Ecosystem Service	**Recreation through activities in nature**
CICES class name	Characteristics of living systems that enable activities promoting health, recuperation or enjoyment through active or immersive interactions
CICES Section	Cultural (Biotic)
CICES Class code	3.1.1.1

Brief Description

- Using the environment for sport and recreation; using nature to help stay fit
- The biophysical characteristics or qualities of ecosystems or species that humans engage with, in ways that require physical and cognitive effort

Sample Indicators

Indicator values from			
Experiment or direct measurement		Survey	
Expert assessment		Statistical- or census data	
Model or GIS		Literature values	
Stakeholder participation		Not provided	

Table 1: Field Scale

Indicator	**Unit**	**Indicator values from**
[13] Capacity for nature-based recreation: The indicator is based on the vicinity of water, land relief, accessibility from urban areas, presence of HNV farmland and variation in land cover.	-	
[23] Abundance of birds with hunting value	Not provided	
[23] Ant species richness as the predictor of the abundance of birds, including those with hunting value.	Not provided	

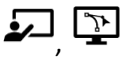
[25] Recreational hunting. Values are based on the following indicators: - Site quality: habitat suitability for prey [low, medium, high] - Site opportunity: population within 1.5 ha travel distance, scaled to [0 -1] - Complementary inputs: availability of campsites in the area [0 -1] - Scarcity: Existence of alternative sites with same quality within the same travel distance [0 -1] - Reliability: Risk of future service loss through urban development within a 3-mile radius [0 -1]	Not provided	

Table 2: Farm Scale

Indicator	Unit	Indicator values from
[30] Recreation opportunities: Indicator calculated by a formula derived from survey and expert assessment. Up to five attributes were considered: singular natural resources, scenic beauty, accessibility, tourism attraction capacity, and tourism use aptitude. Results were corrected by carrying capacity of land use types, considering factors such as flora and fauna factor, perimeter area ratio and slope factor.	persons * ha^{-1}	

Table 2: Regional Scale

Indicator	Unit	Indicator values from
[4] Tourism: Ratio of tourism income to GDP	%	
[7] Potential number of visitors calculated from population statistics and assuming travel distance of 80 km for daily trips and 8 km for short trips	#	
[7] Actual number of visits from surveys or statistics	#	
[24] Density of rural tourism establishments. Values were normalized [0-1] using benchmark values where available and observed values otherwise.	# * km^{-2} Y	
[26] Number of visitors	# * yr^{-1}	
[14] Zone of visual influence: share of the site that is visible by different user groups (pedestrians, cyclists, small vehicle users, train users) due to the layout of footpaths, roads and rail-networks	%	
[14] Visual quality index (VQI), based on 19 parameters (terrain ruggedness, presence of: waterfalls, wells and springs, area of standing water, length of flowing water, presence of the	Index 0-1	

coast, habitat richness, area of woodland, presence of single large trees, number of plant species, hedgerow length, number of vegetation colours, area of human-influenced land, number of spot utilities/quarries, building area, road length, dry-stone walls length, presence of scheduled ancient monuments, presence of designated historic parks or gardens, presence of listed buildings)		
[29] Forest recreation: share of land that is forested	%	
[5] Area of natural or semi-natural habitats not affected by roadside noise louder than 55dB(A)	m^2	
[5] Area of natural or semi-natural habitats not affected by roadside noise louder than 55dB(A) and accessible from the nearest city within a given time constraint	m^2	
[15] (Designated) recreational trails	km	
[26] Area covered by recreational landscape	ha	
[6] Total number of recreational areas	#	
[9] Recreation & ecotourism potential, calculated based on: *Distance to singular natural resources (e.g., diverse forests, presence of water bodies) [0 -100] *Scenic beauty (viewsheds) [0-100] *Accessibility (gaussian distance to roads) [km] *Tourism attraction capacity (distance to natural attractions concentration [1-100], variety of natural attractions [1-100], distance to tourism services [km]) *Tourism use aptitude [1-100] (based on land cover) Selection and weighing of factors based on expert assessment	Index 0 - 100	
[9] Recreation & ecotourism opportunities, calculated as: (Recreation & ecotourism potential /100) * ((physical carrying capacity of an area) * (erodibility of the area) * (correction factor for account for fauna) * (perimeter/area ratio))	persons * ha^{-1}	
[1] Recreational potential: calculated by a composite model that considers the degree of naturalness, nature protection, and presence of water.	Index 0–1	
[8] Recreation potential: continuous index, based on presence of certain ecosystems (i.e., forest, coastline), certain ecosystem characteristics (i.e., naturalness) and their accessibility	-	
[12] Recreational potential, calculated as the sum of scores for density of public rights of way (footpaths, bridleways), the cultural heritage value of land use and proximity of similar alternative sites, each (1-5), multiplied by the score for the population living within 3 km travel distance of any part of the site (1-5)	-	
[17] Recreation & aesthetic values: values are assigned to different land cover classes. The matrix by Burkhard et al., 2012 (DOI: 10.1016/j.ecolind.2011.06.019) was adapted the and used in this study.	Index 0-5	

