Your service contribution to the SDGs

EARSC is looking for eo services/products from EO services providers to populate the eowiki section on "EO Supporting the Sustainable Development Goals, we will concentrate on EO services supporting specific **Goals** and **Targets**. Please let us know (Monica Miguel-Lago) if you are interested to align your services with the UN language for the Sustainable Development Agenda.

If your eo services have some alignment with the specific targets, please let us know. We will be very happy to promote this exercise within the UN and Statistical Community in charge of the SDGs.

SDGs	**EO data can help develop various proxy indicators and targets** **(info extracted from ESA compendium on SDGs at https://eo4society.esa.int/wp-content/uploads/2021/01/EO_Compendium-for-SDGs.pdf)**	**Company suggested examples and links**
SDG1: NO POVERTY		
Target 1.1: By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than $1.25 a day.	Mapping spatial distribution of socioeconomic deprivations.	
Target 1.2: By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions.	Forecast weather, monitor fires, determine populations at risk from flooding/landslides, analyse climate change and map land cover change (e.g. deforestation and degradation).	
Target 1.4: By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance.	Access to services such as electric power, as well as patterns of human interaction. Remote sensing can capture information on biophysical properties such as rainfall, temperature and vegetation cover as well to variables such as infrastructure.	
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.	EO datasets and methods can contribute to disaster risk management and reduction by providing relevant information to the full cycle of disaster and environmental shock management: mitigation, preparedness, warning and response. Information such as the extent of damaged area along with the land-use types as well as the population affected.	
SDG2: ZERO HUNGER		
Target 2.3: By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment.	Information derived from EO, such as weather forecasts, can be made accessible to small-scale food producers even in isolated areas in a way that can inform crop management decisions, such as the time to plant and crop variety selection.	
Target 2.4: By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality.	EO methods can play an important role in increasing agricultural productivity as well as minimising the environmental impact of the agricultural sector. Some of the ways EO has proven successful to contribute to increase the sustainability of agricultural production include: (1) yield estimation, (2) vegetation vigour and drought stress monitoring, (3) assessment of crop phenological development, (4) crop acreage estimation and cropland mapping and (5) mapping of disturbances and land use/land cover (LULC) changes.	
SDG3: GOOD HEALTH		
Target 3.3: By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases.	EO data has been used, for instance, to derive environmental data to feed malaria risk models, identification of potential vector habitats and to inform the development of early warning systems. Products such land cover, land and sea surface temperature vegetation indices such as NDVI and enhanced vegetation index, precipitation and actual evapotranspiration have been applied to epidemiology risks.	
Target 3.9: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.	EO data can be used to monitor the level of air quality data (e.g. PM2.5, CO2, CO, NOx, SO2) , water quality data (E.g. Chlorophyll-a, turbidity) as well as soil pollution data (e.g. concentration of hydrocarbons)	
SDG6: CLEAN WATER		
Target 6.1: By 2030, achieve universal and equitable access to safe and affordable drinking water for all.	Use of land cover change data, particularly in models to estimate the impact on water supplies	

