercial waste generation per inhabitant	Istat elaboration on ISPRA data (N/R)	1996-2020	kg
Pomorskie	Household and commercial waste generation per inhabitant	Local Data Bank (N/R)	2005-2021	kg
Centro	Urban waste collected per inhabitant	Statistics Portugal, Urban waste statistics (N/R)	2011-2020	kg
Nord-Vest	Not available			
TR33	Rate of population receiving waste services in total population (%) and in total municipal population (%)	TurkStat (Turkish Statistical Institute) (N/R)	1998-2020	Rate

Source: authors' own elaboration



SDG 12 - RESPONSIBLE CONSUMPTION AND PRODUCTION

SDG 12, which calls to ensure the sustainability of production and consumption patterns, is subdivided into eleven more specific targets. The three indicators included in the initial JRC proposal for this goal allow the monitoring of three of these targets.

- Target 12.2 Management of natural resources. Indicator: Carbon footprint.
- Target 12.3 Reduce food waste. Indicator: Food waste.
- Target 12.4 Chemical management. Indicator: Hazardous waste.

The analyses carried out by the regions participating in the pilot project show that these three indicators are suitable for monitoring the targets set. At the same time, the reports show the difficulties in finding information on these indicators. Moreover, the analyses show confusion about the definitions of some of these indicators.

Carbon footprint (12.2): Carbon footprint is a measure of the amount of GHG emissions to the atmosphere as a result of the activities of a particular individual, organization, community or territory. In the case of territories, emissions statistics are typically compiled according to production-based accounting methods: measuring emissions occurring within territorial levels borders. However, the need to estimate carbon footprints based on consumption activities is gaining momentum (OECD, 2016).

Only 3 of the 10 regions participating in the pilot project report carbon footprint data. Perhaps the lack of information is due to the absence of a clear definition of this carbon footprint on the original data set. In fact, some regions that do not report carbon footprint data, do report GHG emissions data (see indicators for SDG13 in the next section). Thus, after reviewing the reports, we can say that most of the regions have information on the production-based carbon footprint, but not on the consumption-based carbon footprint. The data sources are national or regional.

Food waste (12.3): According to FAO, more than one third of the food produced today is lost or wasted. Food loss and food waste are the two key factors in the monitoring of target 14.3. Food loss refers to the decrease in edible food mass at the production, post-harvest and processing stages of the food chain. Food waste refers to the discard of edible foods at the retail and consumer levels. The combination of which is known as food wastage (FAO, 2014). The proposal for the European regions is to measure food waste.

Only two of the regions participating in this pilot project report data on food waste, which demonstrates the difficulty in making this information available. It is worth noting that one region proposes a method for calculating regional food waste based on country-level data (Armenise, 2023, pp. 72-74). Country-level data in Europe are estimated by Eurostat ([env_wasfw](#)).

Hazardous waste (12.4): Of the three indicators proposed by JRC, this is the one with the highest availability among the pilot regions. Only three of the 10 regions do not report data on this indicator. The data come from national and/or local sources and the definitions of the indicator are similar between regions. Hazardous wastes include a wide variety of products as stated in the Council Directive 91/689/EEC of 12 December 1991 on hazardous waste or the Waste Framework Directive 2008.

SDG Target 12.2 Management of natural resources.

By 2030, achieve the sustainable management and efficient use of natural resources.

Indicator: Carbon footprint

Carbon footprint is a measure of the amount of GHG emissions to the atmosphere as a result of the activities of a particular territory. Carbon footprint can be production-based, or consumption based.

Table 91 - Carbon footprint

SDG 12 ENSURE SUSTAINABLE CONSUMPTION AND PRODUCTION PATTERNS				
From the JRC dataset	SDG Target(s)	12.2 (management of natural resources)		
	Indicator Name	Carbon footprint		
	Type	Official		
	Coverage	Flanders		
	Source	Statistics Flanders		
	Unit of measurement	Rate		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Not available			
<i>Western Macedonia</i>	Not fit for purpose			
<i>Navarra</i>	Not available			
<i>Andalucia</i>	Carbon footprint	IECA (N/R)	2015-2019	t CO2 eq
<i>Piemonte</i>	CO2 eq per capita	Regional Inventory of Emissions to the Atmosphere (IREA) (N/R)	2015	kt CO2 eq per capita
<i>Puglia</i>	Not available			
<i>Pomorskie</i>	Not available			
<i>Centro</i>	Carbon footprint	Portuguese Environment Agency (N/R)	2015-2019	t CO2 eq per capita
<i>Nord-Vest</i>	Not available			
<i>TR33</i>	Not available			

Source: authors' own elaboration

SDG Target 12.3 Reduce food waste.

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.

Indicator: Food waste

Food waste refers to the discard of edible foods at the retail and consumer levels. According to Eurostat (2023), food waste is any food that has become waste under these conditions:

1. it has entered the food supply chain,
2. it has then been removed or discarded from the food supply chain or at the final consumption stage,
3. it is finally destined to be processed as waste.

Food waste data require measurements and estimations as tonnes of fresh mass.

Table 92 - Food waste

SDG 12 ENSURE SUSTAINABLE CONSUMPTION AND PRODUCTION PATTERNS				
From the JRC dataset	SDG Target(s)	12.3 (reduce food waste)		
	Indicator Name	Food waste		
	Type	Official		
	Coverage			
	Source	Department of Environment of the Regional Government		
	Unit of measurement			
	Frequency			
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Not available			
<i>Western Macedonia</i>	Not available			
<i>Navarra</i>	Not available			
<i>Andalucia</i>	Household food waste	MAPA (ministry of agriculture, fisheries and food) (N/R)	2017-2021	kg/inhab
<i>Piemonte</i>	Not available			
<i>Puglia</i>	Food waste	Armenise (2023) regionalization of country data (N/R)	2020	kg/inhab
<i>Pomorskie</i>	Not available			
<i>Centro</i>	Not available			
<i>Nord-Vest</i>	Not available			
<i>TR33</i>	Not available			

Source: authors' own elaboration

SDG Target 12.4 Chemical management.

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.

Indicator: Hazardous Waste

Hazardous waste is any waste as defined in Article 1(4) of Council Directive 91/689/EEC of 12 December 1991 on hazardous waste.

Table 93 - Hazardous Waste

SDG 12 ENSURE SUSTAINABLE CONSUMPTION AND PRODUCTION PATTERNS				
From the JRC dataset	SDG Target(s)	12.4 (chemical management)		
	Indicator Name	Hazardous Waste		
	Type	Official		
	Coverage	Spain		
	Source	INE (National Statistics Institute)		
	Unit of measurement	Number		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Not available			
<i>Western Macedonia</i>	Hazardous Waste	Region of Western Macedonia (N/R)	2012-2020	Tons
<i>Navarra</i>	Hazardous Waste	Waste inventory, Government of Navarre (N/R)	2010-2020	Tons
<i>Andalucia</i>	Hazardous Waste	REDIAM (N/R)	2011-2020	Tons
<i>Piemonte</i>	Production of special hazardous waste	ISPRA; Istat, Regional Statistics (N/R)	2014-2020	Tons
<i>Puglia</i>	Hazardous Waste	ISPRA; Istat, Regional Statistics (N/R)	2014-2020	Tons
<i>Pomorskie</i>	Hazardous Waste	Local Data Bank (N/R)	2003-2021	Tons
<i>Centro</i>	Hazardous Waste	EEA (N/R)	2011-2020	Tons
<i>Nord-Vest</i>	Not available			
<i>TR33</i>	Not available			

Source: authors' own elaboration



SDG 13 – CLIMATE ACTION

SDG 13 seeks to take urgent action to combat climate change and its impacts. António Guterres, United Nations Secretary-General, said on February 6 2023 that “*climate action is the 21st century’s greatest opportunity to drive forward all the Sustainable Development Goals*”. Four indicators make up JRC’s initial proposal for monitoring SDG13, climate action. They are all linked to target 13.2, which calls for integration of climate change measures into territorial policies and planning.

- Target 13.2. Climate change measures into policy. Indicator: PM10 Emissions; Indicator: CO2 emissions; Indicator: Greenhouse gas emissions; Indicator: Cooling and heating degree-days.

What is interesting about these four indicators is that, although they are related to the same target, they can each give a different perspective on the problem and its evolution. The proposal adds to the well-known indicator measuring GHG emissions,¹² two indicators on emissions projections and an indicator that measures changes in climate patterns. The overall picture that emerges can allow for a more comprehensive monitoring of the SDG under analysis. However, some reports carried out in the regions have modified the initial definition of the indicator, losing this more complete picture.

It is worth mentioning that emissions projections come from the set of indicators produced by the LUISA Territorial Modelling Platform hosted by JRC. This Platform is primarily used for the ex-ante evaluation of EC policies that have a direct or indirect territorial impact. That is, they could be a good proposal to monitor target 13.2 which calls for integration of climate change measures in the different policies carried out in the different territories.¹³

PM10 Emissions (13.2): This indicator shows the spatial distribution of PM10 (sub-10µm particulate matter) emissions over Europe. Total emissions projections are calculated for each region. Two out of the ten regions report that no data is available. Another region changes the indicator for the time series of PM10, missing the idea of showing data on projections.¹⁴

CO2 Emissions (13.2): The indicator measures CO2 projections based on spatial data. As can be seen in the summary of the metadata below, there are three regions that in their analysis choose the historical series of CO2 emissions instead of these projections, somewhat losing the initial idea that seems to be behind the proposal.

Greenhouse gas emissions (13.2): This is an aggregate measure of the different greenhouse gases. The JRC proposal points out that the unit of measure is a rate but does not specify on what. There are regions that report just total emission levels while other opt for emissions per capita. This last option can be considered as a rate but there are other options such as GHG per GDP.

Cooling and heating degree-days (13.2): This is an interesting indicator because its variation can show changes in weather conditions which, if sustained over the long term, could show changes in climate. This information is available for most European regions from Eurostat since 1979. In the case of the regions participating in this pilot project, only the TR33 region of Turkey does not report data from this source but uses another supranational source such as the OECD.

¹² This indicator is one of the proposals in the Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development, indicator 13.2.2. (UN, 2018).

¹³ For more information on the LUISA Territorial Modelling Platform, visit the web site https://joint-research-centre.ec.europa.eu/luisa_en

¹⁴ In general, PM10 is considered an atmospheric pollutant, not a climate change pollutant.

SDG Target 13.2 Climate change measures into policy.

Integrate climate change measures into national policies, strategies and planning.

Indicator: PM10 Emissions

Emissions projections of PM10 based on the spatial distribution of PM10 (sub-10µm particulate matter) emissions over Europe. The total emissions for each territory are derived from the GAINS model (Lavalle, Aurambout and Trombetti, 2015a).

Table 94 - PM10 Emissions

SDG 13 TAKE URGENT ACTION TO COMBAT CLIMATE CHANGE AND ITS IMPACTS				
From the JRC dataset	SDG Target(s)	13.2 (climate change measures into policy)		
	Indicator Name	PM10 Emissions		
	Type	Experimental		
	Coverage	EU-27		
	Source	European Commission, Joint Research Centre		
	Unit of measurement	Number		
	Frequency	Decade		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	PM10 Emissions	European Commission, Joint Research Centre (EU)	2015-2020	Thousand tons
<i>Western Macedonia</i>	PM10 Emissions	European Commission, Joint Research Centre (EU)	2015-2030	tons
<i>Navarra</i>	PM10 Emissions	European Commission, Joint Research Centre (EU)	2015-2030	tons
<i>Andalucia</i>	PM10 Emissions	REDIAM (N/R)	2015-2019	tons
<i>Piemonte</i>	PM10 Emissions	European Commission, Joint Research Centre (EU)	2015-2030	tons
<i>Puglia</i>	PM10 Emissions	European Commission, Joint Research Centre (EU)	2015-2030	tons
<i>Pomorskie</i>	Not available			
<i>Centro</i>	PM10 Emissions	Portuguese Environment Agency (N/R)	2015-2019	Kiloton
<i>Nord-Vest</i>	PM10 Emissions	European Commission, Joint Research Centre (EU)	2015-2030	tons
<i>TR33</i>	Not available			

Source: authors' own elaboration

SDG Target 13.2 Climate change measures into policy.

Integrate climate change measures into national policies, strategies and planning.

Indicator: CO2 Emissions

Emissions projections of CO2 based on the spatial distribution of CO2 (Carbon dioxide) emissions over Europe. The total emissions for each territory are derived from the GAINS model (Lavalle, Trombetti and Pisoni, 2015).

Table 95 - CO2 Emissions

SDG 13 TAKE URGENT ACTION TO COMBAT CLIMATE CHANGE AND ITS IMPACTS				
From the JRC dataset	SDG Target(s)	13.2 (climate change measures into policy)		
	Indicator Name	CO2 Emissions		
	Type	Experimental		
	Coverage	EU-27		
	Source	European Commission, Joint Research Centre		
	Unit of measurement	Number		
	Frequency	Decade		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	CO2 Emissions	European Commission, Joint Research Centre (EU)	2015-2030	thousand tons
Western Macedonia	CO2 Emissions	European Commission, Joint Research Centre (EU)	2015-2030	tons
Navarra	CO2 Emissions	European Commission, Joint Research Centre (EU)	2015-2030	tons
Andalucia	CO2 Emissions	REDIAM (N/R)	2015-2020	tons
Piemonte	CO2 Emissions	European Commission, Joint Research Centre (EU)	2015-2020	tons
Puglia	CO2 Emissions	European Commission, Joint Research Centre (EU)	2015-2030	tons
Pomorskie	CO2 Emissions	Local Data Bank (N/R)	1998-2021	tons
Centro	CO2 Emissions	Portuguese Environment Agency	2015-2019	ktons
Nord-Vest	CO2 Emissions	European Commission, Joint Research Centre (EU)	2015-2030	tons
TR33	CO2 Emissions	OECD (EU)	2008	ktons

Source: authors' own elaboration

SDG Target 13.2 Climate change measures into policy.

Integrate climate change measures into national policies, strategies and planning.

Indicator: Greenhouse gas emissions

Emissions of different greenhouse gases aggregated into a common measure based on their global warming potentials (GWP) relative to CO₂.

Table 96 - Greenhouse gas emissions

SDG 13 TAKE URGENT ACTION TO COMBAT CLIMATE CHANGE AND ITS IMPACTS				
From the JRC dataset	SDG Target(s)	13.2 (climate change measures into policy)		
	Indicator Name	Greenhouse Gas Emissions		
	Type	Official		
	Coverage			
	Source	Department of Tourism/Economics of the Regional Government		
	Unit of measurement	Rate		
	Frequency			
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Greenhouse Gas Emissions	OECD (EU)	2001-2018	Mt CO ₂ eq
<i>Western Macedonia</i>	Greenhouse Gas Emissions	OECD (EU)	2001-2018	Mt CO ₂ eq
<i>Navarra</i>	Greenhouse Gas Emissions	KLINA/OCECAS (N/R)	2007-2020	kt CO ₂ eq
<i>Andalucia</i>	Greenhouse Gas Emissions	REDIAM (N/R)	2010-2020	t CO ₂ eq per capita
<i>Piemonte</i>	Greenhouse Gas Emissions	OECD (EU)	2001-2018	t CO ₂ eq per capita
<i>Puglia</i>	Greenhouse Gas Emissions	OECD (EU)	2001-2018	Mt CO ₂ eq
<i>Pomorskie</i>	Not available			
<i>Centro</i>	Greenhouse Gas Emissions	Portuguese Environment Agency(N/R)	2015-2019	Kiloton
<i>Nord-Vest</i>	Not available			
<i>TR33</i>	Greenhouse Gas Emission	OECD (EU)	2001-2018	Rate

Source: authors' own elaboration

SDG Target 13.2 Climate change measures into policy.

Integrate climate change measures into national policies, strategies and planning.

Indicator: Cooling and heating degree days.

Heating degree day (HDD) index is a weather-based technical index designed to describe the need for the heating energy requirements of buildings.

Cooling degree day (CDD) index is a weather-based technical index designed to describe the need for the cooling (air-conditioning) requirements of buildings.

