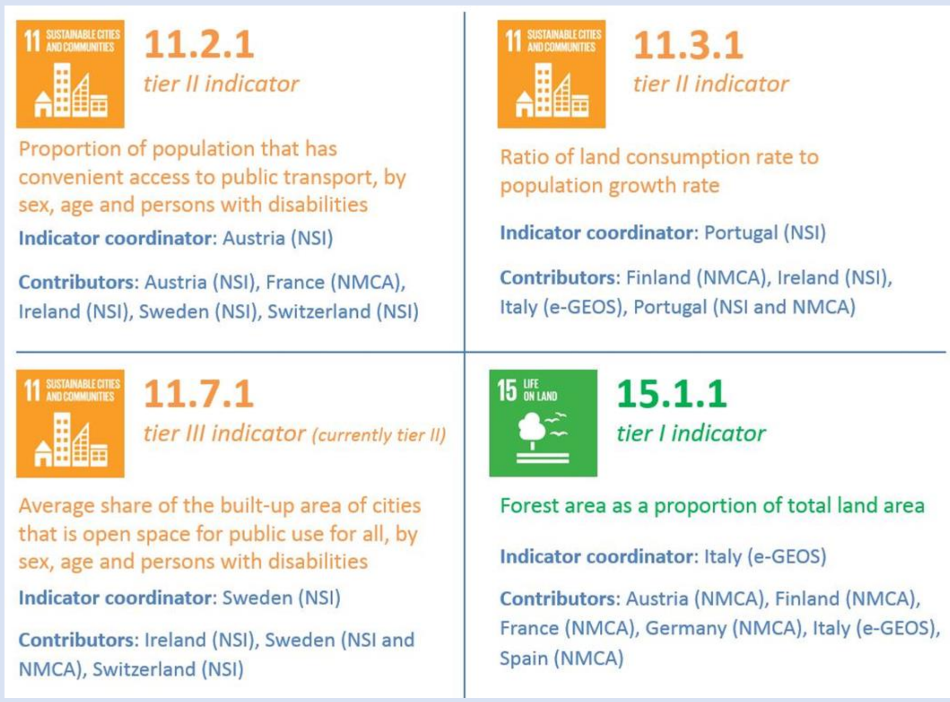
Country Use Case of EO for SDG Indicator	
SDG Indicator/Sub-indicator	**Indicator 11.7.1:** Average share of the built-up area of cities that is open space for public use for all, by sex, age and persons with disabilities ***EU proxy indicator:*** Public green space as share of urban area + Share of urban population with access to public green areas
Country or region	European Union
Status (please check)	_ being used in official SDG Indicator reporting _ being verified or tested by country X_ studying feasibility
Earth Observation Data Used and its links	EO based data is used to define urban green space and urban green areas. Raw data from Copernicus services (Sentinel-2) is combined with Urban Atlas data. https://sentinel.esa.int/web/sentinel/missions/sentinel-2/data-products https://land.copernicus.eu/local/urban-atlas
Additional/ Other Data Used and its links	Local urban planning data from local authorities in cities (test cities Geneva and Bristol) not public. Cadastre information on ownership and accessibility where available. OpenStreetMap data (https://www.openstreetmap.org) to distinguish between public and private green space. Population grid (https://ec.europa.eu/eurostat/web/gisco/geodata/reference-data/population-distribution-demography/geostat)
Description of data access, processing, and analysis, including methodology that was developed, associated tools or applications, and how these are applied to compute SDG Indicator	1) Map all green areas using the NVDI, suitable size threshold still under assessment. 2) Intersect with Urban Atlas data and Open Street Map data using accessibility tags. This should help to distinguish between private green areas and public green areas that people can access. 3) Measure accessibility using the population distribution in a population grid
Work flow	1. Generate a maximum NDVI dataset (April-August) over the urban areas using Sentinel 2 data. The definition of urban areas should be discussed as part of the project. 2. Delimit the built-up area of the city using the Copernicus Urban Atlas or GHSL layer. 3. Create a mask of public vs private areas using a mix of solutions (e.g. cadaster, VGI). The main data source should be Open Street Map access tags but other, including local sources from the selected cities should be investitaged as well. As an optional task, the workflow may be refined by setting up an AI and machine learning process to distinguish between

