«*ESAC – NUCs Workshop: Statistical priorities in the European context: user perspectives and consultation mechanisms*»

"Existing climate adaptation frameworks and the role of Earth Observation (EO)"

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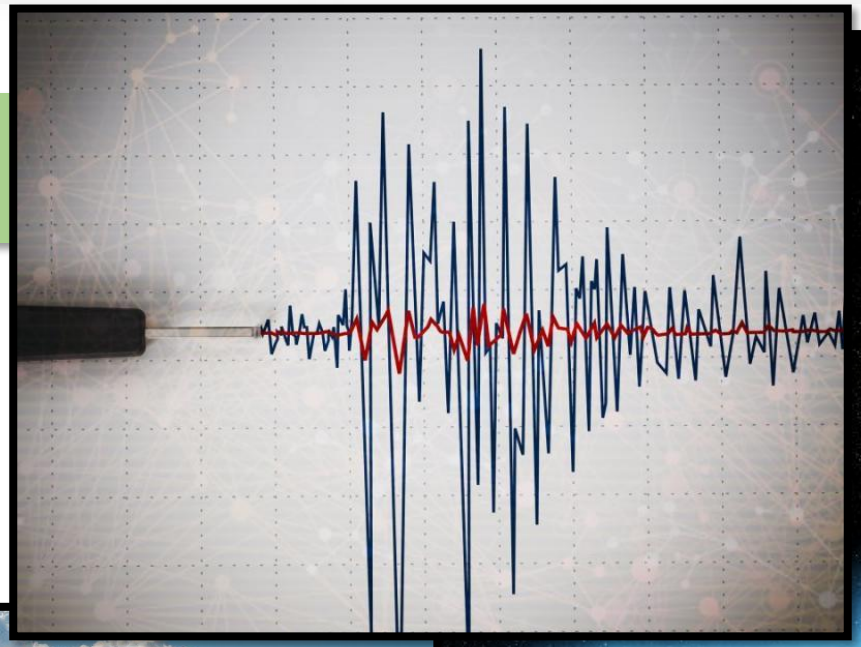
Athens, 26 - 27 March 2025

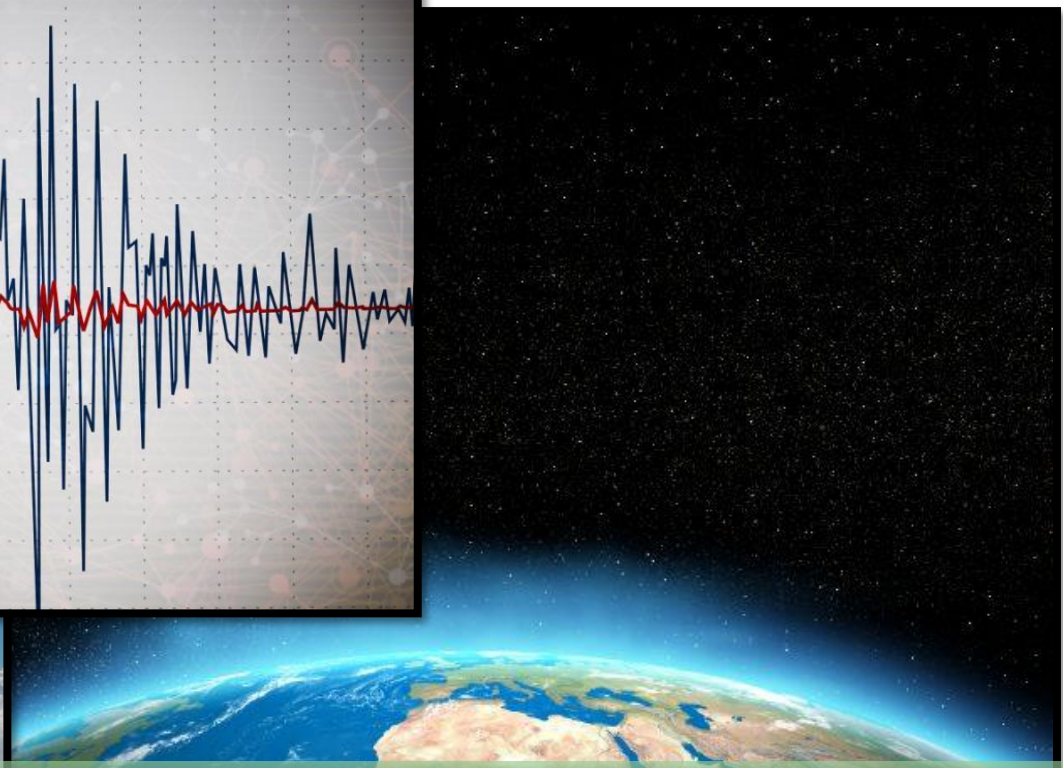
ΙΕΠΒΑ- ΕΑΑ

European Statistical Advisory Committee

eurostat

National Observatory of Athens (NOA)



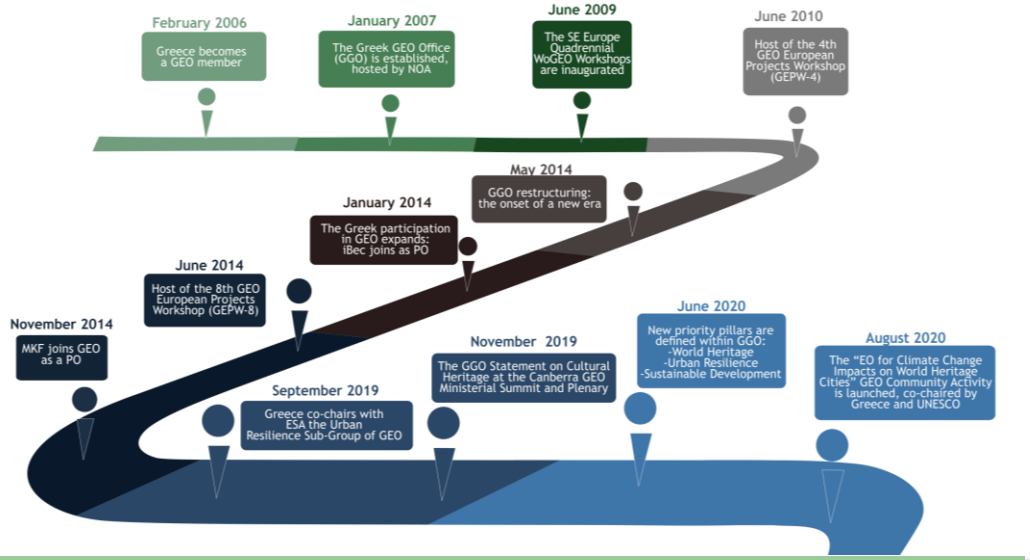


The **National Observatory of Athens** (**NOA**) is a public law Research Center. Founded in 1842, it is the oldest research foundation in Greece.

Research in the fields of Astronomy, Astrophysics, Space applications, Environment, Climate Change, Energy and Meteorology, Seismology, and Geodynamics.

The Greek GEO Office

The main representative of Greece in the Intergovernmental Initiative of the UN named GEO (Group on Earth Observations) and the national contact point for Earth Observation.



