

Table S1. Datasets used in the analysis (Source: Environment Europe Foundation).

Dimension	Ecosystem Services	Indicator	Data Description	Unit	Source and Reference	Rational for Use as Proxy	Date of Dataset	Data Format	Relation between Indicator and Ecosystem Service
Economic	Freshwater	Springs	Spring dataset consisted of all normal springs with flow rate greater than 30 l/s. The discharge rates of the springs are in the categories of $1-3 \times 10^6$ m ³ /a, $3-10 \times 10^6$ m ³ /a, $10-30 \times 10^6$ m ³ /a and $>30 \times 10^6$ m ³ /a. The discharge rate was used to model amount of water provision.	Dimension-less	European Environment Agency (EEA)	This indicator provided dataset that allowed the amount of water to be directly estimated as an ecosystem service hens appropriate for the task	2020	Point vector	Positively correlated. The high quantity of springs, the greater amount of ES provided
	Crops	Crop Provision (actual flow)	This dataset captures crop provisioning service of ecosystems. It is the actual flow of crop provision service and excludes all human inputs. The dataset was produced by multiplying the yield in tonnes/ha with the ecosystem contribution ratio	Tonnes/ha	Vallecillo (2018) [117]	There is scientific consensus on crop provision as an ecosystem service. Also, the dataset provided was appropriate for the task as it measured the ES flow and also excluded human inputs	2012	Raster	Positively correlate with higher crop provision implying greater ES supply
	Livestock	Livestocks	This spatial dataset captures livestock distribution in 2010. The livestock types considered were cattle, sheep, goats, horses, pigs, chickens and ducks among others.	livestock abundance	Gilbert et al. (2018) [118]	Livestock provision is well cited in the various frameworks as ES and the dataset available captured all the major livestock of benefit to people hence representative of ES	2010	Raster	Positively correlated
	Aquaculture fisheries	Fishes	This dataset is an aggregation of the various fish species in freshwater and marine water identified by IUCN red list: Clupeiformes, Blennies, groupers, wrasses parrotfishes, sharks rays chimaeras, seabreams, pufferfish and hagfish among other	Presence of species	IUCN red list	The dataset captured the spatial dimension of ES. With limited dataset available to capture amount of ES, the best attempt was to evaluated the number of fish species present. This dataset adequately satisfied this approach.	2018	Polygon datasets	Positively rated such that number of fish species present is interpreted to correspond with amount of ES provided
	Wild foods	Global wilderness	The Global wilderness index evaluates remoteness by considering settlements, access routes and naturalness	Presence of wilderness	Rob Lesslie. (1998) [119]	Despite the dataset does not directly capture amount of wild food supply, it indicates the presence of the environment where it is possible for	1998	Raster	Positively related to ES provision in capturing the most remote areas where wild foods can be produce

					wild fruits to be produce. This captures the spatial dimension of ES provision as the best available dataset appropriate for the task			
Foliage for livestock	Grassland	This dataset is a high resolution binary grassland data capturing areas of grass and no-grass. The grassland comprised of managed grassland, semi-natural grassland and natural grassy vegetation at a resolution of 20 m.	Presence of grassland	European Environment Agency	This indicator has received scientific consensus as representative of ES and the dataset adequately captures the spatial dimension of ES. The limitation of dataset is that it does indicate the amount of ES produce	2015	2015	Positively related to ES
Timber	Timber provision (actual flow)	The dataset represents actual timber provision by ecosystems base on Dry Matter Productivity (DMP). Timber provision was assessed by multiplying Net annual timber increment with ecosystems contribution to timber growth. It excludes human inputs used in forest management.	m ³ /year	Vallecillo (2019) [120]	Timber is an important export commodity and raw material for a number of end-products and directly supplied from various ecosystems. The dataset is appropriate for the analysis as it captures actual timber flow.	2012	Raster	Positively related to ES as higher values indicates higher ES provision and vice-versa
Fuel	Forest growing stock volume and above-ground biomass	Growing stock volume dataset captures the volume of all living trees more than 10 cm in diameter. It excludes smaller branches, twigs, foliage, flowers, seeds, stump and roots. For above ground biomass dataset it captures the mass, expressed as oven-dry weight of the woody parts of all living trees excluding stump and roots.	Growing Stock Volume (m ³ /ha) Above Ground Biomass (ton/ha)	Santoro et al. (2018) [121]	This indicator captures the exact part of plant biomass used as fuel by excluding the non-essential parts. The dataset represents both the quantity of ES supply in a spatially explicit manner hence appropriate.	2010	Raster	Positively related to ES supply with higher above ground biomass amount corresponding to higher ES supply and vice-versa.
Genetic resources	Distribution maps of tree species	This dataset maps distribution of important European tree and shrub species. The feature class of the tree species represent areas where they are present.	Presence of tree species	Caudullo et al. (2019) [122]	Tree species have been cited as important source of genetic resources needed for regeneration of forest. This dataset captures the important tree species deemed to be providing ES	2017	Polygon vector	Positively related as higher number of tree species present indicates higher genetic resource supply
Phylogenetic diversity	Phylogenetic diversity of terrestrial	Phylogenetic diversity of vertebrate species was calculated with Faith's (1992) statistical model where phylogenetic diversity score evaluates the aggregate of	Dimensionless	Hoekstra et al. (2010) [123]	This dataset adequately captures the spatial dimension of phylogenetic diversity hence	2010	Raster	Positively related to ES