Table 97 - Cooling and heating degree days

SDG 13 TAKE URGENT ACTION TO COMBAT CLIMATE CHANGE AND ITS IMPACTS				
From the JRC dataset	SDG Target(s)	13.2 (climate change measures into policy)		
	Indicator Name	Cooling and heating degree days		
	Type	Official		
	Coverage	EU-27 plus others		
	Source	Eurostat, Regional Statistics		
	Unit of measurement	Number		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Cooling and heating degree days	Eurostat, Regional Statistics (EU)	1979-2022	Number
<i>Western Macedonia</i>	Cooling and heating degree days	Eurostat, Regional Statistics (EU)	1979-2021	Number
<i>Navarra</i>	Cooling and heating degree days	Eurostat, Regional Statistics (EU)	1979-2021	Degree days
<i>Andalucia</i>	Cooling and heating degree days	Eurostat, Regional Statistics (EU)	1979-2022	Number
<i>Piemonte</i>	Cooling and heating degree days	Eurostat, Regional Statistics (EU)	1979-2022	Number
<i>Puglia</i>	Cooling and heating degree days	Eurostat, Regional Statistics (EU)	2013-2021	Number
<i>Pomorskie</i>	Cooling and heating degree days	Eurostat, Regional Statistics (EU)	2018-2022	Number
<i>Centro</i>	Cooling and heating degree days	Eurostat, Regional Statistics (EU)	1979-2021	Number
<i>Nord-Vest</i>	Cooling and heating degree days	Eurostat, Regional Statistics (EU)	2007-2021	Number
<i>TR33</i>	Cooling and heating degree days	OECD (EU)	2001-2018	Number

Source: authors' own elaboration



SDG 14 – LIFE BELOW WATER

SDG 14 seeks to conserve and sustainably use the oceans, seas and marine resources for sustainable development. The United Nations defines 10 targets ranging from reducing marine pollution to protecting coastal ecosystems and effectively regulating fishing activities. The three indicators in the initial JRC proposal relate to four of these targets, namely targets 14.1, one indicator, and 14.5, two indicators.

- Target 14.1 Reduce marine pollution. Indicator: Estuarine with high/very high water quality
- Target 14.5 Coastal and marine areas. Indicator: Protected coastal area as a percentage of total coastal area; Coastal areas with good/very good water quality.

Only five of the regions participating in the pilot project are coastal regions, namely Andalusia in Spain, Centro in Portugal, Puglia in Italy, Pomorskie in Poland and North Aegean in Greece. SDG 14 has strong interdependencies with a broad range of other SDGs, as oceans sustain coastal economies and livelihoods, contribute to food production and function as a carbon sink.

In the initial proposal of indicators, two of them had a limited spatial coverage because the source of information came from a Spanish region and therefore the data initially available were limited to that region. This makes the reports made by the regions involved in the pilot project more valuable, as it makes it possible to expand these data. Another of the indicators initially proposed comes from a supranational source, the OECD, so the availability of regional information is, initially, greater. However, as can be seen in the summary tables below for each indicator, the results obtained have been very limited. In the coastal regions participating in the project, there is hardly any data on the proposed indicators.

With this limited availability of data, the proposals for new indicators made by these coastal regions for SDG14 may be key to the final proposal of territorial indicators.

Estuarine with high/very high water quality (14.1): Only two of the five coastal regions participating in the project report information on this indicator, one of them based on bathing water quality.

Protected coastal area as a percentage of total coastal area (14.5): According to UN, this indicator represents the extent to which marine areas important for conserving biodiversity, cultural heritage, scientific research (including baseline monitoring), recreation, natural resource maintenance, and other values, are protected from incompatible uses. It shows how much of each major ecosystem and habitat is dedicated to maintaining its diversity and integrity. Protected areas are essential for maintaining ecosystem diversity, in conjunction with management of human impacts on the environment. Only two regions report information on this indicator.

Coastal areas with good/very good water quality (14.5): Only two of the five coastal regions participating in the project report information on this indicator. The indicator is related with bathing sites with excellent water quality.

SDG Target 14.1 Reduce marine pollution.

By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution.

Indicator: Estuarine with high/very high water quality

No definition

Table 98 - Estuarine with high/very high water quality

SDG 14 CONSERVE AND SUSTAINABLY USE THE OCEANS, SEAS, AND MARINE RESOURCES FOR SUSTAINABLE DEVELOPMENT				
From the JRC dataset	SDG Target(s)	14.1 (Reduce marine pollution)		
	Indicator Name	Estuarine with high/very high water quality		
	Type	Official		
	Coverage	Basque Country		
	Source	URA (Basque Water Agency)		
	Unit of measurement	Number		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Non applicable			
<i>Western Macedonia</i>	Non applicable			
<i>Navarra</i>	Non applicable			
<i>Andalucia</i>	Estuarine with high/very high water quality	River Basin Agencies (N/R)	2013-2019	Percentage
<i>Piemonte</i>	Non applicable			
<i>Puglia</i>	Not fit for purpose			
<i>Pomorskie</i>	Non available			
<i>Centro</i>	Transitional bathing water of good or excellent quality (%)	APA – SNIRH (N/R)	2006-2022	Percentage
<i>Nord-Vest</i>	Non applicable			
<i>TR33</i>	Non applicable			

Source: authors' own elaboration

SDG Target 14.5 Coastal and marine areas.

By 2020, conserve at least 10 percent of coastal and marine areas, consistent with national and international law and based on the best available scientific information.

Indicator: Protected coastal area as a percentage of total coastal area

Marine protected areas as a share of each country's exclusive economic zone. The indicator does not reflect the effectiveness of these areas, nor whether or not they are suitably located.

Table 99 - Protected coastal area as a percentage of total coastal area

SDG 14 CONSERVE AND SUSTAINABLY USE THE OCEANS, SEAS, AND MARINE RESOURCES FOR SUSTAINABLE DEVELOPMENT				
From the JRC dataset	SDG Target(s)	14.5 (Coastal and marine areas)		
	Indicator Name	Protected coastal area as a percentage of total coastal area		
	Type	Experimental		
	Coverage	OECD countries and other European countries		
	Source	Organisation for Economic Cooperation and Development (OECD)		
	Unit of measurement	Percentage		
	Frequency			
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	Non available			
Western Macedonia	Non applicable			
Navarra	Non applicable			
Andalucia	Surface are of marine sites designated under Natura 2000	IECA (N/R)	2011-2019	km2
Piemonte	Non applicable			
Puglia	Non available			
Pomorskie	Non available			
Centro	Protected coastal area as a percentage of total coastal area	Institute for Nature Conservation and Forests (N/R)	2002-2022	Percentage
Nord-Vest	Non applicable			
TR33	Non applicable			

Source: authors' own elaboration

SDG Target 14.5 Coastal and marine areas.

By 2020, conserve at least 10 percent of coastal and marine areas, consistent with national and international law and based on the best available scientific information.

Indicator: Coastal areas with good/very good water quality

Global, ecological and chemical status of coastal waters. Rating: Good or better Worse than good, Not assessed.

Table 100 - Coastal areas with good/very good water quality

SDG 14 CONSERVE AND SUSTAINABLY USE THE OCEANS, SEAS, AND MARINE RESOURCES FOR SUSTAINABLE DEVELOPMENT				
From the JRC dataset	SDG Target(s)	14.5 (Coastal and marine areas)		
	Indicator Name	Coastal areas with good/very good water quality		
	Type	Official		
	Coverage	Basque Country		
	Source	URA (Basque Water Agency)		
	Unit of measurement	Qualitative classification		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	Bathing water profile	Programme for monitoring the quality of bathing waters on the coasts of Greece (N/R)		map
Western Macedonia	Non applicable			
Navarra	Non applicable			
Andalucia	Coastal areas with good/very good water quality	IECA (N/R)	2015-2020	Percentage
Piemonte	Non applicable			
Puglia	Non available			
Pomorskie	Non available			
Centro	Coastal bathing water of good or excellent quality	APA – SNIRH (N/R)	2015-2020	Percentage
Nord-Vest	Non applicable			
TR33	Non applicable			

Source: authors' own elaboration



SDG 15 – LIFE ON LAND

SDG 15 seeks to protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forest, combat desertification, and halt and reverse land degradation and halt biodiversity loss. There are four indicators in JRC's initial proposal for SDG 15. These four indicators serve to monitor two of the twelve targets of this SDG, two indicators per monitored target. Specifically, the targets and indicators are as follows,

- Target 15.1 Restoration of ecosystems. Indicators: Land Abandonment; Forest area over total surface area.
- Target 15.5 Degradation of habitats. Indicators: Terrestrial protected areas as a percentage of total area; Estimated soil erosion.

The difficulty in monitoring this SDG and the commitment to achieve it is already evident in the initial proposal, which includes three experiential indicators and only one official one.

Land Abandonment (15.1): The proposed indicator is experimental and several of the regions choose to use it. It is interesting to note that this indicator provides predictions up to 2050. Two regions report that the information is not available. One of the regions chooses to use a regionally calculated indicator whose definition is different from the initial indicator and lacks future predictions.

Forest area over total surface area (15.1): It is an indicator available in 9 of the 10 regions. In those regions where information is available, it comes from national or regional sources, all of which are official sources. Although the sources are diverse, the definition of the indicator seems to be common to all of them and this, together with its high availability, makes it an indicator to be taken into account in the final proposal.

Terrestrial protected areas as a percentage of total area (15.5): As in the previous case, the sources of information are diverse, but the indicator is available in most regions (8 out of 10). The initial proposal proposed a supranational source (OECD) but almost all regions use other sources. Thus, the time series also differ but it seems to be an indicator widely calculated by national and/or regional information sources.

Estimated soil erosion (15.5): This experimental indicator is calculated at European level and the information is available on Eurostat. Data are not available for one of the regions, TR33, but are available for the rest. All of them consider this indicator in their analysis except one of them, Andalusia, which opts for a different indicator available from local sources.

SDG Target 15.1 Restoration of ecosystems

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.

Indicator: Land Abandonment

Share of abandoned agricultural land into total agricultural land.

Table 101 – Land Abandonment

PROTECT, RESTORE, AND PROMOTE SUSTAINABLE USE OF TERRESTRIAL ECOSYSTEMS, SUSTAINABLY MANAGE FORESTS, COMBAT DESERTIFICATION, AND HALT AND REVERSE LAND DEGRADATION AND HALT BIODIVERSITY LOSS				
SDG 15				
From the JRC dataset	SDG Target(s)	15.1 (Restoration of ecosystems)		
	Indicator Name	Land Abandonment		
	Type	Experimental		
	Coverage	EU-27		
	Source	European Commission, Joint Research Centre		
	Unit of measurement	Percentage		
	Frequency	Decade		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Land Abandonment	European Commission, Joint Research Centre (EU)	2018	Number
<i>Western Macedonia</i>	Land Abandonment	European Commission, Joint Research Centre (EU)	2018	Number (Ha)
<i>Navarra</i>	Land Abandonment	European Commission, Joint Research Centre (EU)	2015-2050	Percentage
<i>Andalucia</i>	Burned forest area with respect to the total forest area	IECA (N/R)	2011-2019	Km2
<i>Piemonte</i>	Land Abandonment (Agriculture)	European Commission, Joint Research Centre (EU)	2015-2050	Percentage
<i>Puglia</i>	Land Abandonment	LUCAS – EUROSTAT (EU)	2012-2018	Percentage
<i>Pomorskie</i>	Not available			
<i>Centro</i>	Land Abandonment	European Commission, Joint Research Centre (EU)	2015-2050	Hectare
<i>Nord-Vest</i>	Land Abandonment	European Commission, Joint Research Centre (EU)	2016-2021	m2
<i>TR33</i>	Not fit for purpose			

Source: authors' own elaboration

SDG Target 15.1 Restoration of ecosystems

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

Indicator: Forest area over total surface area

Share of forest area over total surface area.

Table 102 - Forest area over total surface area

PROTECT, RESTORE, AND PROMOTE SUSTAINABLE USE OF TERRESTRIAL ECOSYSTEMS, SUSTAINABLY MANAGE FORESTS, COMBAT DESERTIFICATION, AND HALT AND REVERSE LAND DEGRADATION AND HALT BIODIVERSITY LOSS				
SDG 15				
From the JRC dataset	SDG Target(s)	15.1 (Restoration of ecosystems)		
	Indicator Name	Forest area over total surface area		
	Type	Official		
	Coverage	Spain		
	Source	Ministry for the Ecological Transition and the Demographic Challenge		
	Unit of measurement	Percentage		
	Frequency	Decade		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Forest area over total surface area	National Cadaster Greece (N/R)	-	GIS
<i>Western Macedonia</i>	Forest area over total surface area	Copernicus (EU)	2000-2018	Percentage
<i>Navarra</i>	Forest area over total surface area	National Forest Inventory (Ministry for Ecological Transition) (N/R)	1964-2017	Percentage and area (ha)
<i>Andalucia</i>	Forest area over total surface area	IECA (N/R)	2010-2019	Percentage
<i>Piemonte</i>	Forest area over total surface area	FAO-INFC, Global Forest Resources Assessment; Istat, Regional Statistics (N/R)	2005-2015	Percentage
<i>Puglia</i>	Forest area over total surface area	FAO-INFC Global Forest Resources Assessment (N/R)	2005-2015	Percentage
<i>Pomorskie</i>	Forest area over total surface area	Local Data Bank (N/R)	1999-2021	Number
<i>Centro</i>	Forest area over total surface area	Statistics Portugal, land use land cover statistics (N/R)	2010-2018	Percentage
<i>Nord-Vest</i>	Forest area over total surface area	National Institute of Statistics (N/R)	2008-2021	Percentage
<i>TR33</i>	Not available			

Source: authors' own elaboration

SDG Target 15.5 Degradation of habitats

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

Indicator: Terrestrial protected areas as a percentage of total area

Natural Protected Areas as a result of the compilation of those spaces declared in accordance with national and regional regulations.

Table 103 - Terrestrial protected areas as a percentage of total area

PROTECT, RESTORE, AND PROMOTE SUSTAINABLE USE OF TERRESTRIAL ECOSYSTEMS, SUSTAINABLY MANAGE FORESTS, COMBAT DESERTIFICATION, AND HALT AND REVERSE LAND DEGRADATION AND HALT BIODIVERSITY LOSS				
SDG 15				
From the JRC dataset	SDG Target(s)	15.5 (Degradation of habitats)		
	Indicator Name	Terrestrial protected areas as a percentage of total area		
	Type	Experimental		
	Coverage	OECD countries and other European countries		
	Source	Organisation for Economic Cooperation and Development (OECD)		
	Unit of measurement	Percentage		
	Frequency	-		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Not available			
<i>Western Macedonia</i>	Terrestrial protected areas as a percentage of total area	European Environment Agency (EU)	2012	Percentage
<i>Navarra</i>	Terrestrial protected areas as a percentage of total area	Nature Data Bank (Ministry for Ecological Transition) (N/R)	2021	Percentage
<i>Andalucia</i>	proportion of the natural area protected under the Natura 2000	IECA (N/R)	2011-2020	Percentage
<i>Piemonte</i>	Terrestrial protected areas as a percentage of total area	Istat;Elaboration on Ministry of Ecological Transition data (N/R)	2012-2021	Percentage
<i>Puglia</i>	Terrestrial protected areas as a percentage of total area	Istituto Protezione Ambiente (ISPRA) (N/R)	2012-2021	Percentage
<i>Pomorskie</i>	Terrestrial protected areas as a percentage of total area	Local Data Bank (N/R)	1996-2021	Percentage
<i>Centro</i>	Terrestrial protected areas as a percentage of total area	Responsible entities for nature conservation and forests of Continent, Açores and Madeira (N/R)	2011-2021	Percentage
<i>Nord-Vest</i>	Terrestrial protected areas as a percentage of total area	OECD Regional Statistics (EU)	2017	Percentage
<i>TR33</i>	Not available			

Source: authors' own elaboration

SDG Target 15.5 Degradation of habitats

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

Indicator: Estimated soil erosion

Soil erosion rates by water estimated based on the Revised Universal Soil Loss Equation (RUSLE) empirical computer model in tonnes per ha of EU territory per year (t ha⁻¹ yr⁻¹). Agricultural areas and natural grassland.

Table 104 - Estimated soil erosion

PROTECT, RESTORE, AND PROMOTE SUSTAINABLE USE OF TERRESTRIAL ECOSYSTEMS, SUSTAINABLY MANAGE FORESTS, COMBAT DESERTIFICATION, AND HALT AND REVERSE LAND DEGRADATION AND HALT BIODIVERSITY LOSS				
SDG 15				
From the JRC dataset	SDG Target(s)	15.5 (Degradation of habitats)		
	Indicator Name	Estimated soil erosion		
	Type	Experimental		
	Coverage	EU-27		
	Source	European Commission, Joint Research Centre		
	Unit of measurement	Rate		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Estimated soil erosion	Eurostat, AEI_PR_SOILER (EU)	2000-2016	Tonnes per hectare
<i>Western Macedonia</i>	Estimated soil erosion	Eurostat, AEI_PR_SOILER (EU)	2000-2016	Tonnes per hectare
<i>Navarra</i>	Estimated soil erosion	Eurostat, AEI_PR_SOILER (EU)	2000-2016	Tonnes per hectare
<i>Andalucia</i>	Estimated soil erosion	IECA (N/R)	2011-2020	Percentage
<i>Piemonte</i>	Estimated soil erosion - Agricultural areas and natural grasslands	Eurostat, AEI_PR_SOILER (EU)	2000-2016	Tonnes per hectare
<i>Puglia</i>	Estimated soil erosion	Eurostat, AEI_PR_SOILER (EU)	2000-2016	Tonnes per hectare
<i>Pomorskie</i>	Estimated soil erosion	Eurostat, AEI_PR_SOILER (EU)	2000-2016	Tonnes per hectare
<i>Centro</i>	Estimated soil erosion	Eurostat, AEI_PR_SOILER (EU)	2000-2016	Rate
<i>Nord-Vest</i>	Estimated soil erosion	Eurostat, AEI_PR_SOILER (EU)	2000-2016	Tonnes per hectare
<i>TR33</i>	Not fit for purpose			

Source: authors' own elaboration



SDG 16 – PEACE, JUSTICE AND STRONG INSTITUTIONS

SDG 16 seeks to promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels. The JRC proposal contains four indicators covering two of the twelve targets of this SDG. Specifically, the targets covered are as follows,

- Target 16.5 Reduce corruption. Indicator: Extract from QGI an indicator on corruption
- Target 16.6 Effective institutions. Indicators: Transparency index; Participation in the last elections; Quality of Government Index.