- Leading role in national strategic planning;
- Reference and optimization of EO activities and capacities in the region;
- Promote EO information as an enabler for informed decision making;
- Maximize synergies amongst key EO partners in Greece;
- Play up the leadership of the Greek EO actors at the international stage;
- Synergies in terms of funds raising, capacities and cross-discipline research;
- Foster the exploitation of best practices between EO players.

WHAT IS GEO?

National Governments	Participating Organizations	Work Programme Activities
100+	150+	~50

GEO GROUP ON EARTH OBSERVATIONS

HELLENIC GROUP ON EARTH OBSERVATIONS

United Nations

IISD International Institute for Sustainable Development

SUSTAINABLE DEVELOPMENT SOLUTIONS NETWORK A GLOBAL INITIATIVE FOR THE UNITED NATIONS

Global Partnership for Sustainable Development Data

EARTH OBSERVATIONS FOR THE SUSTAINABLE DEVELOPMENT GOALS

VISION Earth Intelligence is universally accessible and our society is empowered to achieve a sustainable future.

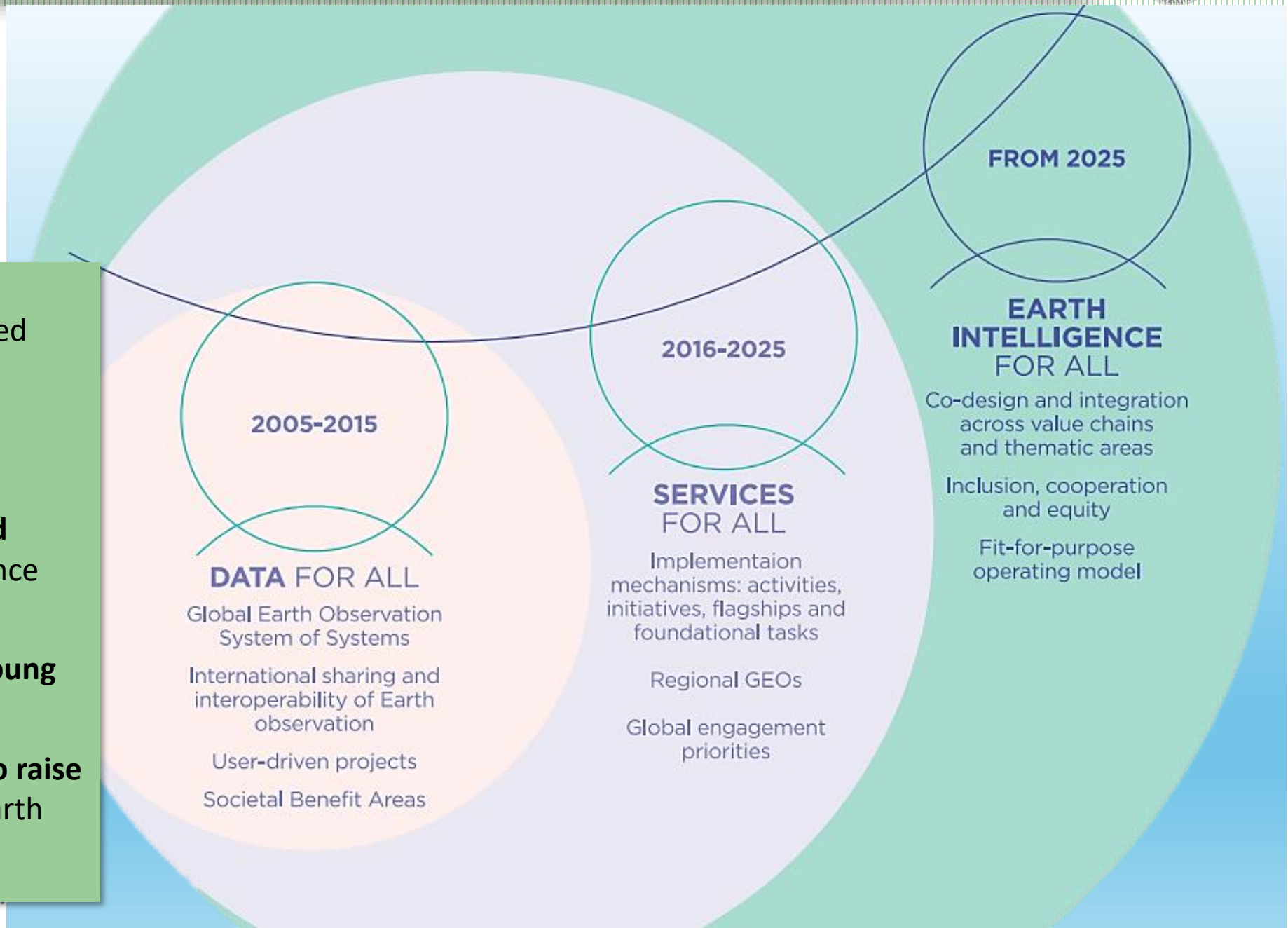
MISSION GEO co-produces user-driven Earth Intelligence solutions that inform better decisions.

OFFER GEO empowers anyone to use and contribute to Earth Intelligence to make better decisions for people, planet and nature.

GEO EVOLUTION

The future

- **Co-produce transformative programmes** that provide trusted Earth intelligence
- **Increase global equity** through accessible Earth intelligence
- **Integrate new technologies and innovations** into Earth intelligence services
- **Increase the participation of young people**
- **Invest in integrated activities to raise awareness** and resources for Earth intelligence



Global Goal on Adaptation (GGA)

GOAL

Enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, with a view to contributing to sustainable development and ensuring an adequate adaptation response in the context of the temperature goal referred to in Article 2.

OBJECTIVES

The UAE Framework for Global Climate Resilience should guide and strengthen efforts, including long-term transformational and incremental adaptation, towards reducing vulnerability and enhancing adaptive capacity and resilience, as well as the collective well-being of all people, the protection of livelihoods and economies, and the preservation and regeneration of nature, for current and future generations, in the context of the temperature goal referred to in Article 2 of the Paris Agreement; should be inclusive in terms of adaptation approaches; and should take into account the best available science and the worldviews and values of Indigenous Peoples, to support the achievement of the GGA.