[16] Recreational surface per capita, calculated as recreational areas (forests, abandoned land, water courses and grassland areas) within a distance of 5 km to settlements divided by the number of residents	ha * capita^{-1}	
[19] Recreational potential: the following indicators were normalized, and the average was calculated: - Degree of naturalness: hemeroby index based on the land cover type [1 (natural/ without actual human impact) - 7 (artificial)] - Protected areas: occurrence of protected areas [not provided] - Attractiveness of water bodies: Distance to the nearest stagnant surface water body or water courses of the first or second order	Not provided	
[22] Recreation potential: (modelled utility value of recreational nature areas (considering both quality of the area and distance to a person) divided by population density)	[0-1]	
[27] Recreation: expert-based index for ecosystem service supply by land cover class [1-5] multiplied by the area of the land cover class [km^2]	Index 1-5 * km^{-2}	
[27] Recreation value: expert-based index for ecosystem service supply by land cover class [1-5] multiplied by the area of the land cover class [km^2] and a literature-based monetary value of the ecosystem service	$ * ha^{-1} * yr^{-1}	
[11] Spatial mapping by stakeholders: stakeholders could place green stickers on a map to mark the supply hotspots of this ecosystem service. Red stickers were used to mark locations where the supply of this service is declining. Two different sizes of stickers were used to represent a radius of 0.75 km or 1 km, respectively.	Index 0-5	
[32] Index based on: -naturalness (based on Corine Landcover Class), -level of conservation (based on presence of protected areas) - accessibility to human population (based on distance from areas with high population density)	-	
[18] Roadside variation: number of "land use patches" intersected by or adjacent to all roads and paths, except motorways and railways, divided by total road length. Values were scaled [0-1]	km^{-1}	
[18] Accessibility: Share of the land surface within 100 meters from a road. Values were scaled [0-1]	%	
[31] (Water activities): Turnover from tourism	$ * ha^{-1}	
[31] (Water activities): Status of fish population	ka * ha^{-1}	
[31] (Water activities): Status of fish population	[species and age structure]	
[31] (Water activities): Median water clarity as a measure of swimming suitability	m	

[31] (Water activities): Number of sites with excellent bathing quality	#	⊘
[31] (Water activities): Number of visitors or facilities (e.g., hotels or restaurants	#	⊘
[33] Number of visitors arrivals	#	
[33] Number of domestic visitors arrivals	#	
[33] Number of foreign visitors arrivals	#	
[33] Number of active enterprises in the area	#	
[33] Number of active enterprises in agriculture (crop production, support activities to agriculture)	#	
[33] Number of active enterprises in accommodation and food services activities	#	
[33] Number of farms with other gainful activities (agritourism, recreational and social activities)	#	
[33] Number accommodation establishments	#	
[33] Number of hotels and similar establishments	#	
[33] Number of holiday- and other short-stay accommodations, camping grounds, recreational vehicle parks and trailer parks	#	
[34] For services that can be monetized: value of cultural services	USD / km^2 * year)	⊘
[34] For services that can not be monetized: qualitative value assessment using Likert-scales	-	⊘
[35] Visibility of creeks from cycle paths	n/a	⊘

Table 4: National Scale

Indicator	Unit	Indicator values from
[2] Number of visits per year	# * area^{-1} * yr^{-1}	
[2] Valuation: Number of visits per year multiplied by value indicator. The value indicator depends on the habitat mix for that location	$ * area^{-1} * yr^{-1}	
[3] Number of "day leisure visits" (any round trip of less than one day in duration made from home or a holiday destination for leisure purposes)	# * grid cell^{-1}	
[7] Potential number of visitors calculated from population statistics and assuming travel distance of 80 km for daily trips and 8 km for short trips	#	
[7] Actual number of visits from surveys or statistics	#	
[10] Number of visitors per year	#	

[21] Number of visitors in agricultural areas	Not specified	⊘
[21] Number of rural enterprises offering tourism-related services	Not specified	⊘
[21] Number of hunting licences	Not specified	⊘
[20] Modelled probability of visitation by recreationists/tourists (0-1), based on land cover class, mean elevation, distance from nearest major road, path density, county and population.	-	
[21] Farm tourism	Not specified	⊘
[21] Walking and biking trails	Not specified	⊘

Table 5: Multinational Scale

Indicator	Unit	Indicator values from
[8] Recreation potential: continuous index, based on presence of certain ecosystems (i.e., forest, coastline), certain ecosystem characteristics (i.e., naturalness) and their accessibility	-	

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