Only one of these indicators, participation in the last elections, is official, the other three are experimental indicators. These are indexes that try to measure transparency, corruption and quality of government. The European Quality of Government Index, developed by the Quality of Government Institute of Gothenburg University, is the only measure of institutional quality available at the regional level in the European Union. It captures average citizens' perceptions and experiences with corruption, quality and impartiality of three essential public services – health, education and policing – in their region of residence.

Extract from QGI an indicator on corruption (16.5): According to the 2023's Eurobarometer surveys on corruption, 74% of Europeans think there is corruption in the national public institutions in their country, while 73% think there is corruption in the local or regional public institutions in their country. This shows that corruption remains a significant challenge in the eyes of most Europeans. Therefore, an indicator for corruption is needed. The indicator in JRC's proposal is based on one of the components of the quality of government index. This is an index obtained from a large survey undertaken to measure perceptions of corruption, quality and impartiality of three essential public services, health, education and policing in the region of residence. The only region for which the index is not available is the Turkish region TR33.

Quality of Government Index (16.6): As noted above, this indicator is available for 9 of the regions, all except TR33. It is worth noting that there is great variability on this index between the regions considered, a variability that extends to the European regions as a whole.

Transparency index (16.6): According to the European research centre for anti-corruption and state-building, we can define transparency as the available and accessible (free of cost) minimal public information required to deter corruption and enable public accountability in a society. Government transparency thus implies that reliable, relevant, and timely information about the activities of government is available to the public, enabling it to defend itself from discrimination resulting from governance based on favouritism and abuse of power. Two of the regions report a transparency index. They obtain it from national information sources, which does not guarantee inter-regional comparability, but it does provide an indicator for observing the evolution over time of the corresponding target in these regions.

Participation in the last elections (16.6): This is generally available in all European regions. The data may be more or less difficult to access, but it is generally available.

SDG Target 16.5 Reduce corruption

Substantially reduce corruption and bribery in all their forms

Indicator: Extract from QGI an indicator on corruption

Corruption is one of the aspects (impartiality, corruption and quality) in the quality of government index. It measures whether there is no abuse of public office for private gain. Data is standardized around an EU mean of 0. The higher its value, the better the situation of the region in terms of corruption.

Table 105 - Extract from QGI an indicator on corruption

PROMOTE PEACEFUL AND INCLUSIVE SOCIETIES FOR SUSTAINABLE DEVELOPMENT, PROVIDE ACCESS TO JUSTICE FOR ALL AND BUILD EFFECTIVE, ACCOUNTABLE AND INCLUSIVE INSTITUTIONS AT ALL LEVELS				
SDG 16				
From the JRC dataset	SDG Target(s)	16.5 (Reduce corruption)		
	Indicator Name	Extract from QGI an indicator on corruption		
	Type	Experimental		
	Coverage	208 european regions		
	Source	University of Gothenburg		
	Unit of measurement	Index		
	Frequency	Quinquennial		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Extract from QGI an indicator on corruption	Eurostat, Regional Statistics (EU)	2010-2021	index
<i>Western Macedonia</i>	Corruption pillar of QGI	University of Gothenburg (EU)	2010-2021	index
<i>Navarra</i>	Extract from QGI an indicator on corruption	University of Gothenburg (EU)	2010-2021	index
<i>Andalucia</i>	Extract from QGI an indicator on corruption	University of Gothenburg (EU)	2017-2021	index
<i>Piemonte</i>	Quality of Government Index (Corruption index)	University of Gothenburg (EU)	2010-2021	index
<i>Puglia</i>	Extract from QGI an indicator on corruption	University of Gothenburg (EU)	2010-2021	index
<i>Pomorskie</i>	Extract from QGI an indicator on corruption	University of Gothenburg (EU)	2010-2021	index
<i>Centro</i>	Corruption dimension of the Quality of Government Index	University of Gothenburg (EU)	2010-2021	index
<i>Nord-Vest</i>	Extract from QGI an indicator on corruption	University of Gothenburg (EU)	2010-2021	index
<i>TR33</i>	Not available			

Source: authors' own elaboration

SDG Target 16.6 Effective institutions

Develop effective, accountable and transparent institutions at all levels

Indicator: Quality of Government Index

The European Quality of Government Index (EQI) captures average citizens' perceptions and experiences with corruption, quality and impartiality of three essential public services – health, education and policing – in their region of residence. The EQI is a composite indicator that uses 17 survey items to proxy for a region's level of quality of government. Data is standardized around an EU mean of 0.

Table 106 – Quality of Government Index

PROMOTE PEACEFUL AND INCLUSIVE SOCIETIES FOR SUSTAINABLE DEVELOPMENT, PROVIDE ACCESS TO JUSTICE FOR ALL AND BUILD EFFECTIVE, ACCOUNTABLE AND INCLUSIVE INSTITUTIONS AT ALL LEVELS				
SDG 16				
From the JRC dataset	SDG Target(s)	16.6 (Effective institutions)		
	Indicator Name	Quality of Government Index		
	Type	Experimental		
	Coverage	208 european regions		
	Source	University of Gothenburg		
	Unit of measurement	Index		
	Frequency	Quinquennial		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Quality of Government Index	Eurostat, Regional Statistics (EU)	2010-2021	index
<i>Western Macedonia</i>	Quality of Government Index	University of Gothenburg (EU)	2010-2021	index
<i>Navarra</i>	Quality of Government Index	University of Gothenburg (EU)	2010-2021	index
<i>Andalucia</i>	Quality of Government Index	University of Gothenburg (EU)	2017-2021	index
<i>Piemonte</i>	European Quality of Government Index	University of Gothenburg (EU)	2010-2021	index
<i>Puglia</i>	Quality of Government Index	University of Gothenburg (EU)	2010-2021	index
<i>Pomorskie</i>	Quality of Government Index	University of Gothenburg (EU)	2010-2021	index
<i>Centro</i>	Quality of Government Index	University of Gothenburg (EU)	2010-2021	index
<i>Nord-Vest</i>	Quality of Government Index	University of Gothenburg (EU)	2010-2021	index
<i>TR33</i>	Not available			

Source: authors' own elaboration

SDG Target 16.6 Effective institutions

Develop effective, accountable and transparent institutions at all levels

Indicator: Transparency Index

Transparency as the available and accessible (free of cost) minimal public information required to deter corruption and enable public accountability in a society.

Table 107 - Transparency Index

PROMOTE PEACEFUL AND INCLUSIVE SOCIETIES FOR SUSTAINABLE DEVELOPMENT, PROVIDE ACCESS TO JUSTICE FOR ALL AND BUILD EFFECTIVE, ACCOUNTABLE AND INCLUSIVE INSTITUTIONS AT ALL LEVELS				
SDG 16				
From the JRC dataset	SDG Target(s)	16.6 (Effective institutions)		
	Indicator Name	Transparency Index		
	Type	Experimental		
	Coverage			
	Source	Transparency International		
	Unit of measurement	Index		
	Frequency			
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Not available			
<i>Western Macedonia</i>	Not fit for purpose			
<i>Navarra</i>	Not available			
<i>Andalucia</i>	Transparency index	DYNTRA (N/R)	2018-2019	index
<i>Piemonte</i>	Cohesion Open Government Index su trasparenza	ISTAT (N/R)	2013	index (Italy 2013=100)
<i>Puglia</i>	Not available			
<i>Pomorskie</i>	Not available			
<i>Centro</i>	Not fit for purpose			
<i>Nord-Vest</i>	Not available			
<i>TR33</i>	Not available			

Source: authors' own elaboration

SDG Target 16.6 Effective institutions

Develop effective, accountable and transparent institutions at all levels

Indicator: Participation in the last elections

Percentage of the voting population participating in elections (European, national, local). Some regions report data on abstention rather than participation.

Table 108 - Participation in the last elections

PROMOTE PEACEFUL AND INCLUSIVE SOCIETIES FOR SUSTAINABLE DEVELOPMENT, PROVIDE ACCESS TO JUSTICE FOR ALL AND BUILD EFFECTIVE, ACCOUNTABLE AND INCLUSIVE INSTITUTIONS AT ALL LEVELS				
SDG 16				
From the JRC dataset	SDG Target(s)	16.6 (Effective institutions)		
	Indicator Name	Participation in the last elections		
	Type	Official		
	Coverage	Spain		
	Source	INE (National Statistics Institute)		
	Unit of measurement	Percentage		
	Frequency	Per election cycle		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	Participation in the last elections	Ministry of Interior Affairs (N/R)	2010-2019	percentage
Western Macedonia	Participation in the last elections	Ministry of Interior (N/R)	1996-2019	percentage
Navarra	Not available			
Andalucia	Participation in the last elections	IECA (N/R)	2015-2022	percentage
Piemonte	Voters Turnout to General Elections	OECD, Regional database (EU)	2001-2018	percentage
Puglia	Participation in the last elections	OECD (EU)	1996-2018	percentage
Pomorskie	Participation in the last elections	NEC (N/R)	2006-2018	percentage
Centro	Abstention rate in the elections (%)	Ministry of Internal Administration (N/R)	2001-2021	percentage
Nord-Vest	Not available			
TR33	Participation in the last elections	OECD (EU)	2002-2015	percentage

Source: authors' own elaboration



SDG 17 – PARTNERSHIPS FOR THE GOALS

SDG 17 seeks to strengthen the means of implementation and revitalize the global partnership for sustainable development. It is the sustainable development goal with the largest number of targets, a total of 19. The JRC's proposed data set, contains four indicators to monitor this SDG, indicators that address four of these 19 targets. Specifically, the targets covered are as follows

- Target 17.2 Development assistance commitments. Indicator: Official development assistance
- Target 17.6 Regional and international cooperation. Indicator: PCT co-patent applications that are done with foreign regions.
- Target 17.8 Enabling technology. Indicator: Individuals who used the internet for interaction with public authorities
- Target 17.12 Imports from least developed countries. Indicator: Imports from developing countries

Official development assistance, individuals who used the internet for interactions with public authorities and import from developing countries are classified as official indicators while PCT co-patent applications that are done with foreign regions is classified as an experimental indicator. One of the official indicators, Individuals who used the internet for interaction with public authorities, comes from European sources (Eurostat, regional statistics, indicator ISOC_R_GOV_I). The other official indicators come from regional sources. Finally, the experimental indicator is available from an international source (OECD, Regional database).

Official development assistance (17.2): Only two regions, Navarre and Andalucia, offer data on this indicator. These are official data from the statistical institutes of these regions. In both cases, the data is given as the percentage that this aid represents of the regions' GDP. The TR33 region also offers data for this indicator, although it seems to be aid that falls on the region itself to support public institutions, private sector, and civil society organizations in line with the development axes of the region.

PCT co-patent applications that are done with foreign regions (17.6): This is an indicator that is available for 8 of the 10 regions and comes from a supranational source, in this case the OECD. Despite the existence of this supranational source of information, one of the regions (Andalucia) chooses to use a regional data source. This allows it to have more updated data since the OECD time series ends in 2015, which is precisely the year in which Andalucia's data starts.

Individuals who used the internet for interaction with public authorities (17.8): This indicator is available from Eurostat for a large number of European regions (NUT2). It is the indicator with Eurostat code ISOC_R_GOV_I and coverage 2011-2021. Six of the ten regions report this indicator.¹⁵ The other three (Pomorskie, North Aegean and Western Macedonia) opt for regional data, one of them changing the indicator for households with internet access (Western Macedonia)

Imports from least developed countries (17.12): This data is available in 5 regions. The time series and unit of measurement differ among them. Navarra offers the information as a percentage of total imports. In the case of Centro, it is also offered as a percentage, but without specifying on what. Andalucia, Puglia and Piemonte offer the data in monetary units.

Following the structure of the previous sections, below is a summary of the definition of these indicators and the data available in each region for these indicators.

¹⁵ In fact, in the Andalucia report, the data is from a local source. However, in the database compiled, Eurostat is cited as the source although the data provided appears to be from a local source. The figures provided differ substantially from those provided by Eurostat.

SDG Target 17.2 Development assistance commitments

Developed countries to implement fully their official development assistance commitments, including the commitment by many developed countries to achieve the target of 0.7 percent of gross national income for official development assistance (ODA/GNI) to developing countries and 0.15 to 0.20 percent of ODA/GNI to least developed countries; ODA providers are encouraged to consider setting a target to provide at least 0.20 percent of ODA/GNI to least developed countries.

Indicator: Official development assistance

Percentage of the General Budget of a region, net of transfers to local entities and the contribution to the State, dedicated to Official Development Assistance (ODA) in terms of the Development Assistance Committee of the OECD.

Table 109 - Official development assistance

SDG 17 STRENGTHEN THE MEANS OF IMPLEMENTATION AND REVITALIZE THE GLOBAL PARTNERSHIP FOR SUSTAINABLE DEVELOPMENT				
From the JRC dataset	SDG Target(s)	17.2 (Development assistance commitments)		
	Indicator Name	Official development assistance		
	Type	Official		
	Coverage			
	Source	Own elaboration (regional government)		
	Unit of measurement			
	Frequency			
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
North Aegean	Not available			
Western Macedonia	Not fit for purpose			
Navarra	Official Development Assistance	ODS-Navarra. General Budgets of Navarra (N/R)	2011-2020	Percentage
Andalucia	Official Development Assistance as a percentage of GDP	IECA (N/R)	2015-2021	Percentage
Piemonte	Not available			
Puglia	Not available			
Pomorskie	Not available			
Centro	Not fit for purpose			
Nord-Vest	Not available			
TR33	Regional Official Financial Support	Zafer Development Agency (N/R)	2010-2022	TL

Source: authors' own elaboration

SDG Target 17.6 Regional and international cooperation

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

Indicator: PCT co-patent applications that are done with foreign regions

This indicator measures the share of PCT co-patent applications that are done with foreign regions. It is calculated in % of the total count of co-patent applications.

Table 110 - PCT co-patent applications that are done with foreign regions

SDG 17 STRENGTHEN THE MEANS OF IMPLEMENTATION AND REVITALIZE THE GLOBAL PARTNERSHIP FOR SUSTAINABLE DEVELOPMENT				
From the JRC dataset	SDG Target(s)	17.6 (regional and international cooperation)		
	Indicator Name	PCT co-patent applications that are done with foreign regions		
	Type	Experimental		
	Coverage	OECD countries and other European countries		
	Source	Organisation for Economic Cooperation and Development (OECD)		
	Unit of measurement	Share		
	Frequency			
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Not available			
<i>Western Macedonia</i>	Not fit for purpose			
<i>Navarra</i>	PCT co-patent applications that are done with foreign regions	OECD, regional innovation (EU)	1997-2014	Percentage
<i>Andalucia</i>	PCT co-patent applications that are done with foreign regions	IECA (N/R)	2015-2020	Percentage
<i>Piemonte</i>	PCT co-patent applications that are done with foreign regions	OECD, regional innovation (EU)	2001-2015	Percentage
<i>Puglia</i>	PCT co-patent applications that are done with foreign regions	OECD, regional innovation (EU)	2001-2015	Percentage
<i>Pomorskie</i>	PCT co-patent applications that are done with foreign regions	OECD, regional innovation (EU)	2001-2015	Percentage
<i>Centro</i>	PCT co-patent applications that are done with foreign regions	OECD, regional innovation (EU)	2001-2015	Percentage
<i>Nord-Vest</i>	PCT co-patent applications that are done with foreign regions	OECD, regional innovation (EU)	2015	Percentage
<i>TR33</i>	PCT co-patent applications that are done with foreign regions	OECD, regional innovation (EU)	2009-2015	Percentage

Source: authors' own elaboration

SDG Target 17.8 Enabling technology

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

Indicator: Individuals who used the internet for interaction with public authorities

Use of Information and Communication Technologies (ICT) by individuals to exchange information and services with governments and public administrations (e-government). It is based on the annual EU survey on the use of ICT in households and by individuals. This allows for harmonised and comparable information on the use of ICT.