TARGETS

WATER & SANITATION

FOOD & AGRICULTURE

HEALTH

ECOSYSTEMS

INFRA-STRUCTURES

LIVELIHOODS

CULTURAL HERITAGE

IMPACT, VULNERABILITY and RISK ASSESSMENT

PLANNING

WATER & SANITATION

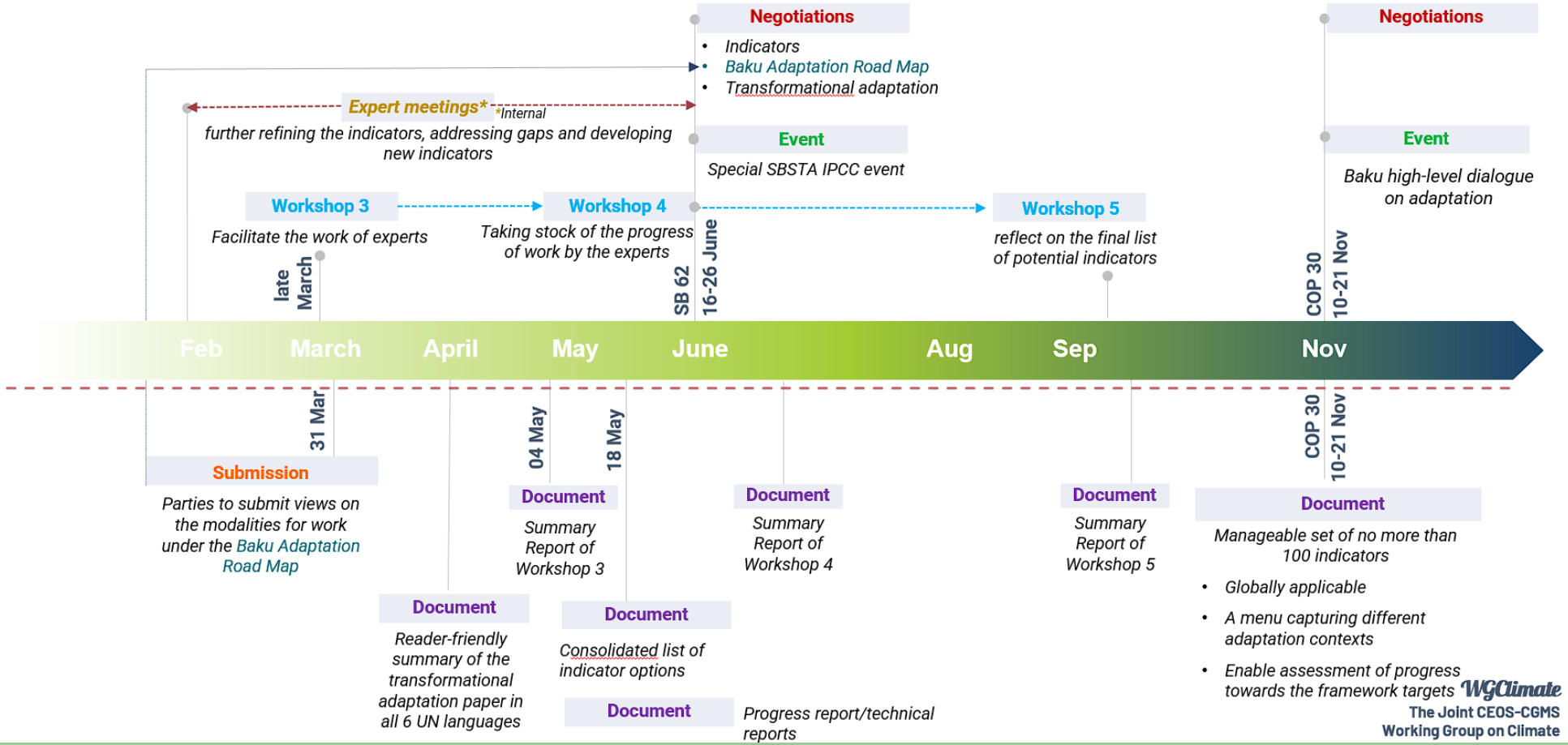
MONITORING, EVALUATION and LEARNING

IMPLEMENTATION

INDICATORS

A two-year UAE–Belém work programme on indicators for measuring progress achieved towards the targets above with a view to identifying and, as needed, developing indicators and potential quantified elements for those targets

Global Goal on Adaptation (GGA)



The European Environment Agency (EEA) is the European pursuant in this process. Criteria for these indicators have been set in CMA5 and CMA6. Approximately 100 Indicators at the end of the process, the SDG equivalent.

Maryam Navi, UNFCCC secretariat, joint WG on Climate between CEOS and CGMS (The Coordination Group for Meteorological Satellites). Event: here

Nature Restoration Law

Official Journal of the European Union
EN
L series

2024/1991

29.7.2024

REGULATION (EU) 2024/1991 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 24 June 2024

on nature restoration and amending Regulation (EU) 2022/869

ANNEX IV-VI list indicators of interest.

Earth Observation is officially incorporated:

Under Article 2 – Definitions: 'urban green space' means the total area of trees, bushes, shrubs, permanent herbaceous vegetation, lichens and mosses, ponds and watercourses found within cities or towns and suburbs, calculated on the basis of data provided by the ***Copernicus Land Monitoring Service*** *under the Copernicus component of the* ***Union Space Programme, established by Regulation (EU) 2021/696****.*

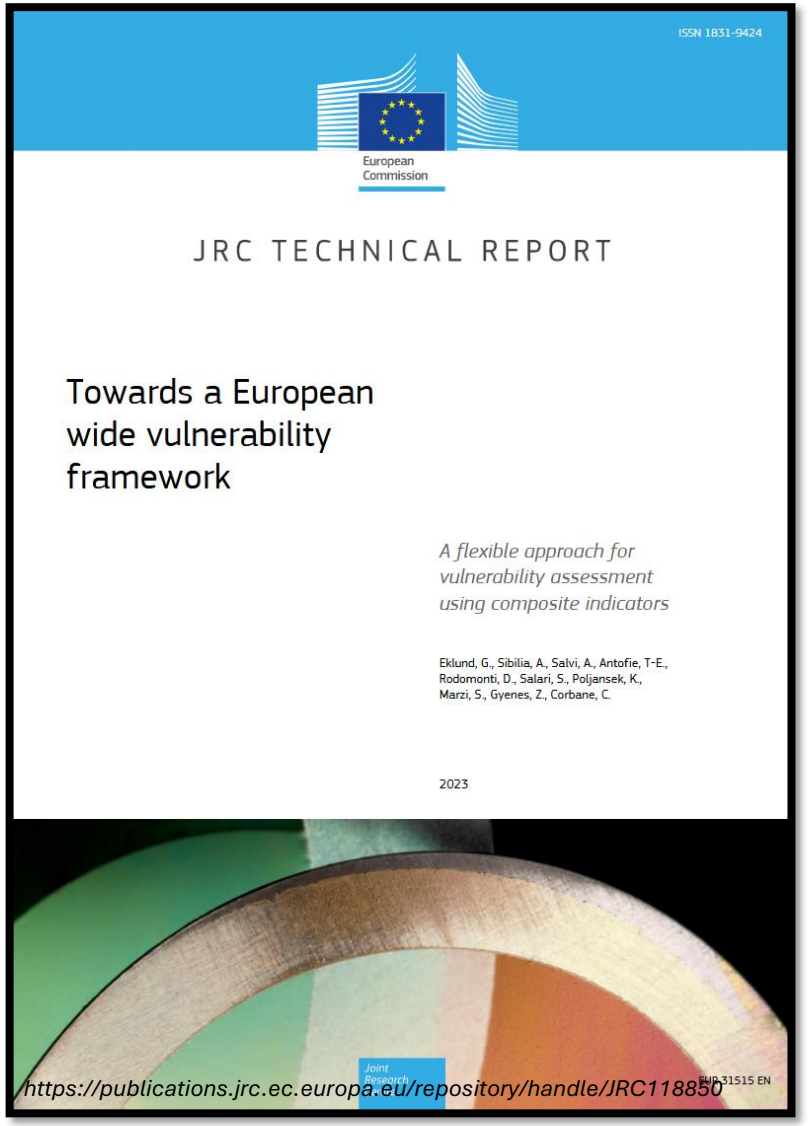
Convergence between EO and policy is increasing.

Nature-based solutions

List of more than 370 indicators. It epitomizes the DG-RTD take from several flagship NbS projects on measuring the impact at different scales (per NbS, for the whole city etc., process-based or outcome based).