Ecological		vertebrate species	the pairwise distances for the minimum spanning distance among a selected set of species of all vertebrate species world-wide			appropriate for the assessment. Moreover, this indicator has received adequate scientific consensus to be considered ES.			
	Biological infrastructure for nature-based recreation	Biological infrastructure for nature-based recreation	Biological infrastructure for nature-based recreation	Presence of protected areas	European Environment Agency	Protected areas can be assessed to offer important infrastructure for recreation and tourism	2019	Polygon vector	Positively related ES
	Nutrient cycling	Soil Cation Exchange Capacity	This datasets is one of 8 chemical properties produced using Gaussian process regression models and soil point data from the LUCAS 2009/2012 soil surveys	cmol/kg (centimoles of positive charge per kilogram of soil)	Ballabio et al. (2019) [124]	Soils with greater cation exchange capacity are able to hold on to more nutrients hence associated with nutrient cycling (Schroder et al., 2016) [125]	2009/2012	Raster	Positively related
	Climate regulation	Carbon Uptake by Forest and Woodland	This dataset captures carbon sequestration of greenhouse gases by ecosystems such as forests and woodland.	Dimension less	Dimension less	This indicator has been assessed by all frameworks as globally important and significant in the local context. The dataset captures carbon sequestration activity of plants hence appropriate for the analysis.	2012	Raster	Positively related as higher carbon uptake implies higher climate regulating activities
	Air quality regulation	Particulate Matter 2.5 (PM _{2.5})	PM _{2.5} is a concentration of ground-level fine particulate matter with dust and sea-salt removed. Geographically Weighted Regression was used with global ground-based measurements to predict and adjust for the residual PM _{2.5} bias per grid cell in the initial satellite-derived values.	Micro-gram per cubic meter	van Donkelaar (2018) [126]	Scientific consensus from various frameworks supports the identification of this indicator as an ES. PM 2.5 is a major global air pollutant at ground level which affects man. This means that its regulation by an ecosystem benefits a lot of people hence an ES. There are other pollutants that could be considered but data was unavailable	2016	Raster	Negatively related to ES as higher amount of PM _{2.5} indicates the environment is experiencing lower rate of pollutant removal from the atmosphere hence low air regulation and vice-versa
	Water purification and waste treatment	Ramsar sites, Wetlands	This dataset is binary indicating areas of wetlands and non-wetland areas. Wetlands were demarcated based on the CORINE Land Cover dataset. A combination of multiple datasets being ramsar	Landuse classes	European Space Agency (ESA) Copernicus programme	Wetlands are an important zone for water purification and has been used as biological filters for waste hence a direct benefit from this ecosystem making it appropriate for	2000	Raster and Polygon	Positively related to ES