Table 111 - Individuals who used the internet for interaction with public authorities

SDG 17 STRENGTHEN THE MEANS OF IMPLEMENTATION AND REVITALIZE THE GLOBAL PARTNERSHIP FOR SUSTAINABLE DEVELOPMENT				
From the JRC dataset	SDG Target(s)	17.8 (enabling technology)		
	Indicator Name	Individuals who used the internet for interaction with public authorities		
	Type	Official		
	Coverage	EU-27 plus others		
	Source	Eurostat, Regional Statistics		
	Unit of measurement	Percentage		
	Frequency	Annual		
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Individuals who used the internet for interaction with public authorities	ELSTAT (N/R)	2012-2021	Percentage
<i>Western Macedonia</i>	Households with internet access	ELSTAT (N/R)	2012-2021	Percentage
<i>Navarra</i>	Individuals who used the internet for interaction with public authorities	Eurostat (EU)	2011-2021	Percentage
<i>Andalucia</i>	Individuals who used the internet for interaction with public authorities	Eurostat (EU)	2011-2021	Percentage
<i>Piemonte</i>	Individuals who used the internet for interaction with public authorities	Eurostat (EU)	2011-2021	Percentage
<i>Puglia</i>	Individuals who used the internet for interaction with public authorities	Eurostat (EU)	2011-2021	Percentage
<i>Pomorskie</i>	Individuals who used the internet for interaction with public authorities	Statistics Poland (N/R)	2008-2021	Percentage
<i>Centro</i>	Individuals who used the internet for interaction with public authorities	Eurostat (EU)	2011-2021	Percentage
<i>Nord-Vest</i>	Individuals who used the internet for interaction with public authorities	Eurostat (EU)	2011-2021	Percentage
<i>TR33</i>	Not available	Not available		

Source: authors' own elaboration

SDG Target 17.12 Imports from least developed countries

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.

Indicator: Imports from developing countries

Imports from developing countries as a percentage of total imports. Developing countries are defined as countries on the OECD Development Assistance Committee list of recipients of official development assistance (ODA).

Table 112 - Imports from developing countries

SDG 17 STRENGTHEN THE MEANS OF IMPLEMENTATION AND REVITALIZE THE GLOBAL PARTNERSHIP FOR SUSTAINABLE DEVELOPMENT				
From the JRC dataset	SDG Target(s)	17.12 (imports from least developed countries)		
	Indicator Name	Imports from developing countries		
	Type	Official		
	Coverage			
	Source	Own elaboration (regional government)		
	Unit of measurement			
	Frequency			
From the REGION datasets	Available indicators at the regional level	Source (EU or N/R)	Time coverage	Unit of measurement
<i>North Aegean</i>	Not available			
<i>Western Macedonia</i>	Not fit for purpose			
<i>Navarra</i>	Imports from developing countries	ODS-Navarra, Nastat (N/R)	2015-2021	Percentage
<i>Andalucia</i>	Imports from developing countries	IECA (N/R)	2015-2021	Million€
<i>Piemonte</i>	Imports from developing countries	Istat, Regional Statics (N/R)	2021-2022	€
<i>Puglia</i>	Imports from developing countries	Coeweb – ISTAT (N/R)	2000-2021	€
<i>Pomorskie</i>	Not available			
<i>Centro</i>	Imports from developing countries	CCDR Centro (N/R)	2022	Percentage
<i>Nord-Vest</i>	Not available			
<i>TR33</i>	Not available			

Source: authors' own elaboration

Indicators excluded from the original dataset

This paragraph summarizes the indicators excluded by the regions because they were considered not suitable for the purpose or because there is no available regional-level data.

Based on the analyses conducted by the regions, certain indicators might be excluded from the final dataset proposal if supported by valid reasons and if they are indeed deemed of limited utility at the European level.

Indicators not fit for purpose by most regions

In relation to geographical, administrative, and other characteristics, regions have identified certain indicators that are not relevant to the region itself due to their lack of relevance, non-measurability at this level, or other specific reasons (Andalucia is the only region that has collected all the indicators). In most cases, individual regions, or at most two, have identified these indicators as "not fit for the purpose." Therefore, in these instances, it was decided to retain these indicators in the dataset as they might be potentially valuable for other regions. A special case is SDG 14, which is not measurable for the Piemonte, Navarra, Western Macedonia and T33 (Manisa, Afyonkarahisar, Kutahya, Usak) regions due to their inland and mountainous nature, without access to the sea. Even in this scenario, the indicators are retained because they are useful for coastal regions.

The only exception is the indicator concerning **"Electricity production that comes from nuclear power"**. This indicator has been excluded from the analyses for the majority of the regions since it is a method of production that doesn't exist, and therefore is not measurable.

Table 113 - Indicators "Not fit for purpose"

SDG	NOT FIT for PURPOSE at the regional level	Regions
1	-	-
2	Gross Value Added (GVA) of agriculture, livestock and fishing	Centro
	Overweight rate	W. Macedonia
3	Deaths due to Covid-19	Centro, Navarra
4	-	-
5	-	-
6	Population connected to wastewater with at least secondary treatment	W. Macedonia
7	Electricity production that comes from nuclear power	Centro, Navarra, Piemonte, Puglia, W. Macedonia, Nord-Vest, T33
8	GVA at basic prices	Centro, Navarra
	GVA at current market prices	Navarra
	Employment	Centro
9	Patent applications to the EPO	W. Macedonia
10	-	-
11	Land use	Centro
	Difference between built-up area growth rate and population growth rate	W. Macedonia
12	Carbon footprint	W. Macedonia
13	-	-
14	Estuarine with high water quality	Puglia
	All the indicators (not measurable)	Navarra, Piemonte, W. Macedonia, Nord-Vest, T33
15	Estimated soil erosion	T33
	Land Abandonment	T33
16	Transparency index	Centro, W. Macedonia

17	Official Development Assistance	Centro, W. Macedonia
	Imports from developing countries	W. Macedonia
	PCT co-patent applications that are done with foreign regions	W. Macedonia

Source: authors' own elaboration

Particular cases

The main critical issues have been identified in SDG 12, particularly in relation to two indicators:

- **Carbon footprint** - target 12.2 (management of natural resources). Only Andalucia and Centro region have analyzed this indicator.
- **Food waste** - target 12.3 (reduce food waste). None of the regions have analyzed this indicator.

For these indicators, although they are very useful for monitoring SDG 12, it is very difficult to obtain region-specific data.

Given the usefulness of these indicators, they will not be excluded from the dataset; however, the difficulty in accessing data should be emphasized. In case of data absence, regions suggest the following alternatives: CO2 equ per capita (Piemonte) or Domestic material consumption (Puglia) as alternatives of Carbon footprint, and BioWaste (North Aegean) or Household food waste (Andalucia) as alternative of Food waste. However, in these cases, the data are available from national or regional sources, making it difficult to consider them accessible for other European regions.

A particular case related to target 1.5 (exposure and vulnerability) is

- **Affected people due to disasters**. This is an interesting indicator, but no specific reference for this indicator is provided by the JRC proposal, and there is no precise definition of what is to be measured. Therefore, regions have opted for very different alternative solutions. The indicator is useful for monitoring target 1.5 and will not be excluded, but a more specific indicator needs to be found.

North Aegean suggests a different indicator in relation to the implications from conflicts and wars, migration issues that become a crucial aspect for monitoring SDG 2. As the region suggests, it is essential to explore and utilize indicators that capture the socio-economic impact of migration, as it plays a significant role in shaping the region's dynamics, including isolation, poverty, and other related factors. However, we could consider this indicator as additional, but it is not more specific for this target 1.5 but is very general for SDG 2 and other SDGs.

Another particular case related to target 3.3 (epidemics and diseases) is:

- **Deaths due to Covid-19**. Even if the indicator is "fit for purpose" for all the regions, except for Navarra and Centro, data are not available from European sources but only from national/regional sources.

The indicator is very useful for this historical period. However, it is difficult to consider it as highly significant for the target 3.3 since it measures only a portion of the epidemic diseases/deaths (those specifically from Covid-19), without considering other forms of viral diseases. It would be more useful and interesting to have a more general indicator, for example indicators related to mental health status or the suicide rate (also related to mental health disorders), also potentially related to the pandemic. Regions suggest the following alternatives: Centro suggests to use "Death rate due to communicable diseases"; instead, Navarra suggests another very useful, but different, indicator "Patients cared for in mental health centres", which is one of the diseases that affects a large part of the population and all ages, also in relation to the pandemic period. In particular on the one hand, on May 5, 2023, the WHO (World Health Organization) chief declared the end of covid-19 as a global health problem, on the other hand, the WHO Comprehensive Mental Health Action Plan 2013-2030 sets out clear actions for Member States, the WHO Secretariat and international, regional and national partners to promote mental health and well-being for all, to prevent mental health conditions for those at-risk and to achieve universal coverage for mental health services (WHO, 2021) (Osés-Eraso, N., 2023).

Annex 4. Additional indicators proposed by each of the region per SDG



SDG 1 – NO POVERTY

Table 114 summarizes the 15 new proposals for monitoring SDG1, end poverty in all its forms everywhere. These proposals relate to four targets of this SDG, namely, target 1.1 (extreme poverty), target 1.3 (social protection systems), target 1.4 (access to basic services) and target 1.5 (exposure to vulnerability). Target 1.1 and target 1.5 were already considered in the initial proposal; the other two, target 1.3 and target 1.4 were not specifically considered in the initial proposal. Of the 15 new proposals, 8 have been classified as new indicators while the other 7 have been classified as replacements (1) or specific measures for indicators included in the initial proposal (6).

For target 1.1, which aims to reduce **extreme poverty**, four of the regions propose to replace the indicator material and social deprivation with the indicator severe material and social deprivation. The definition of severe material deprivation is narrower than the definition of material and social deprivation and can better help to follow the extreme poverty target.

In addition, for target 1.2, **reduce poverty**, we find among the new proposals, people at risk of relative poverty. It is worth mentioning that this indicator is one of the three components of AROPE. The other two components of this composite indicator together with AROPE itself, were already included in the initial proposal of JRC. There is also a proposal to include S80/S20 income distribution as an indicator to monitor poverty. This indicator is usually considered as a measure of the inequality of income distribution. In fact, it is also proposed for monitoring target 10.4 (greater equality) by several regions (see Table 123).

Two new indicators are proposed for target 1.3, **social protection systems** and three for target 1.4, **access to basic services**.

For target 1.5, **exposure and vulnerability**, the indicator in the initial proposal was an experimental one. As a result, many proposals have been made by the regions to cover this indicator. On the one hand, some regions have official data that calculate the number of deaths attributed to disasters. On the other hand, some regions are proposing indicators that better show vulnerability. Beyond deaths due to disasters, an element at risk of being harmed is more vulnerable the more it is exposed to a hazard and the more it is susceptible to its forces and impacts (Messner and Meyer, 2005; Foudi and Osés-Eraso, 2014; Foudi et al., 2015). Whether regions are reducing exposure and vulnerability can be measured by the proportion of people and/or areas exposed to extreme events (heat waves, fires and/or floods). The regions' proposals are along these lines.

There is also a proposal that is very interesting for some European regions that, due to their geographical situation, receive many refugees and/or asylum seekers. This can be an important factor of social vulnerability and can add pressure on the economic, health, education or other social coverage of the region.¹⁶

Table 114 - Proposals for SDG1. No poverty

SDG 1 - End poverty in all its forms everywhere						
New indicator	Target	The indicator replaces...	The indicator complements...	Specific measure for...	It is an additional indicator	Proposing region
Severe material and social	1.1 (extreme poverty)	Material and social deprivation				Centro Navarra Piemonte

¹⁶ UN includes proportion of the population who are refugees, by country of origin as an indicator for target 10.7 (responsible migration) (UN, 2018).

deprivation rate						Puglia
People at risk of relative poverty (1)	1.2 (reduce poverty)				X	TR33
S80/S20 income distribution (2)	1.2 (reduce poverty)				X	TR33
Proportion of population covered by social protection floors/systems	1.3. (social protection systems)				X	Andalucía
Waiver of health care	1.3. (social protection systems)				X	Piemonte
Housing cost overburden rate	1.4 (access to basic services)				X	Centro Piemonte
Proportion of population living in households with access to basic services	1.4 (access to basic services)				X	Andalucía
Households who report difficulties with public transport connections in the area where they reside	1.4 (access to basic services)				X	Piemonte
Number of deaths attributed to disasters per 100,000 population	1.5 (exposure and vulnerability)			Affected people due to disasters		Andalucía Centro Navarra
Number of injured or ill people attributed to	1.5 (exposure and vulnerability)			Affected people due to disasters		Centro

disasters per 100,000 population						
Share of build-up area exposed to river-flooding	1.5 (exposure and vulnerability)			Affected people due to disasters		Navarra
Population exposed to the risk of floods	1.5 (exposure and vulnerability)			Affected people due to disasters		Piemonte Puglia
Population exposed to the risk of landslides	1.5 (exposure and vulnerability)			Affected people due to disasters		Piemonte Puglia
Share of population exposed to at least one forest fire	1.5 (exposure and vulnerability)			Affected people due to disasters		Western Macedonia
Asylum requests	1.5 (exposure to vulnerability)				X	North Aegean

(1) People at risk of relative poverty is one of the three components of AROPE. In the initial proposal of JRC, the AROPE indicator and the other two components of this indicator were included.

(2) This indicator was proposed by some regions for SDG10 (Centro, Puglia, Western Macedonia).

Source: Authors' elaboration



SDG 2 - ZERO HUNGER, FOOD SECURITY AND SUSTAINABLE AGRICULTURE

Table 115 summarizes the proposals for SDG2, end hunger, achieve food security and improved nutrition and promote sustainable agriculture. The proposals relate to targets 2.2 (end malnutrition), target 2.3 (agricultural productivity), 2.4 (sustainable food production), 2.5 (maintain genetic diversity), 2.c (food price volatility). Two of these targets were not included in the initial proposal, target 2.5 and target 2.c. For SDG2, there are 12 new proposals although only 3 of these have been classified as new indicators.

It is interesting to note that some of the indicators that are in the proposal of JRC can be calculated from different perspectives. Such is the case in this SDG for the target 2.2 **end malnutrition** and the overweight indicator which can be calculated for different age groups. We include these different ways of measuring in the summary table to highlight this fact and to note that, if an indicator can be calculated for different groups (e.g. age, gender), it is important to do so. This helps to complete the monitoring of other SDGs, such as SDG5 or SDG10, and follows the recommendations of the UN in its own indicator proposal.¹⁷

¹⁷ Sustainable Development Goal indicators should be disaggregated, where relevant, by income, sex, age, race, ethnicity, migratory status, disability and geographic location, or other characteristics, in accordance with the Fundamental Principles of Official Statistics (UN, 2018).

Other proposals made by the regions seek indicators that can serve as proxies for some initially proposed indicators that are considered appropriate but for which there is no data. This is the case in some regions for the monitoring of organic agriculture to reach target 2.4, **sustainable food production**. The proposals include the use of pesticides, herbicides and insecticides.

In the context of SDG2, several forums claim that aquaculture can be key to the transformation of the agri-food sector by contributing to food security and nutrition goals (FAO, World Economic Forum, Frontiers, among others). Aquaculture or farming in water is the aquatic equivalent of agriculture or farming on land and can contribute to fulfil the growing demand for protein (Jones et al., 2022). Therefore, the proposal made by North Aegean to measure the relevance of aquaculture within the agri-food sector is interesting and novel. This indicator can be interesting for both SDG2 and SDG14 and is particularly relevant for coastal regions. Finally, there are two indicators that can be classify as new proposals. One captures **genetic diversity** and the other **food price volatility**. The latter target has become particularly important since the 2020 pandemic in European regions due to the significant price increases in all sectors, but especially in the food sector. This significantly affects household budgets and threatens some aspects of sustainability, in particular those covered by SDG2.