12 dimensions in total: Climate Resilience, Water Management, Natural and Climate Hazards, Green Space Management, Biodiversity Enhancement, Air Quality, Place Regeneration, Knowledge and Social Capacity Building for Sustainable Urban Transformation, Participatory Planning and Governance, Social Justice and Social Cohesion, Health and Wellbeing, New Economic Opportunities and Green Jobs

JRC vulnerability framework



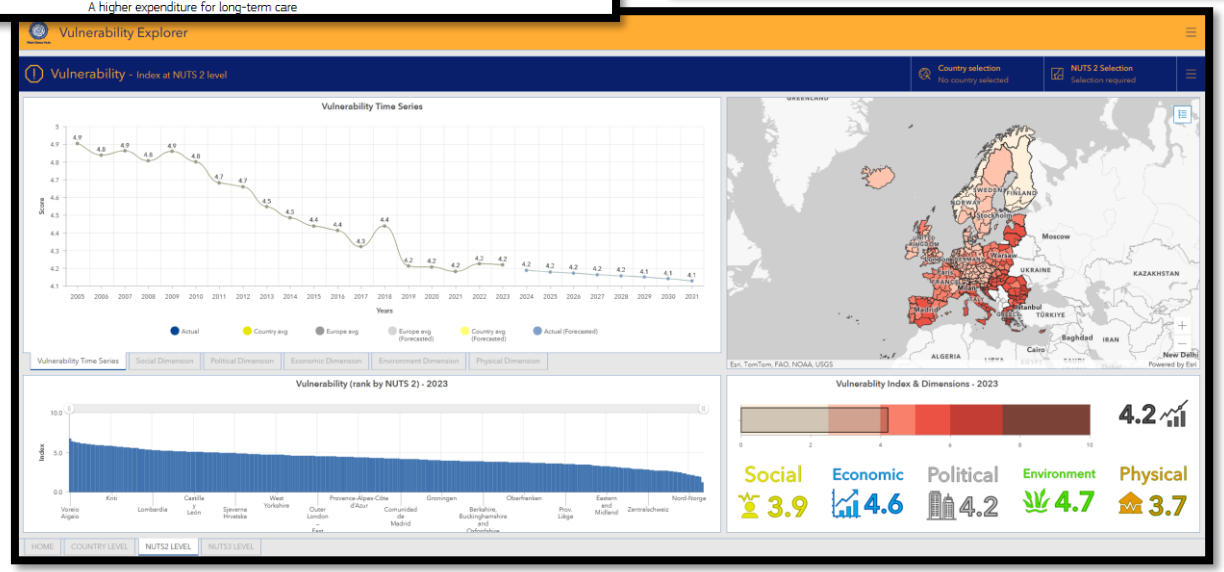
https://publications.jrc.ec.europa.eu/repository/handle/JRC118850

Annexes

Annex 1. Indicators

Description of the indicators included in the framework. The column *Reference IDs* refers to the IDs of the bibliographic sources contained in **Annex 2**. Each time an indicator is mentioned or its conceptualisation is defined in an article then it is linked to that specific source.

Scale	Hazard-independent Indicator	Description	Type	Sub-type*	Reference IDs
Country	Projected population change	Population change in the future will increase the vulnerability if the population growths. This indicator presents the dynamic of vulnerability. Future projection is used since the current situation is covered by population density and future change has a great impact on vulnerability.	Sensitivity	Cohesion	5, 10, 11, 15, 21, 36, 55, 65
Country	Children at-risk-of-poverty	Children at risk of poverty also indicate a future trend: for children already being at risk of poverty, the likelihood that they will be more vulnerable in terms of financial resources and/or social exclusion should be considered. This can further have an influence on political structures.	Sensitivity	Housing / Cohesion	5, 10, 42, 45, 65
Country	Disabled people with need for assistance	People with need for assistance are more vulnerable because of their dependency. This indicator takes disabled people and people who reported the need for assistance into account since young and old dependency is covered by age-dependency it only covers the working age population (15-64 years).	Sensitivity	Housing / Cohesion	10, 11, 12, 15, 41, 45, 52, 54, 65
		A higher expenditure for long-term care			

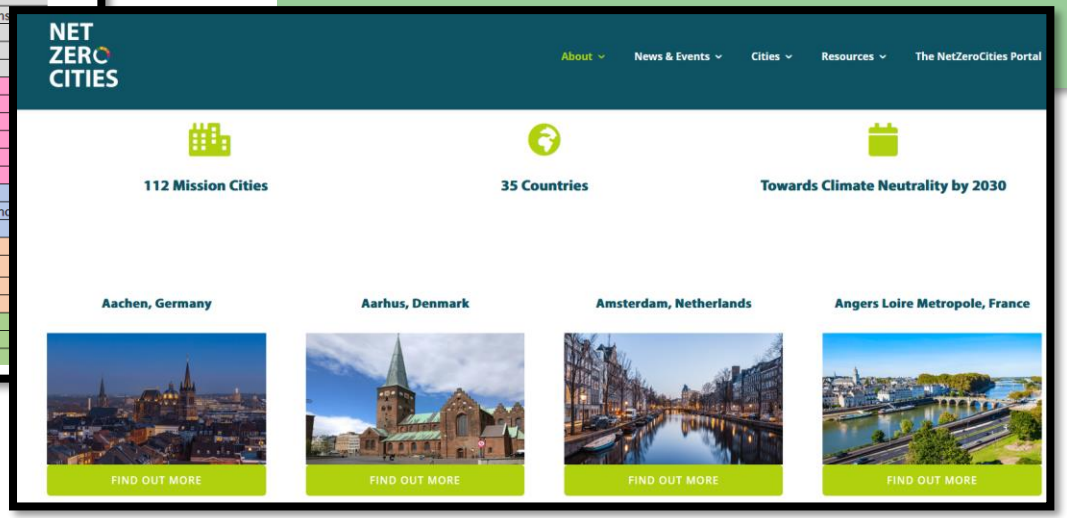


List of 43 vulnerability (the main target of Adaptation) indicators with Eurostat heavily supporting as a data source. Already feeding the DRMKC - Risk Data Hub.