	public and private green space using e.g. high resolution ortho-imagery and categorised training images. 4. Overlay the masks with the NDVI dataset to identify only vegetated and public areas. This gives an estimation of the total green space and the total open public green space. 5. Model the accessibility to public green space. 6. Estimate the share of population that has access to private green space.
Lessons learned, any gaps, key issues and recommendations	<u>EU monitoring</u> • Still too early to assess if this is a valid approach. It will be essential to benchmark the results with national results where available before turning this into an operational model and derive an operational EU wide indicator. • EO alone cannot generate this indicator but is a fast way of producing the green area mask and the source for the land cover/ land mask of the Copernicus Urban Atlas. • Time series is an issue at this point as OSM data is not available as a time series and there is only one Urban Atlas version available from 2012, the 2018 version being released over the course of 2020. • Potentially relevant indicator in densely populated city centres. Towards the outskirts of cities and in suburbia where also agricultural and forest areas and houses with private gardens are more common potentially diluted or biased results if aggregated at city level. Sub-city disaggregation or by population density classes could be a solution. • The combination of big data such as mobile phone data or web pictures might be another, valid approach. <u>European coordination</u> The outcomes and findings of the coordinated analysis carried out on the SDG indicators by the ‘UN-GGIM: Europe Working Group on Data Integration‘ according to the Work Plan 2017-2019 have allowed to agree on the following set of recommendations to enhance the contribution of geospatial data analysis and its integration with statistical data to address the SDG indicators: 1. Harmonize relevant geospatial data themes 2. Implement Cadastral and Land Cover data as key national authoritative data 3. Use geospatial layers generated from Earth Observation data 4. Create capacity building initiatives for NSI to take full advantage of EO based data 5. Define and implement NSDIs having in mind the requirements for statistical production 6. Implement consistent and stable sub-national spatial units 7. Develop and use population grids and other grid-based statistics 8. Adopt harmonised and comparable concepts, definitions and classifications and build consensus among Geospatial Agencies and National Statistical Institutes

	9. Ensure availability and accessibility of processing workflows, including open formats of programming codes 10. Develop initiatives that promote availability, accessibility and usability of geospatial data 11. Increase the collaboration with researchers and data providers 12. Increase cooperation between National Statistical Institutes and Geospatial Agencies Lessons learned, gaps and key issues on (1) ‘concepts’, (2) ‘data sources’, (3) ‘computation and algorithm’ and (4) ‘challenges regarding the use of geospatial data’ have been compiled for four specific SDG indicators (11.2.1, 11.3.1, 11.7.1 and 15.1.1). 
Supporting material about this use case. Include links, publications, etc.	<u>European monitoring</u> Not yet available first results will become available at the end of 2020 <u>European coordination</u> Concerning the coordinated elaboration of the UN-GGIM: Europe Working Group on Data Integration a Final Report on ‘The territorial dimension in SDG indicators: geospatial data analysis and its integration with statistical data’ was published in July 2019 within the Work Plan 2017-2019. The report focuses on the contribution of geospatial data analysis and its integration with statistical data at a global, European and national perspective based on the analysis of four selected SDG indicators. Source: https://un-ggim-europe.org/wp-content/uploads/2019/05/UN_GGIM_08_05_2019-The-territorial-dimension-in-SDG-indicators-Final.pdf According to the Work Plan 2019-2022 the UN-GGIM: Europe Working Group on Data Integration has accepted new tasks to provide methodological, operational

	and technical guidance in the use of geospatial data and statistics to compute SDG indicators, with a European and national perspective, and reflecting on solutions which may contribute to reduce statistical burden and increase the level of detail of SDG indicators. The new tasks comprise (1) a benchmarking of pan-European data sources, i.e. comparative analysis between pan-European and national methodologies, data sources and results as well as (2) an integration of pan-European data sources with national data sources, i.e. analysis of the combination of pan-European with national data sources to extract new relevant information for indicators computation. The expected outputs will include: 1. The development of standard methodological/technical documents for each selected indicator compiling the solutions analysed and presenting normative methodological guidance on the use of EO for the computation of SDG indicators; and 2. The production of flyers/leaflets synthesising and illustrating the approaches analysed and the main results. Based on this, the work has started by taking the following indicators as a reference: 3.6.1 | Death rate due to traffic injuries (tier I) 6.6.1 | Change in the extent of water-related ecosystems over time (tier I) 11.2.1 | Accessibility to public transports (tier II) 11.3.1 | Ratio of land consumption rate to population growth (tier II) 11.6.2 | Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities (tier I) 11.7.1 | Access to public / green areas (proxy) (tier II) 14.5.1 | Coverage of protected areas in relation to marine areas (tier I) 15.1.1 | Forest area as a proportion of total land area (tier I) 15.3.1 | Proportion of land that is degraded over total land area (tier I) 15.4.1 | Coverage by protected areas of important sites for mountain biodiversity (tier I)
Collaboration with other agencies - agency names and activities	<u>National monitoring</u> NA <u>European coordination</u> The selection and analysis of the SDG indicators should benefit from the different institutional background and technical expertise of members of the UN-GGIM: Europe Working Group on Data Integration. Additionally, this list should benefit from an articulation with the UNECE as well as the European Environment Agency (EEA) and Eurostat's SDG Working Group. Furthermore, the information exchange with the Inter- and Agency Expert Group on SDG Indicators – Working Group on Geospatial Information (IAEG SDG WG GI) will be continued. The same applies with the exchange and collaboration with the relevant global GEO initiatives and working groups, in particular, the EO4SDG initiative. On the European level, the exchange with the EuroGEO initiative has to be established as well.

Name(s) and email address of individual(s) involved in this effort. Please note the principal point(s) of contact (POCs).	National monitoring Ekkehard Petri, Eurostat Ekkehard.Petri@ec.europa.eu European coordination Pier-Giorgio Zaccheddu (Chair of the UN-GGIM: Europe Working Group on Data Integration), email: pier-giorgio.zaccheddu@bkg.bund.de Francisco Vala (Leader of the Subgroup I – SDG Analysis of the UN-GGIM: Europe Working Group on Data Integration), email: francisco.vala@ine.pt