Table 115 - Proposals for SDG2. Zero hunger

SDG 2 - End hunger, achieve food security and improved nutrition and promote sustainable agriculture						
New indicator	Target	The indicator replaces...	The indicator complements...	Specific measure for...	It is an additional indicator	Proposing region
Overweight general	2.2 (end malnutrition)			Overweight rate		Andalucía Piemonte Puglia
Overweight adults (>17)	2.2 (end malnutrition)			Overweight rate		Centro
Overweight Children (<17)	2.2 (end malnutrition)			Overweight rate		Andalucía Navarra Piemonte Pomorskie
% employment in aquaculture or % of aquaculture in agrifood production	2.2 (end malnutrition)				X	North Aegean
Income in agriculture, forestry and fishing per Annual	2.3 (agricultural productivity)		Productivity (GVA per worker) in agriculture, forestry and fishing			Andalucía

Work Units (AWU)						
Use of insecticides in farming (kg and area)	2.4 (sustainable food production)		Organic farming: areas with different crops			Nord-Vest
Use of fungicides in farming (kg and area)	2.4 (sustainable food production)		Organic farming: areas with different crops			Nord-Vest
Use of herbicides in farming (kg and area)	2.4 (sustainable food production)		Organic farming: areas with different crops			Nord-Vest
Organic farming: Number of holdings	2.4 (sustainable food production)		Organic farming: areas			TR33
Organic farming: Productions (Tons)	2.4 (sustainable food production)		Organic farming: areas			TR33
Proportion of local breeds classified as being at risk of extinction	2.5 (maintain genetic diversity)				X	Andalucía
Food Consumer Price Index Growth	2.c.(food price volatility)				X	Andalucía

Source: Authors' elaboration



SDG 3 – GOOD HEALTH AND WELL-BEING

Table 116 summarizes the proposals for SDG3, good health and well-being. The proposals cover six different targets, namely, target 3.3 (epidemics and diseases), target 3.4 (non-communicable diseases), target 3.5

(substance abuse), target 3.7 (sexual and reproductive health care services), target 3.8 (universal health coverage) and target 3.c (health financing and the recruitment). Half of these targets were not covered in the initial list of JRC indicators. It is worth noting that 8 of the 15 proposals have been classified as new indicators. The other 7 proposals are replacements (1), complements (1) and specific measures (5) for indicators included in the initial proposal.

There are four proposals to monitor the target **non-communicable diseases**. It is worth mentioning that two out of these four are related to mental health. Mental health is becoming a major health problem in the most developed countries and regions and more and more resources will be needed to meet the needs of these patients. The WHO Comprehensive Mental Health Action Plan 2013-2030 sets out clear actions for Member States, the WHO Secretariat and international, regional and national partners to promote mental health and well-being for all, to prevent mental health conditions for those at-risk and to achieve universal coverage for mental health services (WHO, 2021). Mental health is specifically mentioned in target 3.4.

Another set of interesting proposals are the ones related to **substance abuse**, mainly alcohol and tobacco as other substances are more difficult to measure and monitor. There is also a proposal to monitor the target **sexual and reproductive health care services**.

Finally, rather than new proposals strictly speaking, the regions propose new ways to measure **universal health coverage**, measuring hospital beds and health personnel. Most of them propose to use relative values (e.g. in terms of population) instead of absolute values as in the initial proposal. This is the most appropriate way to be able to assess whether or not there is progress.

Table 116 - Proposals for SDG3. Good health and well-being

SDG 3 – Ensure healthy lives and promote well-being for all at all ages						
New indicator	Target	The indicator replaces...	The indicator complements...	Specific measure for...	It is an additional indicator	Proposing region
Death rate due to communicable diseases	3.3 (epidemics and diseases)	Deaths due to Covid-19				Centro
Deaths due to Covid-19 per 1000 inhabitants	3.3 (epidemics and diseases)			Deaths due to Covid-19		North Aegean
Cases of infectious diseases	3.3 (epidemics and diseases)				X	North Aegean
Suicide mortality rate	3.4 (non-communicable diseases)				X	Centro Navarra Pomorskie TR33
Patients cared for in mental health centers	3.4 (non-communicable diseases)				X	Navarra

Proportion of deaths due to respiratory diseases	3.4 (non-communicable diseases)				X	TR33
Premature mortality rate	3.4 (non-communicable diseases)				X	Piemonte
Life expectancy at birth	3.4 (non-communicable diseases)				X	Andalucia Piemonte
Prevalence of daily alcohol consumption among population aged 15 years and older (%)	3.5 (substance abuse)				X	Centro
Prevalence of daily smokers among population aged 15 years and older (%)	3.5 (substance abuse) 3.a. (tabacco control)				X	Andalucia Centro
Proportion of women of reproductive age (aged 15–49 years) who have their need for family planning satisfied with modern methods	3.7. (sexual and reproductive health care)				X	Andalucia
Hospital beds per 100000 inhabitants	3.8 (universal health coverage)			Hospital beds		Andalucia Navarra Pomorskie Nord-Vest
Medical doctors per 1000 inhabitants	3.c (health financing and recruitment)			Health personnel		Andalucia Centro Navarra Western Macedonia Pomorskie

						Puglia
Nurses per 1000 inhabitants	3.c (health financing and recruitment)			Health personnel		Andalucia Centro Navarra
Pharmacy professionals per 1000 inhabitants	3.c (health financing and recruitment)			Health personnel		Centro
Dentist medical doctors per 1000 inhabitants	3.c (health financing and recruitment)			Health personnel		Centro
Proportion of the target population covered by all vaccines included in their national programme	3.c. (health financing and recruitment)				X	Andalucia
Satisfaction with health services	3.c. (health financing and recruitment)		Self-reported unmet needs for medical examination			Piemonte

Source: Authors' elaboration



SDG 4 - INCLUSIVE AND QUALITY EDUCATION

Table 117 summarizes the proposals for SDG4, quality of education. The initial proposal for indicators covered 4 targets of this SDG, 4.1 (primary and secondary education), 4.2 (access to early childhood education), 4.3 (vocational and tertiary education), 4.5 (gender and other disparities in education) and 4.6 (youth and adult literacy). The new proposals arising from the regional studies also cover targets 4.4 (technical and vocational skills) and 4a (inclusive and effective learning environments for all). Some of the proposals simply complement or disaggregate information contained in the initial indicators, but a good number of proposals add new and relevant information for the monitoring of this SDG. In fact, of the 14 proposals identified in the regional reports, 9 are new indicators.

It is worth mentioning the indicators for target 4.1, **primary and secondary education**. The indicators in the initial proposal were focussed on participation indicators, objective information that is relatively easy to obtain at the regional level. However, the new proposals cover not so much participation as competences acquired by students. Access to education at the lower educational stages is practically guaranteed at European level. On the other hand, it is more difficult to ensure the acquisition of adequate skills. Monitoring this acquisition can be a qualitative step towards quality education.

Also interesting are the proposals on **lifelong learning** and education beyond the normal pathway, primary, secondary, and tertiary. The acquisition of digital competences stands out at this point.

There are also proposals for **gender and other disparities in education** and **inclusive and effective learning environments for all** that, in certain ways link this SDG with SDG5 and SDG10.

Table 117 - Proposals for SDG4. Quality Education.

SDG 4 - Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all						
New indicator	Target	The indicator replaces...	The indicator complements...	Specific measure for...	It is an additional indicator	Proposing region
Not adequate alphabetical and numerical competence, secondary school	4.1 (primary and secondary education)				X	Piemonte
Average score in the eighth-grade exam in Polish and mathematics	4.1 (primary and secondary education)				X	Pomorskie
Percentage of seats authorized in socio-educational services for early childhood (nurseries and supplementary services) on children aged 0-2	4.2 (access to early childhood education)		Pupils enrolled in early childhood education			Puglia
Children in pre-primary education	4.2 (access to early childhood education)			<i>Pupils enrolled in early childhood education</i>		<i>Pomorskie</i>
New students in STEM degrees	4.3 (vocational and tertiary education)		Students enrolled in tertiary education			Navarra
Lifelong learning (%)	4.3 (vocational				X	Centro

	and tertiary education)					
Participation in continuing education	4.3 (vocational and tertiary education)				X	Piemonte
Share of students of stage I sectoral vocational schools in total number of students of post-primary schools	4.3 (vocational and tertiary education)			Distribution of pupils and students enrolled in general and vocational programmes		Pomorskie
Participation rate in education and training (last 4 weeks) TRNG_LFSE_04	4.3 (vocational and tertiary education)			Participation in education		Western Macedonia
Individual who have basic or above basic overall digital skills (%)	4.4. (technical and vocational skills)				X	Centro Piemonte Puglia
Share of female graduates at all levels of education (1)	4.5 (gender and other disparities in education)				X	Western Macedonia
Schools not physically accessible	4.a. (inclusive and effective learning)				X	Piemonte
Schools with pupils with disabilities with presence of adapted computer stations: secondary school	4.a. (inclusive and effective learning)				X	Piemonte

Percentage of foreign students	?				X	Pomorskie
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(1) Indicator for lower secondary level, upper secondary level, vocational education level, post-secondary non-tertiary level, foreman level education, tertiary education level.

Source: Authors' elaboration



SDG 5 - GENDER EQUALITY

Table 118 summarizes the proposals for SDG5, gender equality. The proposals made by the regions are in line with the same targets as the initial proposal. Namely, target 5.1 (gender discrimination), target 5.2 (gender violence), target 5.4 (unpaid work) and target 5.5 (women participation and leadership). Seven proposals for this SDG have been identified in the reports made by the regions. Among these proposals, 4 stand out and have been classified as new proposals.

Among the proposals, we find well-known indicators such as the gap in salaries or the gap in unemployment by gender to monitor **gender discrimination**. It should be borne in mind that some of these data are already considered in the composite indicator of the initial proposal, the female achievement index, and the female disadvantage index. We find also specific measures to measure **gender violence**.

We can also find some specific measures for the indicator inactive population rate due to caregiving responsibilities like the one comparing the employment rates of women with and without children. These are interesting indicators to monitor the target **unpaid work**.

We highlight a new indicator proposed to monitor **women participation and leadership**. This indicator measures the gender gap in managerial positions, another of the glass ceilings in gender equality in addition to female research and development personnel and women in parliament and government that were already included in the initial proposal.

In any case, on any proposal made to analyse SDG5 it is necessary not only to look at the trend but also to compare with similar data and trend data for men. Otherwise, it is difficult to assess whether we are moving towards gender equality. This type of comparison does not appear in some of the reports reviewed.

Table 118 - Proposals for SDG5. Gender equality.

SDG5 - Achieve gender equality and empower all women and girls						
New indicator	Target	The indicator replaces ...	The indicator complements ...	Specific measure for...	It is an additional indicator	Proposing region
Disparity in the average monthly earnings between Male and Female employees (%)	5.1 (gender discrimination)				X	Centro

Unemployment rate of women	5.1 (gender discrimination)				X	Western Macedonia
Gender gap for employment rate	5.1 (gender discrimination)				X	North Aegean
Proportion of women victims in crimes registered as Domestic violence by the partner or similar (%)	5.2 (gender violence)			Victims of violence against women		Centro
Number of women aged 18-59 suspected of being affected by violence (physical, sexual, economic or psychological)	5.2 (gender violence)			Victims of violence against women		Pomorskie
Number of domestic violence incidents	5.2 (gender violence)			Victims of violence against women		North Aegean
Ratio of employment rate for women aged 25-49 with at least one child aged 0-5 to the employment rate of women 25-49 years without children	5.4 (unpaid work)		Inactive population rate due to caregiving responsibilities			Piemonte Puglia
Proportion of time spent on unpaid domestic and	5.4 (unpaid work)				X	Pomorskie

care work, by sex, age and location						
Inactive population due to personal or family reasons	5.4 (unpaid work)			Inactive population rate due to caregiving responsibilities		North Aegean
Gender gap in managerial positions (%)	5.5 (women participation and leadership)				X	Centro
Women in regional council	5.5 (women participation and leadership)		Women in parliament and government			North Aegean

Source: Authors' elaboration



SDG 6 - CLEAN WATER AND SANITATION

Table 119 summarizes the proposals for SDG6, clean water and sanitation. In the initial JRC proposal, the targets to be monitored were 6.1 (universal access to water) and 6.3 (water quality), but the references to available databases were too specific and concerned mainly a particular region. Therefore, the regions participating in the project have identified alternative sources of information for their regions. The proposals can be considered as specific measures for the indicators proposed by JRC. In fact, 9 out of 16 proposal can be classified as such. This is something that can occur on many occasions for the monitoring of water targets. There may not be a strictly equal indicator for all regions, but there are alternative measures that can provide a snapshot of the situation. This makes inter-regional comparisons difficult, but for regional monitoring they are perfectly valid.

On the other hand, it is worth highlighting the proposals for indicators that are linked to target 6.4, **increase water-use efficiency and ensure freshwater supplies**. The proposed indicators analyze water withdrawals. They are very relevant indicators to analyze water demand. There is still a need to also consider water supply in order to have an approximation of what the water stress in the region may be. It should be noted that these measurements are complicated at the regional level. Often regions include several watersheds or share watersheds with neighboring regions, which makes it difficult to have accurate data at the regional level. In any case, having measurements of water availability is essential for assessing the sustainability of water withdrawals.

One region's reference to the use of treated wastewater may be of interest. This utilization may be especially relevant in areas with scarce freshwater availability. Regions and countries with critical water stress should consider alternative sources such as unconventional waters. Treated waters can be an interesting alternative for worldwide irrigation, but more specifically for the agricultural sector in critically water-stressed regions (FAO and UN Water, 2021).

Table 119 - Proposals for SDG6. Clean water and sanitation

SDG6 - Ensure availability and sustainable management of water and sanitation for all						
New indicator	Target	The indicator replaces ...	The indicator complements ...	Specific measure for...	It is an additional indicator	Proposing region
Proportion of dwellings served by water supply (%)	6.1 (universal access to water)			Population served by safely managed drinking water supply services		Centro
Safe water (%)	6.1 (universal access to water)			Population served by safely managed drinking water supply services		Centro
Efficiency of drinking water distribution networks	6.1 (universal access to water)			Population served by safely managed drinking water supply services		Piemonte
Drinking water supply network - length	6.1 (universal access to water)			Population served by safely managed drinking water supply services		Nord Vest
Drinking water supply network – settlements served	6.1 (universal access to water)			Population served by safely managed drinking water supply services		Nord Vest
Length of public sewerage system	6.1 (universal			Population served by safely managed		Nord Vest

	access to water)			drinking water supply services		
Public sewerage system – settlements covered	6.1 (universal access to water)			Population served by safely managed drinking water supply services		Nord Vest
Percentage of households who report irregularities in water supply	6.1 (universal access to water)			Population served by safely managed drinking water supply services		Puglia
Population connected to urban waste water collection system	6.3 (water quality)	Population connected to wastewater with at least secondary treatment				North Aegean
Urban water treatment plants in operation by type of secondary/advanced treatment	6.3 (water quality)			Population connected to wastewater with at least secondary treatment		Puglia
Industrial and municipal wastewater treated biologically, chemically and with increased biogene removal in % of wastewater requiring treatment	6.3 (water quality)				X	Pomorskie
Rate of population served by wastewater treatment plants	6.3 (water quality) 6.4 ?				X	TR33

in total municipal population						
Water withdrawals for drinking purposes/ potable use	6.4. (water-use efficiency and freshwater supplies)				X	Piemonte TR33
Volume of drinking water supplied to households	6.4. (water-use efficiency freshwater supplies)				X	Nord Vest
Urban Water supply network efficiency	6.4. (water-use efficiency and freshwater supplies)				X	Puglia
Wetlands of international importance	6.6 (protect and restore water-related ecosystems)				X	Piemonte

Source: Authors' elaboration



SDG 7 – AFFORDABLE AND CLEAN ENERGY

Table 120 summarizes the proposals for SDG7, affordable and clean energy. This SDG has 5 targets, 3 of which were already included in the initial JRC indicator proposal, target 7.1 (access to energy), target 7.2 (share of renewable energy) and target 7.3 (energy efficiency). The new proposals made by the regions also revolve around these 3 targets. A total of 14 proposals have been identified of which 4 have been classified as new indicators while 4 are complements and 5 are specific measures for indicators already included in the initial proposal.

One of the indicators proposed by JRC for monitoring **access to energy** is the monitoring of people affected by energy poverty. This is undoubtedly a very important factor, even more so in a context of a changing climate. Energy consumption is highly dependent on the weather. When the outside temperatures deviate significantly from the comfortable indoor temperatures they were built for this may require an increase of energy consumption to balance heat/cold difference. Energy poverty is a complex topic, since different variables come together and affect energy poverty situations: the status of the household, income, gender, knowledge, existing electrical appliances, energy sources and prices, among others (EPAH, 2022; EPAH, 2023). This complexity of measurement can be approached from two different perspectives, measurable and perceived energy poverty (EPAH, 2022). This is why some of the proposals made by the regions combine several indicators. On the one hand, measures such as energy bills and on the other hand the proportion of people who do not manage to keep their homes at an adequate temperature. It is necessary to combine both ideas because a low energy bill may be due to good home insulation and high energy efficiency or it may actually show energy poverty.

The target **share of renewable energy** is also a relevant one. The proposals for this goal have been classified as complementary measures for the JRC proposal. The initial proposal considered the share of electricity produced by renewable energy while the new proposals consider the share of renewable energy in final energy consumption or the consumption of renewable energy in specific sectors.

In any case, for all questions of renewable energies and energy efficiency, it may be interesting to know whether the different regions regularly publish their **energy balances**.