	Target 6.3: By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.	EO is important in ongoing, routine water quality monitoring of large water bodies, ideally in combination with in situ sampling. EO can also support countries with the target by assessment of the risk of eutrophication of a country's water bodies by monitoring ambient nutrient pollution in standing waters.	
	Target 6.4: By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity.	Quantifying surface water changes over time, water consumed by key water-user sector such as agriculture, as well as soil moisture deficits. Through hydrological models, based on EO parameters such as evapotranspiration, soil moisture and surface water, and by modelling supply and demand across sectors based on land use change. In agricultural areas, EO can monitor how effectively water uptake by vegetation is translated into crop yield, using a metric that is referred to as agriculture water productivity (yield/m3 of water consumed).	
	Target 6.6: By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes.	EO provides a standardised monitoring approach which can capture the multiple dimensions of change from hydrological to biophysical processes. For example, high resolution land cover change can be used to track changes in water- related ecosystems, to assess the success of catchment-wide restoration efforts and the effectiveness of protection measures or to identify threats to sensitive habitat. Other EO products such as the extent of water bodies and their temporal dynamics, as well as digital terrain models, are inputs to models that assess the availability of surface and ground water.	
SDG7: AFFORDABLE & CLEAN ENERGY			
	Target 7.1: By 2030, ensure universal access to affordable, reliable and modern energy services.	A useful data source is nigh-time luminosity data, which can collect daily variations at sufficiently low light levels to detect artificial lights at night across remote and rural areas. the type of energy source (e.g. solar panels, diesel power generators, nationwide electrical networks) can only be acquired using high resolution EO data in combination with sophisticated statistical techniques.	
SDG9: INDUSTRY, INNOVATION & INFRASTRUCTURES			
	Target 9.1: Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans- border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all.	EO data can inform the production of efficient and effective plans for infrastructures development and management. The global coverage of remote sensing images allows the identification of areas currently lacking infrastructures for transportation or energy access. These data coupled with information on topography, land cover, precipitation patterns, climate change scenarios, can support the development of climate resilient infrastructures. EO data has been widely used to extract infrastructures such as urban areas, roads and dams using data at different spatial resolution (e.g. rural roads can be detected just with high resolution images) and different techniques (e.g. supervised and unsupervised classification, neural networks, and mathematical morphology)	
	Target 9.4: By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities.	EO data can be used to measure pollutants that arise from industries and infrastructure. Satellite data can also be used to locate potential pollutant hotspots through analysis of global emissions, and monitoring pollution plumes.	
SDG11: SUSTAINABLE CITIES & COMMUNITIES			
	Target 11.1: By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums.	EO can help both understanding and monitoring slums, but can also link their morphology with socio-economic data, as well as help to identify hazardous areas where many of these settlements are located. By knowing the dynamics and the extent of slums, sustainable urban plans and slum improvement polices can be developed and monitored, including the improvement of the building structures, access to water, electricity and other basic needs.	
	Target 11.2: By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.	EO data can inform the production of efficient and effective plans for road infrastructures and shipping routes (although, the global coverage of remote sensing images allows the identification of areas currently lacking infrastructures for transportation. This data can be combined with census data to provide more detailed information on public transport that cannot be measured through EO (e.g. railways and subways), as well as data on vulnerable people.	
	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.	Remote sensing data can support the generation of country specific urban expansion models and inform the development of sustainable urban plans.	
	Target 11.5: By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations.	EO can play a role in both planning and achievement of this target. For planning purposes, EO can map both the areas that are vulnerable to disasters, e.g. coastal, low- lying areas or areas of deforested, steep slope, susceptible to landslides as well as to map vulnerable populations, e.g. through informal urban settlement mapping.	
	Target 11.6: By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management.	EO can be used in three major aspects of this target – the spatial mapping of cities and the sources of pollution, the identification and treatment of waste in and around cities and in planning better waste management for per capita pollution reduction. EO-derived maps of cities allow the size, shape and other metrics of urban setting (e.g. monitored from which likely environmental impact could be inferred. EO as a tool to evaluate the impact of different phases of the waste cycle.	
	Target 11.7: By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities.	EO can help countries to achieve this target because it is a useful tool to establish the extent of urban areas as well as to do an inventory of open space in cities, especially green open space.	

SDG13: CLIMATE ACTION			
	Target 13.1: Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries.	EO can be used by countries in two ways, both in planning for the target, though a more robust system of identifying, monitoring and preparing for climate related hazards and natural disasters and in achieving the target, through improved resilience to disasters through ecosystem-based adaptation strategies. EO is useful as a national planning tool for the target in ecosystem-based adaptation to natural disasters. Coastal ecosystems such as mangroves are readily mapped through EO.	
SDG14: LIFE BELOW WATER			
	Target 14.1: By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land- based activities, including marine debris and nutrient pollution.	EO is useful in relation to this target because it has both land, sea and coastal coverage thereby enabling integrated monitoring, e.g. of land based debris which accumulates on shorelines before being transported seaward. EO can monitor the location and extent of inland waterways, including their water quality as mentioned in relation to SDG 6, enabling the transport of land based, water-dissolved pollutants such as excessive nutrients to be monitored.	
	Target 14.3: Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels.	EO can support countries in planning for and setting targets on minimising ocean acidification, as part of a wider climate change monitoring/management strategy. EO can also be used as a diagnostic tool, e.g. to map the impacts of ocean acidification on coral reefs.	
	Target 14.4: By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics	Satellite data on ocean parameters such as temperature, salinity, phytoplankton and chlorophyll- a concentrations can help identify ocean areas where fish tend to aggregate (e.g. thermal fronts) and to estimate primary production.	
SDG15: LIFE ON LAND			
	Target 15.1: By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements.	EO can play multiple roles in achieving the target as it is a crucial part of the monitoring strategies for conservation, restoration and sustainable use of terrestrial ecosystems. The availability of multi-decadal time series datasets of the (global) land surface from multiple satellite sensors means that there are fewer remote sensing data gaps and greater ability to monitor long term changes over greater areas. Remote sensing data coupled with modelling tools can support the identification of priority areas for ecosystem services provision that needs specific management activities.	
	Target 15.2: By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally.	EO can be used to assess the change in forest extent and quality (e.g. degradation), but also to plan for the effective implementation of activities aiming to achieve the sustainable management of forest. Satellite images and subsequent analyses can help to identify sites where to implement reforestation and afforestation activities, as well as areas that are at higher risk of deforestation because of past forest clearing for agriculture or because of the proximity to infrastructures such as roads, and their protection should be prioritised.	
	Target 15.3: By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world.	EO data as inputs thereby directly contributing to countries in the Land Degradation Neutrality: Land cover (area), Land productivity (Net Primary Production) and Carbon stock (SOC)	
	Target 15.4: By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development.	The applicability of EO to monitor land use dynamics and the drivers of land use change, such as expansion of human settlements or crop conversion, as well as their implications for biodiversity, has been extensively proven. EO data, such as Digital Elevation Models (DEMs) or data on climate and dynamic processes, can also be used to feed models that assess the supply of and demand for mountain ecosystem services	