Mission Cities

	GHG Emissions/Impact Domain	Impact Subdomain	Indicator
1	Greenhouse Gas Emissions (GHG)	**Total GHG emissions**	Total greenhouse gas emissions per year
2		**Stationary energy**	GHG emission per year from stationary energy per year
3		**Transport**	GHG emission from transport per year
4		**Waste**	GHG emission from waste per year
5		**Industrial processes and product use**	GHG emission from industrial processes and product use per year
6		**Agriculture, forestry and land use (AFOLU)**	GHG emission from agriculture, forestry and land use per year
7		Grid supplied energy	GHG emission from grid supplied energy per year
8		**Energy Consumption**	Change in the total energy consumption per year
9		**Energy Efficiency**	Change in energy efficiency over the lifetime of the project
10		Share of Renewable Energies	Change in the energy mix over the lifetime of the project
11		**Carbon capture and residual emissions**	Amount of permanent sequestration of GHG within city boundary
12		**GHG emissions**	Change of the greenhouse gas emissions per sector during the lifetime of the project
13	Public Health and Environment	**Air quality**	Improved air quality
14		**Noise**	Reduction of noise pollution
15		**Health**	Improved physical and mental wellbeing
16		**Quality of life**	Perceived change in the quality of life
17	Social Inclusion, Innovation, Democracy and Cultural Impact	Citizen & Communities Participation	Improved citizen participation
18		Capacity of the public administration	Improvement in skills and awareness
19		Social cohesion	Affordability of housing and energy
20		Digitalisation	Improved acceptance of digital solutions
21		Social Innovation	Number of participative activities implemented per stakeholder group
22		Scientific or Communication Outreach of the project	Scientific publications, social campaigns etc
23		Upscaling & Replication	Number of follow-up projects or districts
24	Digitalisation and Smart Urban Technology	Green ICT and Smart Metering	% of households and buildings with reduced energy consumption as a consequence of installing smart energy metres
25		Green ICT and Smart Metering	% of households and buildings with reduced water consumption as a consequence of installing smart water meters
26		Green ICT and Smart Metering	% of municipal buildings equipped with building energy management systems
27		EGovernment	% of city services available online
28		Access to information	Business-to-Government (B2G) data sharing
29		Urban Data Platforms	Usage of Urban Data Platforms
30	Economy	Investment in R&I	Improved investments in climate change action
31		Skilled Jobs & Employment	Newly created sustainable jobs
32		Technological readiness	Number of solutions suggested for implementation in local strategies
33		Local Entrepreneurship & Local Businesses	Creation of Start-ups, accelerators or tech innovation
34		Increase in Efficiency	Savings in working time achieved
35		Revenues generated	Revenues generated by the project
36	Finance and Investment	Public Spending	Public Capital Invested in Climate Action Projects
37		External Financing	Capital Attracted and Invested in Climate Action Projects from External Financ
38		Capital Efficiency	Emission Reductions Return on Invested Capital
39	Resource Efficiency	**Waste management and efficiency**	Urban waste reduction; Biowaste recovery
40		**Circular Economy**	Re-use of material during construction or renovation
41		**Water Management**	Improved water management
42		**Land use management**	Improved land use management practices (e.g. urban greening)
43	Biodiversity	**Urban Forestry Plantation and Improved Plant Health**	Percentage of tree canopy within the city
44		**Non-Invasive Species and Pollinators**	Change in the number of species of birds in built-up areas
45		**Ecological Habitat Connection**	Structural connectivity of green spaces

List of 45 indicators. Official indicators mandated by NetZeroCities. Direct outcomes of GHG mitigation action but also co-benefits (poorly monitored). Based on the Covenant of Mayors and CDP-ICLEI practices. **Earth Observation and data from the socio-economic domain can support the climate journey of the Mission Cities and beyond.**



KCEO Urban Adaptation Indicators

Framework	Provider
Key Performance Indicators for Smart Sustainable Cities ([67])	United for Smart Sustainable Cities (U4SSC)
Sustainable cities and communities — Indicators for resilient cities ISO 37123:2019 ([68])	International Organization for Standardization (ISO)
Repository for Adaptation Indicators ([69])	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, German Federal Ministry for Economic Cooperation and Development
Urban Vulnerability Indicators - A joint report of ETC-CCA and ETC-SIA ([70])	European Topic Center (ETC) on Climate Change Impacts, Vulnerability and Adaptation / ETC on Spatial Information and Analysis
The Lancet Countdown on health and climate change	Romanello et al. (2022)
Indicators for European cities to assess and monitor the UN Sustainable Development Goals (SDGs) ([71])	European Topic Center ETC/ULS - Urban, Land and Soil systems
Towards a European wide vulnerability framework	Joint Research Center (Eklund et al., 2023)
The climate and ocean risk vulnerability index: Measuring coastal city resilience to inform action	Rouleau et al. (2022)

https://data.jrc.ec.europa.eu/dataset/41fdfea8-0199-4fc9-83e0-1f960aead367

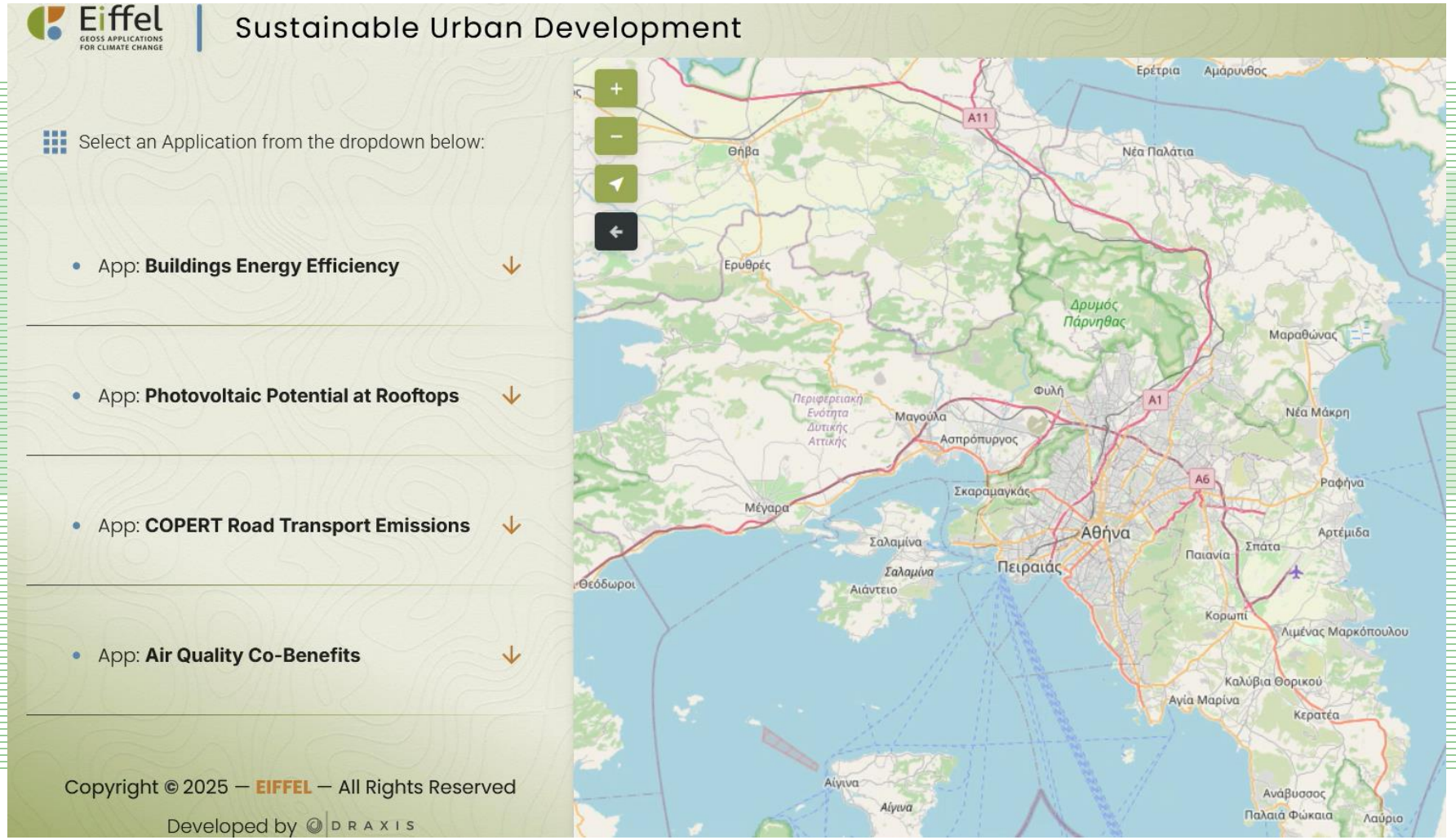
Knowledge Center on Earth Observation

List of more than 500 indicators following a top-down approach from a diverse compilation of existing frameworks. Approximately 200 can be monitored and/or supported via Earth Observation.