Table 120 - Proposals for SDG7. Affordable and clean energy

SDG7 - Ensure access to affordable, reliable, sustainable, and modern energy for all						
New indicator	Target	The indicator replaces...	The indicator complements...	Specific measure for...	It is an additional indicator	Proposing region
Proportion of households whose share of energy expenditure in income is more than twice the national median (1)	7.1 (access to energy)			People affected by energy poverty		Andalucía Navarra
Share of households whose absolute energy expenditure is below half the national median (1)	7.1 (access to energy)			People affected by energy poverty		Andalucía Navarra
Share of population not able to keep their home adequately warm (1)	7.1 (access to energy)			People affected by energy poverty		Andalucía Centro Navarra
Share of population with arrears on utility bills (1)	7.1 (access to energy)			People affected by energy poverty		Andalucía Navarra
Percentage of beneficiaries	7.1 (access to energy)			People affected by		Centro

of the Social Tariff for Energy compared to the resident population (%)				energy poverty		
I&Ileq index	7.1 (access to energy)			People affected by energy poverty		North Aegean
Households very or fairly satisfied with continuity of electric service	7.1 (access to energy)				X	Piemonte Puglia
Electricity in households by consumer location	7.1 (access to energy)				X	Pomorskie
Renewable energy share in gross final energy consumption	7.2 (share of renewable energy)		Electricity production that comes from renewable sources			Piemonte Puglia
Installed power that comes from renewable energy sources	7.2 (share of renewable energy)		Electricity production that comes from renewable sources			Western Macedonia
Consumption of energy from renewable sources in the thermal sector	7.2 (share of renewable energy)		Electricity production that comes from renewable sources			Piemonte
Consumption of energy from renewable sources in the	7.2 (share of renewable energy)		Electricity production that comes from renewable sources			Piemonte Puglia

transport sector						
Energy storage capacity	7.3 (energy efficiency)				X	Andalucía
Electric Energy intensity	7.3 (energy efficiency)				X	Western Macedonia

(1) Andalucía and Navarra, as well as other Spanish regions, provide information on these four indicators.

Source: Authors' elaboration



SDG 8 – DECENT AND INCLUSIVE WORK AND SUSTAINABLE ECONOMIC GROWTH

Table 121 summarizes the proposals for SDG8, decent work and economic growth. SDG 8 has the largest number of indicators in the initial JRC proposal, ten indicators. It has also the largest number of new proposals from the regions. 25 new proposals have been identified in the review of the regional reports: 4 proposals are classified as replacements, 8 as complements, 3 as specific measures and 10 as new indicators.

Of the 12 SDG8 targets, 6 were addressed in the initial JRC indicator proposal, namely 8.1 (economic growth), 8.2 (economic productivity), 8.3 (job creation), 8.5 (productive employment), 8.6 (youth not in employment, education, or training) and 8.8 (labour rights). The new proposals include two additional monitoring targets, target 8.9 (sustainable tourism) and target 8.10 (access to banking). Special mention should be made of the proposals made for the monitoring of target 8.9, as tourism is a very important sector in the economy of many European regions. The inclusion of tourism in the analysis of regional sustainability was one of the issues discussed at the workshop held between the different regions, an issue on which there was a broad consensus.

Perhaps the clearest proposals among the 26 proposals are those referring to the target of **economic growth**. JRC's initial proposal was based on monitoring GDP in nominal terms (current prices). It is well known that economic growth must be followed using GDP in real terms (constant prices). This is the proposal made by three of the regions that have produced reports, either proposing GDP in constant prices or volume or, equivalently, real GDP growth rate. Something similar happens with other indicators such as GDP per worker or compensation to employees.

There are also some proposals to monitor **job creation**. Some of them describe specific forms to measure firm creation while others are classified as new indicators. It is interesting to note the proposal to compare firm creation with firm closures. This comparison may give a better perspective of what is happening than just looking at firm creation. **Productive employment** is another goal that brings together many the proposals made. Some complement the employment indicator by breaking down this indicator into different ages and/or sectors. Others complement the compensation of employees' indicator by proposing its measurement in relative terms (as a proportion of GDP or per employee).

As noted above, the new indicators are proposed primarily for the **sustainable tourism** target. These indicators range from tourism revenues to overnight stays or the impact of tourism on waste. Finally, to close indicators are proposed to monitor **access to banking**. These indicators could be interesting in a social context where access to face-to-face financial services is increasingly limited, especially in small municipalities or less populated areas.

Table 121 – Proposals for SDG8. Decent work and economic growth

SDG8 – Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all						
New indicator	Target	The indicator replaces...	The indicator complements ...	Specific measure for...	It is an additional indicator	Proposing region
GDP at constant prices or volume	8.1 (economic growth)	GDP at current market prices				Navarra Puglia
Annual growth rate of real GDP per capita	8.1 (economic growth)	GDP at current market prices				Piemonte
GVA per worker at constant prices or volume	8.2 (economic productivity)	GVA at basic prices				Navarra
Births of Enterprises (%)	8.3 (job creation)			Firm creation		Centro
Survival rate of Enterprises borned 2 years before (%)	8.3 (job creation)			Firm creation		Centro
Number of registered firms	8.3 (job creation)			Firm creation		Nord-Vest
Firm creation in comparison with firm closures	8.3 (job creation)	Firm creation				North Aegean
Jobs created	8.3 (job creation)				X	Western Macedonia
Number and share of female entrepreneurs (new firms)	8.3 (job creation)				X	Nord-Vest

Share of employed persons not in regular occupation	8.3 (job creation)				X	Piemonte Puglia
Youth unemployment rate (%)	8.5 (productive employment)		Unemployment			Centro North Aegean
Unemployment rate of older workers (%)	8.5 (productive employment)		Unemployment			Centro
Employment in energy sector	8.5 (productive employment)		Unemployment			Western Macedonia
Share of employment in cultural and creative sectors	8.5 (productive employment)		Unemployment			Puglia
Rate of non-participation in employment	8.5 (productive employment)		Unemployment			Piemonte
Compensation of employees at constant prices	8.5 (productive employment)	Compensation of employees				Navarra
Compensation of employees as a percentage of GDP	8.5 (productive employment)		Compensation of employees			Navarra
Average monthly earnings (€)	8.5 (productive employment)		Compensation of employees			Centro
At-risk-of-poverty rate (after social transfers) of employed population with 18 and	8.5 (productive employment)		Compensation of employees			Centro

more years old (%)						
Total tourism revenues	8.9 (sustainable tourism)				X	Andalucia
Number of domestic and foreign tourist arrivals	8.9 (sustainable tourism)				X	Pomorskie
Share of tourists staying overnight outside the summer tourist season	8.9 (sustainable tourism)				X	Pomorskie
Touristic intensity index	8.9 (sustainable tourism)				X	Puglia
Impact of tourism on waste	8.9 (sustainable tourism)				X	Puglia
Number of commercial bank offices	8.10 (access to banking)				X	Andalucia
Number of operational bank branches	8.10 (access to banking)				X	Piemonte

Source: Authors' elaboration



SDG 9 - RESILIENT INFRASTRUCTURE, SUSTAINABLE INDUSTRIALIZATION AND INNOVATION

Table 122 summarizes the proposals for SDG9, industry, innovation, and infrastructure. JRC's initial indicator proposal addressed the monitoring of two of the eight SDG9 targets, namely 9.2 (sustainable industrialization) and 9.5 (promote innovation). The new proposals extend this coverage to the targets 9.3 (small-scale enterprises), 9.4 (adoption of clean technologies), 9.a (resilient infrastructure), 9.b (domestic technology development) and 9.c (access to information and communications technology and internet). This expansion of targets means that, of the 12 new proposals identified, 10 are classified as new indicators.

There is an interesting proposal for monitoring **sustainable industrialization**, a vulnerability index based in employment diversity. There is also a proposal to evaluate the weight of **small-scale enterprises** and a couple of them that could be linked to **adoption of clean technologies**. On of this indicators, Total industry GHG emissions per industry GDP, coincides with the proposed UN indicator for monitoring this target.

It is worth mentioning the new proposal to monitor the **promotion of innovation**, adding additional measures for R&D expenditure and technology sectors. There are also proposals to measure access to information and communication technology and internet.

Table 122 - Proposals for SDG9. Industry, innovation, and infrastructure

SDG9 – Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation						
New indicator	Target	The indicator replaces ...	The indicator complements ...	Specific measure for...	It is an additional indicator	Proposing region
Employment dependency ratio by sector (Vulnerability index based on employment diversity)	9.2 (sustainable industrialization)				X	Andalucia
Value added of small manufacturing enterprises on total manufacturing value added	9.3 (small-scale enterprises)				X	Piemonte Puglia TR33
Total industry GHG emissions per industry GDP	9.4 (adoption of clean technologies)				X	Andalucia
Investment outlays and gross value of fixed assets in enterprises	9.4 (adoption of clean technologies)				X	Pomorskie
Gross Domestic Expenditure on R&D as a percentage of GDP	9.5 (promote innovation)		Gross Domestic Expenditure on R&D			Navarra Piemonte
Enterprises in high and medium-high technology sectors	9.5 (promote innovation)				X	Centro
Share of intramural expenditure on R&D financed from business enterprise sector funds in total intramural expenditure on R&D	9.5 (promote innovation)				X	Pomorskie

Number of Geographical Indication/utility model/trademark/design Applications and Registrations	9.5 (promote innovation)		Patent applications to the EPO			TR33
Share of passenger traffic (airports)	9.a. (resilient infrastructure)				X	Pomorskie
Entrepreneurial activity index	9.b (domestic technology development)				X	Andalucia
White and Grey areas (degree of coverage and access to new-generation broadband networks)	9.c (access to ICT and internet)				X	Andalucia
Households with fixed and/or mobile broadband connection	9.c (access to ICT and internet)				X	Piemonte

Source: Authors' elaboration



SDG 10 - REDUCE INEQUALITY

Table 123 summarizes the proposals for SDG10, reduced inequalities. For this SDG, the initial JRC proposal contained the fewest number of indicators, only two. These two indicators covered two of the ten SDG10 targets, namely 10.2 (inclusion irrespective of status) and 10.4 (greater equality). There are seven new proposals in the reports made by the regions that also cover, 10.1 (income growth of the bottom 40 percent) and 10.3 (reduce inequalities of outcome).

SDG10 aims to reduce inequalities between different social groups, beyond the gender inequalities addressed in SDG5. As the aim is to monitor whether inequalities are being reduced, indicators need to actually measure these inequalities. Therefore, two of the new proposals simply complement the initial indicators to actually measure inequalities. Thus, unemployment of people with disabilities should be complemented with unemployment of people without disabilities in order to observe the differences. Similarly, the Gini index of disposable income after taxes and transfers should be compared with the Gini index of disposable income before taxes and transfers to assess the redistributive impact of fiscal policy (UN, 2018).

We also identify three new indicators to monitor income growth of the bottom 40%. One of them, per capita growth rate of household expenditure of the poorest 40% of the population, is the indicator proposed by the United Nations to monitor this target (UN, 2018).

Table 123 - Proposals for SDG10. Reduced inequalities

SDG10 - Reduce inequality within and among countries						
New indicator	Target	The indicator replaces...	The indicator complements...	Specific measure for...	It is an additional indicator	Proposing region
Inequality of net income	10.1 (income growth bottom 40%)				X	Piemonte
Disposable income per capita	10.1 (income growth bottom 40%)				X	Piemonte North Aegean
Per capita growth rate of household expenditure of the poorest 40%	10.1 (income growth bottom 40%)				X	Andalucía
Unemployment of people without disabilities	10.2 (inclusion irrespective of status)		Unemployment of people with disabilities			Navarra
Net entry rate in the job market of people with disabilities	10.2 (inclusion irrespective of status)		Unemployment of people with disabilities			Puglia
Gender inequality in low incomes	10.3 (reduce inequalities of outcome)				X	Andalucía
Gini index of disposable income (before taxes and transfers)	10.4 (greater equality)		Gini index of disposable income (after taxes and transfers)			Navarra
S80/S20 income distribution	10.4 (greater equality)		Gini index of disposable income (after taxes and transfers)			Centro Puglia Western Macedonia



SDG11 – SUSTAINABLE CITIES AND COMMUNITIES

Table 124 summarizes the proposals for SDG11, sustainable cities and communities. SDG11, together with SDG8, is the one with the highest number of new proposals. Of these 25, only 4 are considered new indicators and the rest are replacements (4), complements (6) or specific measures (11). The indicators in the initial proposal cover four of the 10 targets of this SDG, namely, 11.1 (access to housing), 11.2 (access to transport systems), 11.3 (sustainable urbanization), 11.6 (environmental impact). The new proposals relate to these same targets and add target 11.7 (green and public spaces).

Following the review of the regional reports, and before going into these new proposals, it is worth noting an observation on some of the indicators included in the initial proposal. Several of these indicators should be taken in relative values. Such is the case for the number of vehicles or accident victims. Absolute values show trends but these trends would be more informative in relative terms, for example by number of inhabitants. In the reports, we find some data in relative terms and some in absolute terms.

As for the new proposals, a total of ten have been identified as specific measures for transport performance, an indicator not clearly defined in the initial proposal for monitoring **access to transport systems**. They measure railroads, bicycle paths or public transport services. There are also several proposal for monitoring **sustainable urbanization**, mainly to replace or complement the information of the two indicators on the initial proposal, land use and difference between built-up area growth rate and population growth rate. There is also a new indicator. There is also a new indicator to measure illegal construction that could be interesting.

When considering the **environmental impact** target, two proposals emerge related to the indicator included in the initial proposal household and commercial waste generation per inhabitant. On the one hand, it is proposed to replace this indicator by one that distinguishes between sorted and mixed household and commercial waste generation per inhabitant. On the other hand, it is proposed to complement this information with the recycling rate. It is important to know how much waste is generated, how it is collected and what is done with it. With regard to these indicators, it is worth noting that they also appear as new proposals in SDG12, responsible consumption and production, to monitor target 12.5 (reduce waste generation) (see Table 19 and 21). The use of the same indicator in several SDGs is possible. In fact, something similar happens in the indicators proposed by the UN for monitoring the SDGs (UN, 2018). Moreover, this shows the interrelationship between the different SDGs.

Finally, we highlight the new indicators proposed for target **green and public spaces**.

Table 124 - Proposals for SDG11. Sustainable cities and communities

SDG11 - Make cities and human settlements inclusive, safe, resilient and sustainable						
New indicator	Target	The indicator replaces ...	The indicator complements ...	Specific measure for...	It is an additional indicator	Proposing region
Overcrowding rate (%)	11.1 (access to housing)				X	Centro
Stock of vehicles by type of motor energy	11.2 (access to transport systems)		Stock of vehicles (passenger cars)			Navarra

(passenger cars)						
Household expenses dedicated to public transport means to total transportation costs	11.2 (access to transport systems)				X	Puglia
Households declaring difficulties of connection with public transport means (1)	11.2 (access to transport systems)			Transport performance		Puglia
Seats/ km offered by the local public transport service (1)	11.2 (access to transport systems)			Transport performance		Piemonte Puglia
Frequent users of the public transport service, (1)	11.2 (access to transport systems)			Transport performance		Puglia
Rail usage rate	11.2 (access to transport systems)			Transport performance		Pomorskie
Bicycle paths per 10,000 population	11.2 (access to transport systems)			Transport performance		Pomorskie
Share of the region's population that can reach the metropolis by public transportation within 90 minutes	11.2 (access to transport systems)			Transport performance		Pomorskie
Density of public roads	11.2 (access to transport systems)			Transport performance		Nord-Vest

Density of railroads in operation	11.2 (access to transport systems)			Transport performance		Nord-Vest
Share of electrified railroads in operation	11.2 (access to transport systems)			Transport performance		Nord-Vest
Share of modernized public/national / county and communal roads	11.2 (access to transport systems)			Transport performance		Nord-Vest
Road accident fatality	11.2 (access to transport systems)		Victims in road accidents			Pomorskie
Artificial Surfaces	11.3 (sustainable urbanization)			Land use		Western Macedonia
Annual change in land use categories	11.3 (sustainable urbanization)		Land use			Pomorskie
Illegal building	11.3 (sustainable urbanization)				X	Piemonte
Marginal land consumption	11.3 (sustainable urbanization)	Difference between built-up area growth rate and population growth rate				Puglia
Soil sealing per capita	11.3 (sustainable urbanization)	Difference between built-up area growth rate and population growth rate				Piemonte
Efficiency evaluation of the artificial	11.3 (sustainable urbanization)	Difference between built-up area growth				Centro

land by inhabitant (%)		rate and population growth rate				
Sorted and mixed household and commercial waste generation per inhabitant (2)	11.6 (environmental impact)	Household and commercial waste generation per inhabitant				Navarra Centro
Recycling rate (3)	11.6 (environmental impact)		Household and commercial waste generation per inhabitant			Navarra
Urban waste sent to landfill out of total urban waste collected	11.6 (environmental impact)		Household and commercial waste generation per inhabitant			Piemonte
PM2.5 Concentration	11.6 (environmental impact)		PM2.5 Emissions			Andalucía
Incidence of urban green areas on urbanised area of cities	11.7 (green and public spaces)				X	Piemonte
Urban population without green areas in their neighbourhood	11.7 (green and public spaces)				X	Andalucía

(1) According to the analysis that for Puglia region, these 3 indicators deserve to be read together as they could express 3 different dimensions for transport performance.