		site and wetlands were considered to reduce incidence of not capturing some features							the analysis. The dataset captures the spatial dimension of this ES but not how much of the service is supplied
Water regulation	Water Retention Index (WRI)	WRI captures the capacity of the landscape to regulate and retain water passing through it. Factors considered in developing this dataset includes interception by vegetation, soil water-holding capacity and water percolation, soil sealing and slope gradient.	Dimensionless	Maes, J. (2010) [127]		2010	Raster	Positively related to ES	This dataset captures the spatial dimension of this ES and adequately measures capacity of the landscape to regulate water passing through it. The indicator and dataset is the most representative and concise available for this analysis
Erosion regulation	Soil erosion control	This dataset captures soil erosion by measuring how much soil is retained by vegetation based on the RUSLE model.	tonne of soil retained per year	Maes, J. (2010) [128]		2010	Raster	Positively related to ES as higher amount of soil retain means higher erosion regulation.	Soil erosion control is the main type of erosion regulated by ecosystems which is of high direct benefit to man. This is supported by numerous researches including Maes (2010) [128]
Pest regulation	Predation (bat zones)	This dataset captures the location of bat breeding areas in France. This dataset indicates areas where pest regulation is supplied but not the magnitude supplied.	Presence of bat underground sites	Eurobats conservation of key underground sites		2010	Point vector	Positively related to ES	Predation, particularly when harmful pest are preyed upon, is an important pest control mechanism of benefit to agriculture. Bats have been cited in many researches as key agents of pest control by consuming certain insects which reduce farm productivity. Justified by this, this indicator is appropriate for this analysis.
Pollination	Crop pollination	This dataset represent the actual use of pollination as an ecosystem service.	Amount (kg) of crop per pixel attributable to the role of pollinators	Maes, J. (2010) [129]		2012	Raster	Positively related to ES	The dataset does not only capture supply but also demand hence adequately depicting the actual flow of ES. Pollination is a key ecosystem service as fruits and vegetables are partially dependent on pollinators to produce food.

Natural hazard regulation	Flood Control (Actual Flow)	This dataset represents the potential of ecosystems to regulate water flows as well as socio-economic demand for protection against river floods.	Dimensionless	Vallecillo (2019) [130]	Ecosystems such as forests, shrubland, grasslands and wetlands control runoff by retaining water in the soil and aquifers, and reducing speed of water flow. This results in reducing rapid downstream runoff of surface water, lowering peak runoff, and flood losses and damages to man.	2012	Raster	Positively related to ES as the higher the capacity of an ecosystem to control flooding, the greater its benefit of hazard regulation
Maintenance of genetic diversity	Richness of forest-related species and habitats	This dataset is composed of Forest Non-bird species, Forest bird species and Forest habitats which are used for identification of High Nature Value Forest areas.	Dimensionless	European Environment Agency	High Nature Value areas provide an important abode and habitat for the survival of forest species. The presence of such habitats provides an environment for maintaining genetic diversity hence an important proxy indicator for the analysis.	2007 to 2012	Raster	Positively related to ES
Habitat creation and maintenance	Habitat quality index	Habitat quality indicator is based on modelled species distribution of common birds derived from EBCC Atlas of European Breeding Birds. The indicator expresses the relative species richness of common birds as a ratio between local and regional species richness.	Dimensionless	Maes, J. (2010) [131]	Vallecillo et al. (2016) [132] have argued that Habitat Quality Index is a reliable proxy for the provision and maintenance of reproductive habitats for terrestrial species as regulatory ecosystem services.	2010	Raster	Positively related to ES
Formation, protection and decontamination of soils and sediments	Heavy metals in soil	The dataset represents amount of concentration of heavy metals such as Lead, copper, Mercury among others	mg/kg	Toth et al. (2016) [133]	Presence of Heavy metals in soil indicates contamination. Plants and animals play a key role in remediation of soil contamination. Higher amount of Heavy metals implies lower benefits of soil decontamination	2016	Raster	Negatively related to ES
Formation, protection and decontamination of soils and sediments	Earthworm abundance and richness	This dataset was developed from maps of Earthworm richness and abundance data and was used to estimate the earthworm factor.	Dimensionless	Orgiazzi and Panagos (2018) [134]	Earthworms play a key role in soil decomposition and soil formation.	2016	Raster	Positively related to ES