There are currently no formalized EU-standard or consolidated set of adaptation indicators, especially when addressing the vulnerability dimension of climate-change or -adaptation actions. This work aims to address this gap by delivering an inventory of Urban Climate Adaptation Indicators. It was produced in the framework of the Urban Climate Adaptation Deep Dive by the Knowledge Centre on Earth Observation (KCEO).

Growing collaboration – EIFFEL

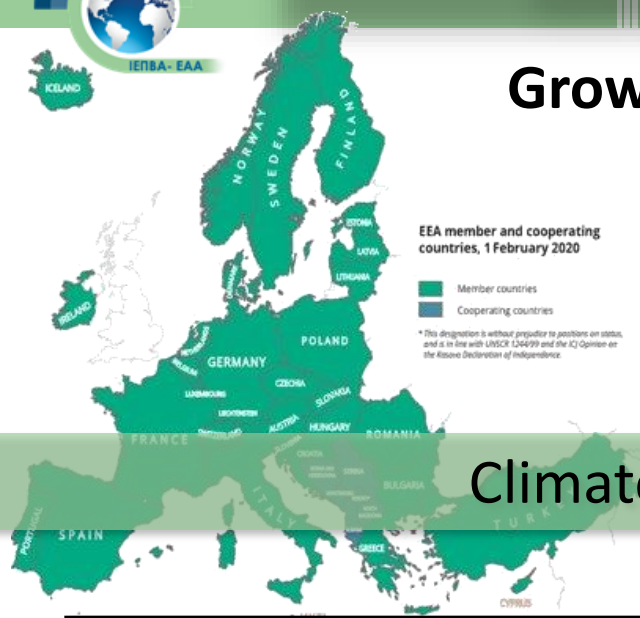
Digital portal for building climate change adaptation & mitigation applications



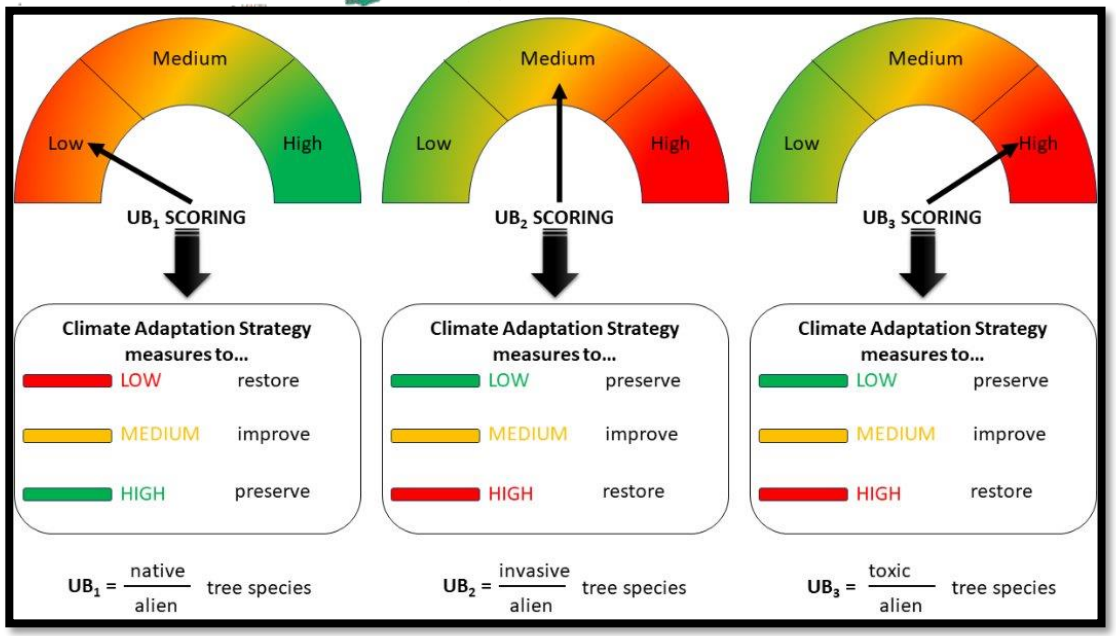
https://www.eiffel4climate.eu/

http://urban-sustainability.apcg.meteo.noa.gr/

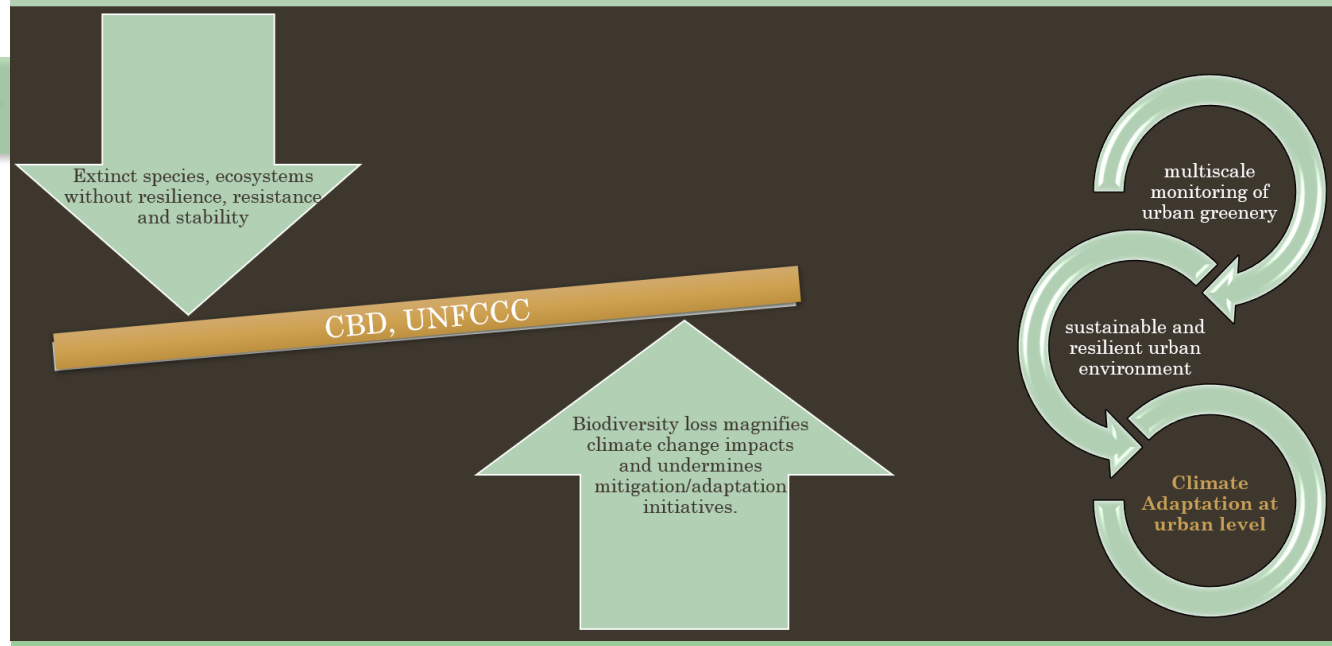
Growing collaboration – Urban Biodiversity Index for Trees for Climate Adaptation in cities (UBI4T)