(2) This indicator was proposed by some regions for SDG12 (Andalucía, Piemonte)

(2) This indicator was proposed by some regions for SDG11 (Centro, Pomorskie)

Source: Authors' elaboration



SDG 12 - RESPONSIBLE CONSUMPTION AND PRODUCTION

Table 125 summarizes the proposals for SDG12, responsible consumption and production. The initial proposal included only three indicators. Fourteen new proposals are drawn from the regional reports, of which twelve

have been classified as new indicators. Sustainable consumption and production (SCP) is a key dimension of sustainability that needs to be integrated in different sector policies. In fact, an analysis of the wording of the different targets shows that SCP-related concerns are factored into targets belonging to other goals (Le Blanc, 2015). The links between the SDG12 and other SDG through targets can be seen in Figure 10, adapted from Le Blanc (2015).

On the other hand, there are specific goals from different targets that overlap and, therefore, some of the proposed indicators are similar or even the same. Such is the case of **sustainable tourism**, which appears in target 8.9 and target 12.b.¹⁹ As can be seen in Table 124, 5 new indicators are proposed to monitor sustainable tourism under target 12.b when seven new indicators had already been proposed to monitor sustainable tourism under target 8.9 (see Table 120). Something similar happens with **waste generation** and targets 11.6 and 12.5.²⁰ For this target, we find two new proposals that coincide with indicators already proposed in SDG11.

Figure 10 - Links between SDG12 and other SDG through targets.

Source: adapted from Le Blanc (2015)

Table 125 - Proposals for SDG12. Responsible consumption and production

SDG12 - Ensure sustainable consumption and production patterns						
New indicator	Target	The indicator replaces ...	The indicator complements ...	Specific measure for...	It is an additional indicator	Proposing region
Recovery of urban waste, biowaste and compost like output	12.2 (management of natural resources)				X	Western Macedonia
Land use with heavy environmental impact	12.2 (management of natural resources)				X	Western Macedonia
Domestic material consumption DMC	12.2 (management of natural resources)	Carbon footprint				Piemonte Puglia
Food waste (Armenise, 2023)	12.3 (reduce food waste)			Food waste		Puglia
Biowaste	12.3 (reduce food waste)	Food waste				North Aegean
Percentage of measurement points where air quality standards for PM 10 and benzo(a)pyrene in PM 10 were found to be exceeded	12.4 (chemical management)				X	Pomorskie
Separate collection of urban waste (1)	12.5 (reduce waste generation)				X	Andalucía Piemonte
Proportion of municipal waste prepared for reuse and recycling (2)	12.5 (reduce waste generation)				X	Centro Pomorskie
Number of EMAS-registered organizations/enterprises	12.6 (sustainable practices in companies)				X	Piemonte
Percentage of public institutions that acquire products and/or services by	12.7 (sustainable public)				X	Piemonte

adopting minimum environmental criteria	procurement practices)					
Incidence of tourism on waste (3)	12.b (sustainable tourism)				X	Piemonte Puglia
Tourist intensity index (3)	12.b (sustainable tourism)				X	Piemonte Puglia
Local Tourism intensity	12.b (sustainable tourism)				X	Andalucía
Presences of open-air accommodation establishments, agritourisms and mountain lodges out of total presences in accommodation establishments	12.b (sustainable tourism)				X	Piemonte
Cultural demand index	12.b (sustainable tourism)				X	Puglia

(1) This indicator was proposed by some regions for SDG11 (Navarra, Centro)

(2) This indicator was proposed by some regions for SDG11 (Navarra)

(3) This indicator was proposed by some regions for SDG8 (Puglia)

Source: Authors' elaboration



SDG 13 – CLIMATE ACTION

Table 126 summarizes the proposals for SDG13, climate action. The initial proposal for indicators focuses on target 13.2 (climate change measures into policy), with four indicators. From the pilot studies we obtained seven new proposals, four of which have been classified as new indicators and three as complements. The three new indicators allow us to monitor two more targets, 13.1 (resilience and adaptive capacity) and 13.3 (human and institutional capacity).

The two indicators proposed for monitoring **resilience and adaptive capacity** are similar to those proposed in SDG1 for monitoring exposure and vulnerability. These to target seek to build resilience, one of them in general terms (target 13.1) and the other focused on the poor (target 1.5).²¹

Another important target is the **integration of climate change measures** into policies and strategies. For this purpose, among the initial indicators proposed by JRC for SDG13 is greenhouse gas GHG emissions. In the new proposals, we find the measurement of these same emissions but taking 1990 or 2005 emissions as a reference, two of the most commonly used references in international agreements on climate change to

²¹ Target 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.

Target 13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries.

quantify reduction commitments. If we have a sufficiently long time series of GHGs, it is possible to calculate these other measurements.

On the other hand, an interesting proposal is the measurement of carbon intensity in GDP, measured as GHG/GDP. This is a measure that complements the GHG emissions data and is also used by different countries for their Nationally Determined Contributions (NDCs) in the Paris Agreement.

Finally, there is a proposal to measure concern for climate change. This indicator is based on a survey identify de most important environmental problems. Climate change is probably among the environmental issues of greatest concern to citizens in most regions, especially in coastal regions or southern regions. It would also be interesting to know how a problem such as climate change ranks among a region's global priorities. Different research has established that we have a "finite pool of worry," which means we're unable to maintain our fear of climate change when a different problem, an economic crisis, price hike, a war, a pandemic or a personal comes along (Gertner, 2009; Botzen, 2021).

Table 126 - Proposals for SDG13. Climate action

SDG13 - Take urgent action to combat climate change and its impacts						
New indicator	Target	The indicator replaces...	The indicator complements...	Specific indicator for...	It is an additional indicator	Proposing region
Impact of forest fires	13.1 (resilience and adaptive capacity)				X	Piemonte
Population residing in flood and landslide hazard areas per km² (1)	13.1 (resilience and adaptive capacity)				X	Piemonte
Renewable energy share in the gross final energy consumption (2)	13.2 (climate change measures into policy)				X	Pomorskie
GHG per unit of GDP	13.2 (climate change measures into policy)		Greenhouse Gas Emissions			Andalucía
GHG compared to 1990	13.2 (climate change measures into policy)		Greenhouse Gas Emissions			Andalucía

GHG compared to 2005	13.2 (climate change measures into policy)		Greenhouse Gas Emissions			Andalucía
Concern for climate change	13.3. (human and institutional capacity)				X	Puglia

(1) A similar indicator can be found in the proposals to measure exposure and vulnerability in SGD1

(2) A similar indicator can be found in the proposals for SDG7, affordable and clean energy.

Source: Authors' elaboration



SDG 14 – LIFE BELOW WATER

Table 127 summarizes the proposals for SDG14, life below water. Eight new proposals have been identified, five of which are considered new indicators and three specific measures for some of the indicators included in the initial proposal. With these new proposals, in addition to the two goals already considered in the initial proposal, 14.1 (reduce marine pollution) and 14.5 (reduce marine pollution), three more goals are added, 14.4 (effectively regulate harvesting and end overfishing), 14.7 (sustainable use of marine resources) and 14.a. (research in marine technology).

Thus, the indicators of the initial proposal serve to monitor the environmental quality of the marine environment while the new proposals also look at the economic performance and sustainable exploitation of marine resources. The difficult balance between conservation and exploitation of natural resources (Clark, 2010) is key to SDG14.

Table 127 - Proposals for SDG14. Life below water

SDG14 - Conserve and sustainably use the oceans, seas and marine resources for sustainable development						
New indicator	Target	The indicator replaces...	The indicator complements...	Specific indicator for...	It is an additional indicator	Proposing region
Beached marine waste	14.1 (reduce marine pollution)			Estuarine with high/very high water quality		Puglia
Fishing from stocks subject to sustainable yields	14.4 (effectively regulate harvesting and end overfishing)				X	Andalucia

Commercialized aquaculture products as a proportion of total commercialized fishery products	14.4 (effectively regulate harvesting and end overfishing)				X	Andalucia
Protected Marine Areas	14.5 (coastal and marine areas)			Protected coastal area as a percentage of total coastal area		Puglia
Coastal bathing waters	14.5 (coastal and marine areas)			Coastal areas with good/very good water quality		Puglia
Gross Value Added (GVA) of the marine economy (€)	14.7 (sustainable use of marine resources)				X	Centro
Research and Development (R&D) expenditure of the marine economy	14.a (research in marine technology)				X	Centro
Cargo traffic at seaports					X	Pomorskie

Source: Authors' elaboration



SDG 15 – LIFE ON LAND

Table 128 summarizes the proposals for SDG15, life on land. In the initial proposal, there were 4 indicators for this SDG and in the technical reports produced by the regions we found another 4 indicators, all of them classified as new indicators. Thus, the indicators of the initial proposal cover two targets, 15.1 (restoration of ecosystems) and 15.5 (degradation of habitats), while the new indicators cover three other targets, 15.2 (sustainable management of forest) 15.3 (restore degraded land and soil) and 15.4 (conservation of mountain ecosystems).

As was the case with SDG14, the indicators in the initial proposal are closely related to the conservation of terrestrial natural resources. The new indicators also revolve around the idea of conservation. For example, an

indicator is included on key biodiversity areas based on threatened species, endemic species, rarity, ecological integrity, and fragility (Strogylopoulos, 2023). Protecting these areas helps preserve biodiversity, maintain ecological balance, and contribute to the overall health and resilience of ecosystems. Although one of the new proposals also includes management, there are no indicators related to the profitability of the exploitation of these terrestrial resources.

Table 128 - Proposals for SDG15. Life on land

SDG15 - Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss						
New indicator	Target	The indicator replaces...	The indicator complements...	Specific indicator for...	It is an additional indicator	Proposing region
Key biodiversity areas	15.1 (restoration of ecosystems)				X	North Aegean
Proportion of forest area subject to sustainable management instruments	15.2. (sustainable management of forest)				X	Andalucia
Mean burnt area	15.2. (sustainable management of forest)				X	Centro
Fragmentation of natural and agricultural land	15.3.(restore degraded land and soil)				X	Puglia
Mountain vegetation index	15.4 (conservation of mountain ecosystems)				X	Piemonte

Source: Authors' elaboration



SDG 16 – PEACE, JUSTICE AND STRONG INSTITUTIONS

Table 129 summarizes the proposals for SDG16, peace, justice and strong institutions. JRC's initial proposal for SDG16 contains four indicators that fall under two targets, namely 16.5 (reduce corruption) and 16.6 (effective institutions). From the technical reports of the regions, we obtain eleven proposals of which eight are considered new indicators, one is a replacement, one is a complement and one is a specific measure. Seven of the new

indicators monitor additional targets: 16.1 (reduce all forms of violence), 16.2 (end violence against children), 16.3 (equal access to justice for all) and 16.4 (reduce illicit financial and arms flows).

Specific indicators are proposed for monitoring **violence** in general and violence against children in particular. Some of them, for example the homicide death rate and the perception of safety when walking alone in the dark, are indicators that appear in the global indicator framework of the United Nations (UN, 2018). The same is true for one of the indicators proposed to **monitor equal access to justice**, specifically unsentenced detainees as a proportion of overall prison population.

Table 129 - Proposals for SDG16. Peace, justice and strong institutions

SDG16 - Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels						
New indicator	Target	The indicator replaces...	The indicator complements...	Specific indicator for...	It is an additional indicator	Proposing region
Death rate by homicide	16.1 (reduce all forms of violence)				X	Piemonte Western Macedonia
Crime rate	16.1 (reduce all forms of violence)				X	Andalucia Centro
Perception of safety walking alone in the dark	16.1 (reduce all forms of violence)				X	Puglia
Violence against children	16.2 (end violence against children)				X	Andalucia
Unsentenced detainees as a proportion of overall prison population	16.3 (equal access to justice for all)				X	Andalucia Piemonte
Correctional institution crowding	16.3 (equal access to justice for all)				X	Piemonte
Rate of money laundering and drug	16.4 (reduce illicit financial				X	Andalucia

trafficking offences	and arms flows)					
Number of crimes registered as corruption committed in the exercise of public functions	16.5 (reduce corruption)		Extract from QGI an indicator on corruption			Centro
Composite index of service accessibility	16.6 (effective institutions)	Transparency index				Puglia
Abstention rate in different elections	16.6 (effective institutions)			Participation in the last elections		Centro
Length of civil proceedings	16.6 (effective institutions)				X	Piemonte

Source: Authors' elaboration



SDG 17 – PARTNERSHIPS FOR THE GOALS

Table 130 summarizes the proposals for SDG17, partnerships for the goals. Four are the indicators initially proposed to monitor SDG17 and four are also the new proposals found in the regions' technical reports. Of these new proposals, three are considered new indicators and one a replacement. This is an SDG dedicated to cross-cutting means of implementation for all the SDGs. It contains the largest number of targets, a total of 19. With the initial indicators and the new proposals, 6 of these targets can be monitored. And almost all of them revolve around cooperation with other countries or regions in terms of funding, research, project development or development aid.

A relevant issue in SDG 17 may be social entrepreneurship companies. They are not named as such among the targets of this SDG but can contribute to the target. 17.17, encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships. Social entrepreneurship companies play a crucial role in bringing together stakeholders from the "quadruple helix," which includes government, academia, industry, and civil society (Carayannis and Campbell, 2010).

Table 130 - Proposals for SDG17. Partnerships for the goals

SDG17 - Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development						
New indicator	Target	The indicator replaces...	The indicator complements...	Specific indicator for...	It is an additional indicator	Proposing region
Strength and autonomy of the regional institution in budgetary terms	17.1 (improve domestic capacity for tax and other revenue collection)				X	Andalucia
Volume of remittances as a proportion of total GDP	17.3 (financial resources for developing countries)				X	Andalucia Puglia
Cooperation projects with neighbouring countries	17.6 (regional and international cooperation)				X	Western Macedonia
Households with internet access	17.8 (enabling technology)	Individuals who used the internet for interaction with public authorities				Western Macedonia
Number of coinSEp companies	17.17 (effective partnerships)				X	North Aegean

Source: Authors' elaboration

Annex 5. The final dataset

Table 131 - The final dataset

JRC/ NEW	SDG	SDG Target(s)	Indicator Name	Type	Coverage	Source	Unit of measurement
NEW	1	1.1 (extreme poverty)	Severe material and social deprivation	Official	EU-27 plus others	European Union Statistics on Income and Living Conditions (EU-SILC)	Percentage
JRC	1	1.2 (reduce poverty)	Persons living in households with very low work intensity	Official	EU-27 plus others	Eurostat, Regional Statistics	Percentage
JRC	1	1.2 (reduce poverty)	Persons at risk of poverty or social exclusion (AROPE)	Official	EU-27 plus others	Eurostat, Regional Statistics	Percentage
NEW	1	1.5 (exposure to vulnerability)	Population exposed to disasters: Population exposed to water floods and to landslides	Official	Italian regions	ISPRA (Italy)	Percentage
			Population exposed to disasters: Population exposed to at least one forest fire	Official	OECD countries and other European countries	Organisation for Economic Cooperation and Development (OECD)	Percentage
NEW	2	2.2 (end malnutrition)	Malnutrition rate	Official		National statistics	Percentage
JRC	2	2.3 (agricultural productivity)	Gross Value Added (GVA) of agriculture, livestock and fishing	Official	European regions and others	OECD, regional statistics	Number Constant prices or volume
JRC	2	2.3 (agricultural productivity)	Real productivity (real Gross Value Added per worker) in agriculture, forestry and fishing	Experimental	OECD countries and other European countries	Organisation for Economic Cooperation and Development (OECD)	Number
NEW	2	2.4 (sustainable food production)	Share of utilised agricultural area UAA cultivated with organic crops	Official	Italian regions Spanish regions	ISTAT from data of Ministry of Agricultural, Food and Forestry (Italy) OCECAS (Spain)	Percentage
NEW	2	2.4 (sustainable food production)	Productivity of organic farming				
JRC	3	3.2 (preventable death of newborns)	Infant mortality	Official	EU-27 plus others	Eurostat, Regional Statistics	Rate (number per 100.000 inhabitants)
NEW	3	3.3 (epidemics and diseases)	Deaths due to communicable diseases	Official	EU-27 plus others	Eurostat, regional statistics	Rate
NEW	3	3.4 (non-communicable diseases)	Suicide mortality rate	Official	Several European countries and regions	National and regional sources (Mental health plans)	Ratio (number per 100,000 inhabitants)
JRC	3	3.8 (universal health coverage)	Hospital beds	Official	EU-27 plus others	Eurostat, Regional Statistics	Ratio (number per 100.000 inhabitants)
JRC	3	3.8 (universal health coverage)	Self reported unmet needs for medical examination	Official	Several European countries and regions	European Union Statistics on Income and	Percentage