	Spiritual and religious values	Place of worship and wayside shrine	This dataset represent areas of religious value and places that have been designated for worship hence service flow from landscape	Presence of place of worship	Open Street Map (OSM)	The dataset adequately captures the spatial dimension of people's religion and can be aggregated to provide a good estimate of level of concentration of worship places.	2020	Point vector	Positively related to ES
	Aesthetic values	Natura 2000 sites	This dataset indicates the location of Natura 2000 sites which are main breeding and resting areas for rare and threatened species, and some protected rare natural habitat.	Presence of Natura 2000 sites	European Environment Agency	Scientific consensus exist for this indicator coupled with a reliable dataset backed by policy at the EU level for its maintenance hence appropriate for the analysis	2019	Polygon vector	Positively related to ES as higher number of Natura 2000 sites means greater flow of aesthetic value.
	Recreation	Recreation Opportunity Spectrum	This dataset captures both degree of potential opportunities offered by nature and means of access.	Dimensionless	Maes, J. (2010) [135]	The dataset was used because it captured both the benefit of nature and level of ease in accessing it which is very important for ES to flow to people.	2010	Raster	Positively related
	Spiritual and religious values	Place of worship and wayside shrine	This dataset represents areas of religious value and places that have been designated for worship hence service flow from landscape	Presence of place of worship	Open Street Map (OSM)	The dataset adequately captures the spatial dimension of people's religion and can be aggregated to provide a good estimate of level of concentration of worship places.	2020	Point vector	Positively related to ES
Social and cultural	Ecotourism	Camping sites, picnic sites, playground, theme park, archaeological sites	The dataset maps areas that people have frequented and toured for relaxation, sightseeing and leisure.	Presence of various sites of ecotourism	Open Street Map (OSM)	This indicator has received support from literature and assessment exercises. The dataset captures the spatial dimension of ecotourism and provided room for evaluating the amount by estimating its density during pre-processing analysis.	2020	Point vector	Positively rated to ES
	Learning, inspiration, education and Knowledge	ZNIEFF	This dataset identifies areas of strong biological capacities and a good state of conservation.	Presence of ZNIEFF	https://www.data.gouv.fr/en/datasets/inpn-donnees-du-programme-znieff/ , accessed on 15 January 2021	ZNIEFF plays a central role in nature protection policy and is required for regional planning projects which also forms the focus of this analysis. The indicator and dataset is appropriate and provides reliable information.	2015	Polygon vector	ositively related to ES

Physical and psychological experiences	UNESCO world heritage sites	The dataset identifies sites categorize as cultural, natural and mixed heritage sites.	Presence of heritage site	UNESCO	The benefit of visiting heritage sites goes beyond sight-seeing to include physical and psychological experiences gained (Ulrich, 1979) [136]. The UNESCO heritage dataset captures the spatial dimension of such services and create the possibility of assessing their densities as a surrogate of magnitude of ES hence an appropriate proxy for the analysis.	2017	Point vector	Positively rated to ES
Supporting identities	Cheese producing areas, wine producing regions	This dataset illustrates cheese producing and non- producing areas in France as well as vineyards for wine production.	Presence of cheese and wine production	Data.gov.fr	Cheese export is associated with local culture and wine production serve as regional trademark and a taste of place. With scientific evidence in support of this indicator and available dataset, their inclusion in the analysis is appropriate.	2020	Polygon vector	Positively rated to ES
Stability of land use and land cover	Soil suitability to provide a platform for most human activities	This dataset illustrates the ability of soil to support human activities based on variables such as soil type, soil water regime, limitation to agricultural use, depth to rock, land use and the terrain.	Dimensionless	Toth and Hermann (2015) [137]	Land and soil for that matter remains the fundamental space within which all productive activities occur. Hence, there is a direct relation between soil suitability to provide platform and stability of land use making it a good proxy for analysis	2015	Raster	Positively rated to ES
Sense of Place and attachment	National nature reserves, Regional Nature reserves, nature parks, regional nature parks, biosphere reserves	This dataset identifies various national and regional parks, and reserves	Presence of parks and reserves	INPN—Donnees du programme 'Espaces Proteges'-data.gov.fr	This indicator represent places where there exist a sense of attachment to the environment hence deliberate effort to put them under protection. The indicator has been assessed as important in EFES exercise and reliable dataset exist for it to be included in this assessment.	2015	Polygon vector	Positively rated to ES