Climate Adaptation Indicator



Biodiversity Conservation – Climate Change nexus

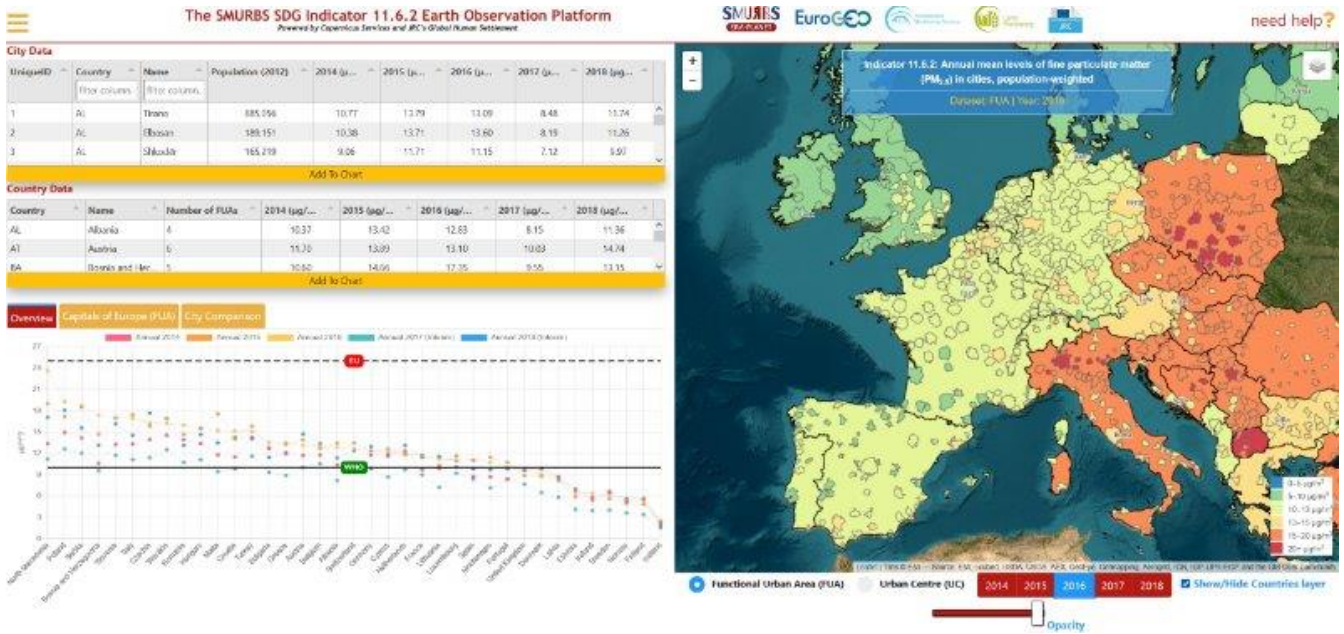


- Monitoring the quality of urban greenery
- Targeted and efficient strategic actions

EO in support of SDGs

SMart URBan Solutions for air quality, disasters and city growth

SMURBS new online platform utilizing EO to calculate population weighted air pollution (SDG 11.6.2) over ca. 800 European cities!



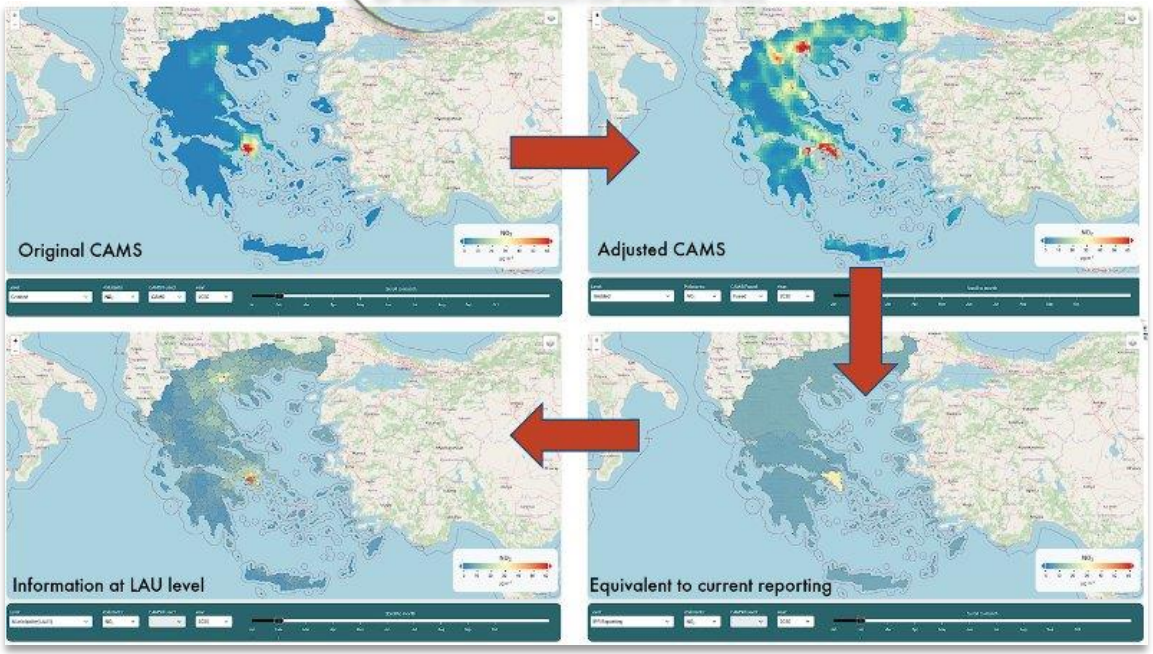
http://apcg.meteo.noa.gr/sdg1162/

SMURBS employs multiple EO platforms, augments cross-validated EO information and creates synergies among these platforms for city scale applications and solutions.