						Living Conditions (EU-SILC)	
JRC	3	3.c (health financing and recruitment)	Health personnel	Official	EU-27 plus others	Eurostat, Regional Statistics	Ratio (number por 100.000 inhabitants)
JRC	4	4.1 (primary and secondary education)	Participation rates in selected education levels	Official	EU-27 plus others	Eurostat, Regional Statistics	Rate
NEW	4	4.1 (primary and secondary education)	Not adequate alphabetical and numerical competence, secondary school	Official	Italian regions	ISTAT, National learning survey	Percentage
JRC	4	4.2 (access to early childhood education)	Share of pupils enrolled in early childhood education (4 years)	Official	EU-27 plus others	Eurostat, Regional Statistics	Rate
JRC	4	4.3 (vocational and tertiary education)	Students enrolled in tertiary education by sex	Official	EU-27 plus others	Eurostat, Regional Statistics	Number
JRC	4	4.3 (vocational and tertiary education)	Participation in education (from 20 to 24 years)	Official	EU-27 plus others	Eurostat, Regional Statistics	Rate
NEW	4	4.3 (vocational and tertiary education)	Participation rate in education and training (from 25 to 65 years) in the last 4 weeks.	Official	EU-27 plus others	Eurostat, Regional Statistics	Rate
JRC	4	4.3 (vocational and tertiary education)	Distribution of pupils and students enrolled in general and vocational programmes	Official	EU-27 plus others	Eurostat, Regional Statistics	Rate
NEW	4	4.4 (technical and vocational skills)	Proportion of individuals with digital skills at basic or above basic level	Official	Several European countries and regions	National and regional sources	Percentage
JRC	4	4.5 (gender and other disparities in education), 4.6 (youth and adult literacy)	Share of women and men 30-34 years old with higher education level	Official	EU-27 plus others	Eurostat, Regional Statistics	Rate
JRC	4	4.6 (youth and adult literacy)	Share of early leavers from education and training	Official	EU-27 plus others	Eurostat, Regional Statistics	Rate
NEW	4	4.a (inclusive and effective learning environments for all)	Proportion of schools not physically accessible	Official	Italian regions	ISTAT, Regional Statiscs	Percentage
JRC	5	5.1 (gender discrimination)	Female achievement/disadvantage index	Experimental	EU-27	European Commission, DG REGIO	Index
JRC	5	5.2 (gender violence)	Fatal victims of gender-based violence at the hands of their partners or expartners	Official	Several European countries and regions	National and regional statistics	Number

JRC	5	5.2 (gender violence)	Victims of violence against women	Official	Several European countries and regions	National and regional statistics	Number
JRC	5	5.4 (unpaid work)	Inactive population rate due to caregiving responsibilities	Official		National and regional statistics	Rate
JRC	5	5.4 (unpaid work)	Gender gap in part-time employment incidence	Experimental	OECD countries and other European countries	Organisation for Economic Cooperation and Development (OECD)	Percentage
JRC	5	5.5 (women participation and leadership)	Female research and development personnel	Experimental	OECD countries and other European countries	Organisation for Economic Cooperation and Development (OECD)	Percentage
JRC	5	5.5 (women participation and leadership)	Women in parliament and government	Official		National and regional sources	Percentage
NEW	5	5.5 (women participation and leadership)	Women in managerial position	Official		Labor force surveys	Percentage
JRC	6	6.1 (universal access to water)	Population served by safely managed drinking water supply services	Official		National and regional sources	Percentage
JRC	6	6.3 (water quality)	Water bodies that exceed a standardized quality rating	Official		National and regional sources	Percentage
JRC	6	6.3 (water quality)	Groundwater that exceed a standardized quality rating	Official		National and regional sources	Percentage
JRC	6	6.3 (water quality)	Population connected to wastewater with at least secondary treatment	Official		National and regional sources	Percentage
NEW	6	6.4 (water scarcity)	Efficiency of drinking water distribution networks	Official	Italian regions	Istat, Regional Statistics, Italy	Percentage
NEW	6	6.4 (water scarcity)	Water exploitation index plus (WEI+)	Official	EU-27 and others	European Environmental Agency (EEA)	Percentage
NEW	6	6.6 (water-related ecosystems)	Wetlands of international importance	Official	Parties to the Convention	Ramsar, Convention of Wetlands	Hectares
JRC	7	7.1 (access to energy)	People affected by energy poverty	Official		National sources	Percentage
JRC	7	7.2 (share of renewable energy)	Electricity production that comes from nuclear power	Official		National sources	Percentage
JRC	7	7.2 (share of renewable energy)	Electricity production that comes from renewable sources	Official		National sources	Percentage
NEW	7	7.2 (share of renewable energy)	Total energy consumption that comes from renewable sources	Official		National and regional sources	Percentage
NEW	7	7.2 (share of renewable energy)	Renewable energies in the transport sector	Official	Italian regions	GSE S.p.A. - Energy Services Operator, Italy	Percentage
JRC	7	7.3 (energy efficiency)	Energy intensity	Official	Several European countries and regions	National sources	Tons of oil equivalent (toe) per million euros
JRC	8	8.1 (economic growth)	Real GDP per capita	Official	EU-27 plus others	Eurostat, Regional Statistics	Euros (PPS); Volume

JRC	8	8.2 (economic productivity)	Real GVA per worker	Experimental	Regional	OECD countries and other European countries	USD constant prices
JRC	8	8.3 (job creation)	Firm creation in comparison with firm closures	Experimental	OECD countries and other European countries	Organisation for Economic Cooperation and Development (OECD)	Rate
NEW	8	8.3 (job creation)	Share of employed persons in the informal economy	Official	Italian regions	ISTAT, Regional Statics	Rate
NEW	8	8.5 (productive employment)	Activity rate	Official	EU-27 plus others	Eurostat, regional statistics	Rate
JRC	8	8.5 (productive employment)	Unemployment rate	Official	EU-27 plus others	Eurostat, regional statistics	Rate
JRC	8	8.5 (productive employment)	Long-term unemployment (12 months and more)	Official	EU-27 plus others	Eurostat, Regional Statistics	Rate
JRC	8	8.5 (productive employment)	Average compensation of employees	Official	Several European countries and regions	National and regional sources	Euros, constant prices
JRC	8	8.6 (youth not in employment, education or training)	Young people neither in employment nor in education and training	Official	EU-27 plus others	Eurostat, Regional Statistics	Rate
JRC	8	8.8 (labour rights)	Occupational accidents	Official	Several European countries and regions	National and regional sources	Rate (accidents per XX employees)
NEW	8	8.9 (sustainable tourism)	Touristic intensity index	Official	Italian regions	ISTAT, Regional Statics	Ratio
NEW	8	8.10 (access to banking)	Number of operational bank branches	Official	Several European countries and regions	National and regional sources	Ratio (Number per 100,000 inhabitants)
JRC	9	9.2 (sustainable industrialization)	GVA of the industry with respect to the GVA of the total sectors	Official	EU-27 plus others	Eurostat, Regional Statistics	Rate
NEW	9	9.3 (small-scale enterprises)	Value added of small manufacturing enterprises on total manufacturing value added	Official	Several European countries and regions	National and regional sources	Percentage
NEW	9	9.4 (efficiency and clean technologies)	CO2 emissions per industry GDP	Official	Several European countries and regions	National and regional sources	Ratio (Kilograms per €)
JRC	9	9.5 (promote innovation)	Gross Domestic Expenditure on R&D	Official	EU-27 plus others	Eurostat, Regional Statistics	Rate
JRC	9	9.5 (promote innovation)	R&D personnel and researchers (full-time equivalent)	Official	EU-27 plus others	Eurostat, Regional Statistics	Ratio (FTE per million inhabitants)
JRC	9	9.5 (promote innovation)	Employment in high-technology manufacturing as a percentage of total manufacturing employment	Experimental	OECD countries and other European countries	Organisation for Economic Cooperation and Development (OECD)	Rate
JRC	9	9.5 (promote innovation)	Patent applications to the EPO	Official	EU-27 plus others	Eurostat, Regional Statistics	Ratio (number per million inhabitants)

NEW	9	9.c (access to ICT and internet)	Households with broadband connection	Experimental	OECD countries and other European countries	Organisation for Economic Cooperation and Development (OECD)	Rate
JRC	10	10.2 (inclusion irrespective of status)	Difference in unemployment between people with and without disabilities	Official	Several European countries and regions	National and regional sources	Percentage
JRC	10	10.4 (greater equality)	Gini index of disposable income before and after taxes and transfers	Official/ Experimental	OECD countries and other European countries	OECD countries and other European countries	Index
JRC	11	11.1 (access to housing)	Households expenses dedicated to housing costs	Experimental	OECD countries and other European countries	Organisation for Economic Cooperation and Development (OECD)	Percentage
NEW	11	11.2 (access to transport systems)	Seats/ km offered by the local public transport service	Official	Italian regions	ISTAT (Italy)	Number per inhab.
NEW	11	11.2 (access to transport systems)	Households declaring difficulties of connection with public transport means (per 100 households)	Official	Italian regions	ISTAT (Italy)	Percentage
JRC	11	11.2 (access to transport systems)	Daily accessibility	Experimental	EU-27	European Commission, Joint Research Centre	Number
JRC	11	11.2 (access to transport systems)	Victims in road accidents per Million inhabitants	Official	EU-27 plus others	Eurostat, Regional Statistics	Number
JRC	11	11.2 (access to transport systems)	Stock of vehicles (passenger cars)*1,000 inhab.	Official	EU-27 plus others	Eurostat, Regional Statistics	Number
NEW	11	11.2 (access to transport systems)	Bicycle paths Km* 10,000 inhab.	Official	Pomorskie region	Local Data Bank (Poland)	Km per 10,000 inhab.
NEW	11	11.2 (access to transport systems)	Density of railroads in operation per 1,000 square kilometres	Official	Romanian regions	Romanian Statistical Yearbook, National Institute of Statistics (Romania)	per 1,000 km2
JRC	11	11.3 (sustainable urbanization)	Difference between built-up area growth rate and population growth rate	Experimental	OECD countries and other European countries	Organisation for Economic Cooperation and Development (OECD)	Percentage
NEW	11	11.3 (sustainable urbanization)	Artificial surface		European countries	Copernicus, Land cover and land cover changes in European countries	Percentage
NEW	11	11.3 (sustainable urbanization)	Illegal building	Official	Italian regions	CRESME (Italy)	Rate (per 100 authorized buildings)
NEW	11	11.5 (people affected by disasters)	Deaths, missing persons and directly affected persons attributed to disasters per 100,000 inhabitants				

JRC	11	11.6 (environmental impact)	PM2.5 Emissions	Experimental	EU-27	European Commission, Joint Research Centre	Number
NEW	11	11.6 (environmental impact)	PM10 Emissions	Experimental	EU-28	European Commission, Joint Research Centre	Number
JRC	11	11.6 (environmental impact)	Household and commercial waste generation per inhabitant	Official	Portugal	Statistics Portugal	Rate
NEW	11	11.6 (environmental impact)	Recycling rate	Official	Navarra	Waste inventory of Navarre	Rate
NEW	11	11.7 (green and public spaces)	Urban population without green areas in their neighbourhood		Spanish regions	INE (Spain)	Percentage
NEW	12	12.2 (management of natural resources)	Domestic material consumption DMC per capita	Official	Italian regions	ISTAT (Italy)	million tonnes per capita
JRC	12	12.3 (reduce food waste)	Food waste	Experimental	Andalusia Puglia	MAPA (Andalusia) Armenise (2023) regionalization of country data (Puglia)	kg/inhab
JRC	12	12.4 (chemical management)	Hazardous Waste	Official	Several European countries and regions	Regional/national sources	Number
NEW	12	12.5 (reduce waste generation)	Proportion of municipal waste prepared for reuse and recycling	Official	Centro	Statistics Portugal, Urban waste statistics	Percentage
NEW	12	12.6 (sustainable practices in companies)	Number of EMAS-registered organizations/enterprises	Official	Italian regions	ISPRA (Italy)	Number
NEW	12	12.7 (sustainable public procurement practices)	Percentage of public institutions that acquire products and/or services by adopting minimum environmental criteria, in at least one procurement procedure (Green Purchasing or Green Public Procurement)	Official	Italian regions	ISTAT, Regional Statics (Italy)	Percentage
NEW	12	12.b (sustainable tourism)	Incidence of tourism on waste	Official	Italian regions	ISPRA (Italy)	Rate (Kg per inhabitants equivalent)
JRC	13	13.2 (climate change measures into policy)	CO2 Emissions	Experimental	EU-27	European Commission, Joint Research Centre	Number
JRC	13	13.2 (climate change measures into policy)	Greenhouse Gas Emissions	Official	EU-27	Organisation for Economic Cooperation and Development (OECD)	Mt CO2 eq
JRC	13	13.2 (climate change measures into policy)	Cooling and heating degree days	Official	EU-27 plus others	Eurostat, Regional Statistics	Number

JRC	14	14.1 (reduce marine pollution)	Estuarine and/or costal areas with high/very high water quality	Official	Spanish regions	River Basin Agencies (Andalusia)	Percentage
NEW	14	14.4 (effectively regulate harvesting and end overfishing)	Fishing from stocks subject to sustainable yields		Andalusia	Consejería de Agricultura, Pesca, Agua y Desarrollo Rural (Andalusia)	Percentage
JRC	14	14.5 (coastal and marine areas)	Protected coastal area as a percentage of total coastal area		Andalusia Centro	IECA (Andalusia) Institute for Nature Conservation and Forests (Centro)	Km2 (Andalusia); Percentage (Centro)
NEW	14	14.a (research in marine technology)	Research and Development (R&D) expenditure of the marine economy		Centro	Directorate-General for Maritime Policy (DGMP) (Centro)	€
JRC	15	15.1 (restoration of ecosystems)	Land Abandonment	Experimental	EU-27	European Commission, Joint Research Centre	Percentage
JRC	15	15.1 (restoration of ecosystems)	Forest area over total surface area	Official	EU regions	FAO-INFC, Global Forest Resources Assessment* (Piemonte Puglia) Copernicus (Western Macedonia) National sources (other regions)	Percentage
NEW	15	15.2 (sustainable management of forest)	Proportion of forest area subject to sustainable management instruments		Andalusia	IECA (Andalusia)	Percentage
JRC	15	15.5 (degradation of habi)	Terrestrial protected areas as a percentage of total area	Official	EU regions	European Environment Agency (EU) and National sources	Percentage
JRC	15	15.5 (degradation of habitats)	Estimated soil erosion	Experimental	EU-27	European Commission, Joint Research Centre	Rate Tonnes per hectare
NEW	16	16.1 (reduce all forms of violence)	Death rate by homicide	Official	Italian and Greek regions	ISTAT from data of the Ministry of the Interior (Italy) ELSTAT, Offences committed (Greece)	Rate (per 100,000 inhabitants)
NEW	16	16.2 (end violence against children)	Violence against children		Spanish regions	MDSyA2030 (Andalusia)	Rate x 10000 inhab
NEW	16	16.3 (equal access to justice for all)	Unsented detainees as a proportion of overall prison population	Official	Italian and Spanish regions	ISTAT from data of the Ministry of Justice –Dep. of prison administration (Italy) IECA (Spain)	Percentage
JRC	16	16.5 (reduce corruption)	Extract from QGI an indicator on corruption	Experimental	EU regions	University of Gothenburg	Index

JRC	16	16.6 (effective institutions)	Participation in the last elections	Official	EU regions	OECD (EU) And national/regional sources	Percentage
JRC	16	16.6 (effective institutions)	Quality of Government Index	Experimental	EU regions	University of Gothenburg	Index
JRC	17	17.2 (development assistance commitments)	Official Development Assistance	Official	Navarra and Andalusia	ODS-Navarra. General Budgets of Navarra IECA Annual Regional Accounts of Andalusia	Percentage
NEW	17	17.3 (financial resources for developing countries)	Volume of remittances as a proportion of total GDP	Official	Spanish and Italian regions	IECA and Bank of Spain (Spain) ISTAT from Bank of Italy (Italy)	Percentageas (Andalusia) Millions of Euro, current values (Italy)
JRC	17	17.6 (regional and international cooperation)	PCT co-patent applications that are done with foreign regions	Experimental	OECD countries and other European countries	Organisation for Economic Cooperation and Development (OECD)	Share
JRC	17	17.8 (enabling technology)	Individuals who used the internet for interaction with public authorities	Official	EU-27 plus others	Eurostat, Regional Statistics	Percentage
JRC	17	17.12 (imports from least developed countries)	Imports from developing countries	Official	Several European countries and regions	ODS-Navarra, Nastat (Navarra) IECA (Andalusia) Coeweb – ISTAT (Italian regions) CCDR Centro (Portugal)	Number (€) or Percentage

Source: authors' own elaboration

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