https://smurbs.eu/

GAUSS
GENERATING ADVANCED USAGE OF EARTH OBSERVATION FOR SMART STATISTICS

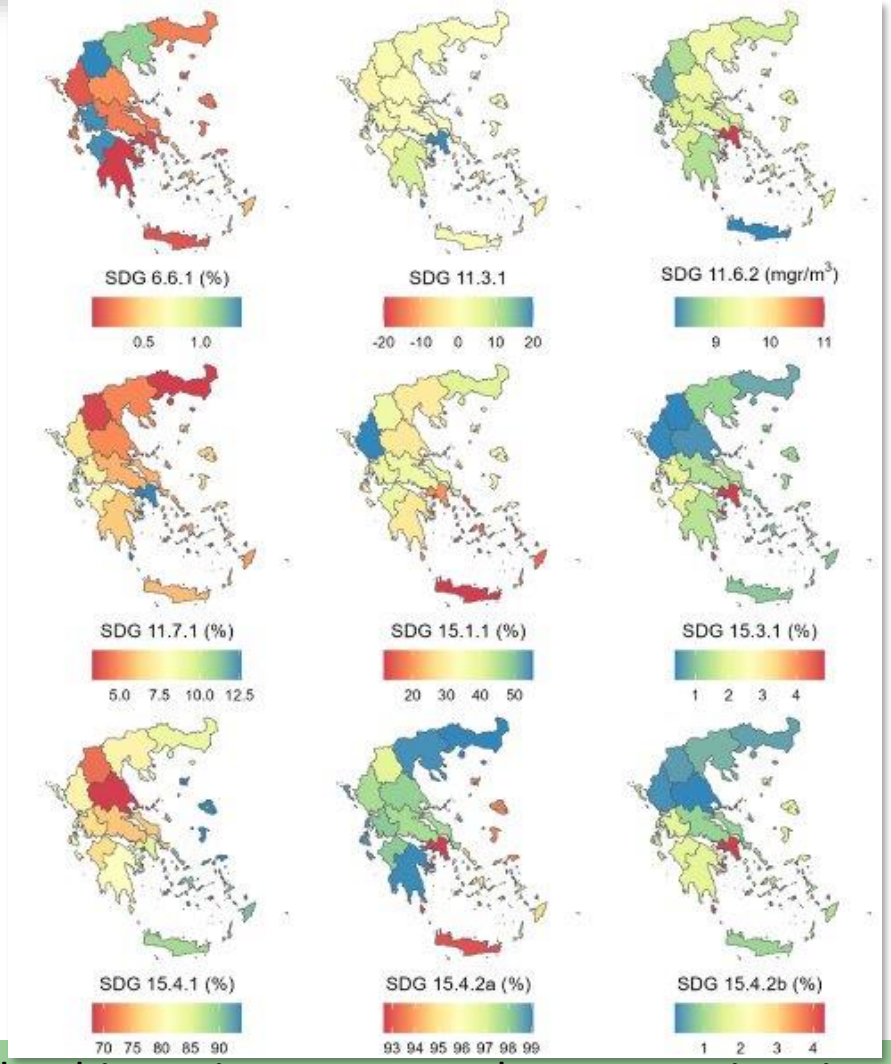
EO in support of SDGs



https://gauss-aqgreece.ddns.net/

EO data are an important part of such smart statistics, proving insights into land use, agriculture, urban planning, and air quality, as well as many other applications.

https://eo4smartstats.com/



JustReDI
Towards a just green and digital transition

National flagship project to assess the current situation regarding green and digital transition in Greece and develop public policy proposals to advance dual transition.

Official Convergence

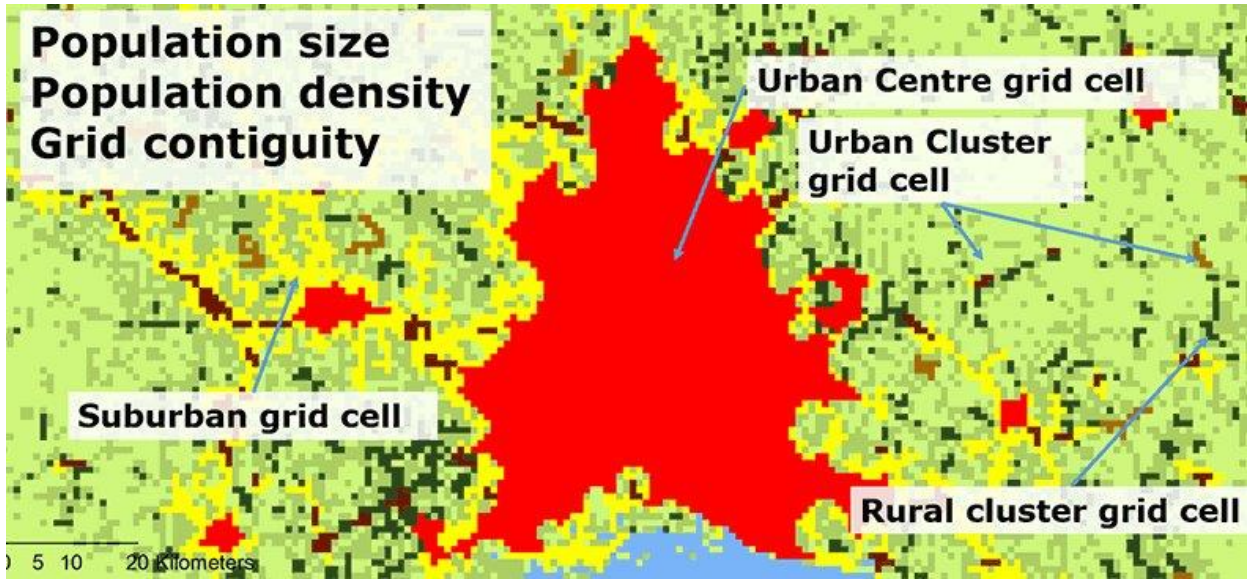
DGINS Varsovie | Venue and accommodation | Warsaw Memorandum | Agenda | Practical information | Coronavirus | Gallery

At the 47th meeting of the European Statistical System Committee the Warsaw Memorandum on Earth Observation for official statistics was adopted.

WARSAW MEMORANDUM
2021 DGINS Conference on Earth observation for official statistics
Warsaw, Poland 27-28 October 2021

Considering:

1. Increasing needs of statistical information users, mainly resulting from issues that have been escalating in recent years, like climate change and growing devastation of the environment.
2. Support needed for monitoring and reporting the SDGs indicators at national, regional and local levels, especially for those goals related to the environment and the environmental economic and ecosystem accounts.
3. The necessity of data for data space initiatives in various fields, particularly the "Green Deal data space", the "Common European agricultural data space", the "Common European industrial (manufacturing) data space", the "Common European mobility data space" and the "Common European energy data space". This also applies to supporting the public administration in decision-making processes such as urban planning, emergency mapping and early warning systems, border and maritime surveillance.
4. Further improving granularity and quality of statistical information and providing the up-to-date aggregations at the lowest possible levels and ad hoc estimations.
5. The need to further reduce the burden on respondents and survey costs by incorporating innovative data collection methods and new sources.
6. The availability of, which is not equal to unlimited access to, big data, earth observation (including from the Copernicus program), geospatial information etc. allowing producing new and improved statistics.
7. Strategic orientation of various statistical domains such as the Strategy on Agricultural Statistics 2020 and beyond, which promote new innovative techniques and data sources.
8. The aim of the Single Market Programme[1] (including European statistics) 2021-2027 to provide timely and comprehensive statistical indicators on regions, including the Union outermost regions, cities and rural areas, and to increasingly use geospatial data and systematically integrate and mainstream geospatial information management into statistical production.
9. The opportunity of using Earth Observation techniques in various statistical domains, enforcing to expand the knowledge and competence of statisticians, who will contribute to the development of innovative methods in statistics.
10. Dynamic development of satellite remote sensing techniques, which is already used by many government and scientific institutions.
11. The need to exploit the full potential of remote sensing data, which engenders the necessity to have access to frequently updated high-resolution data.
12. That many Member States have already been using satellite data for statistical purposes and see the need for close cooperation and exchange of experiences.



THANK YOU!

Dr Evangelos Gerasopoulos, *Director,*
Institute for Environmental Research and Sustainable Development,
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ESAC
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