

<b>Ecosystem Service</b>	Biotic remediation of waste
CICES class name	Bio-remediation by micro-organisms, algae, plants, and animals
<b>CICES Section</b>	Regulation & Maintenance (Biotic)
<b>CICES Class code</b>	2.1.1.1

# **Sample Indicators**

Indicator values from			
Experiment or direct measurement	\$	Survey	
Expert assessment	<u>.</u>	Statistical- or census data	á
Model or GIS	Ţ	Literature values	
Stakeholder participation	<b>#</b>	Not provided	$\Diamond$

Table 1: Field Scale

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Indicator	Unit	Indicator values from
<sup>[2]</sup> Organic waste used	kg * m <sup>-2</sup> * yr <sup>-1</sup>	<u>\$</u>
[1] Natural attenuation/ clean groundwater:		
Indicator value calculated as:		
$\begin{aligned} & \sum  \log(\frac{i}{i_{max}})  \\ & = \frac{\sum  \log(\frac{i}{i_{max}}) }{n} \end{aligned}$ With: I – Indicator value, i – variable i measured, i <sub>max</sub> – maximum ecologic potential of variable i in benchmark reference, n – number of variables.		
Where performance is considered better than in the benchmark and deviation, therefore, has a positive effect, $ \log(\frac{i}{i}) $ is subtracted from the sum instead of added. For	-	<b>\$</b> , <b>Q</b>
this ES, variables were:		
-Soil organic matter [% dw]		
-Bacterial biomass [mg C *(g dw) <sup>-1</sup> ]		
-pH in KCl		
-Physiological diversity bacteria [bBiolog. CLPP: Hill's slope] -Water suluble P (Pw) [mg * I <sup>-1</sup> ] and extractable P (PAL) [mg * kg <sup>-1</sup> ]		



## Impact Area & Indicator Factsheet: Ecosystem Services

Table 2: Farm Scale

Indicator	Unit	Indicator values from
[3] Share of nitrogen retained during water passage between agricultural sub-catchment and sea. Values were scaled [0-1]	%	<u>T</u>
[3] Share of farmers that express clearly a value and care for the health of the land. Values were scaled [0-1]	%	<u> </u>

Table 3: Regional Scale		
Indicator	Unit	Indicator values from
[6] Nitrate leaching	kg * ha <sup>-1</sup> * yr <sup>-1</sup>	<u> </u>
[5] Risk of nitrate leaching: exchange frequency of the soil water in the root layer. Infiltration rate divided by field capacity	%	Ī
[3] Share of nitrogen retained during water passage between agricultural sub-catchment and sea. Values were scaled [0-1]	%	<u> </u>
[3] Share of farmers that express clearly a value and care for the health of the land. Values were scaled to [0-1]	%	<u> </u>
[4] Nutrient regulation: assigned values depend on the land cover class. The matrix defined by Burkhard et al., 2012 (DOI:10.1016/j.ecolind.2011.06.019) was adapted and used in this study.	Index 0 - 5	Ţ
<sup>[7]</sup> Share of riparian forest cover in 25 m buffer along rivers. Values were normalized [0-1] using benchmark values where available and observed values otherwise.	%	0
<sup>[7]</sup> Share of natural forest cover in municipality's surface. Values were normalized [0-1] using benchmark values where available and observed values otherwise.	%	0
[8] Water purification and provision, calculated as:		
$W = NPP * (1 - VCNPP) * IC_s * S_{cf}$		
With: W – water purification and provision, NPP – Net Primary Production calculated from NDVI-values and expressed on a relative scale set to $[0-1000]$ , VCNPP – coefficient of variation of NPP $[0-1]$ , $IC_s$ – soil infiltration capacity $[0-1]$ , $S_{cf}$ – slope average correction factor of the study area $[0-1]$	n/a	<u>*</u>
Waste purification, calculated as: $W = NPP * (1 - VCNPP) * I_w * O_w * 1.75$	n/a	Ī



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With: NPP – Net Primary Production calculated from NDVI-	
values and expressed on a relative scale set to [0 – 1000],	
VCNPP – coefficient of variation of NPP $[0-1]$ , $I_w$ – water	
input to the system (calculated as rainfall * (1-runoff	
coefficient) and scaled to a range of $[0-1]$ ), $O_w$ – water	
bodies occupancy percentage and flat floodplain area $[0-1]$	

#### Table 4: National Scale

Indicator	Unit	Indicator values from
[9] "Recycling capacity" of external nutrients: Amount of phosphorus in pig manure that can be spread on tillage soils and P deficient grassland soils.	t P * yr <sup>-1</sup>	<u>~</u>

#### Table 5: Multinational Scale

Indicator	Unit	Indicator values from
[10] Nutrient regulation: Values were assigned to Corine land cover classes, based on values published by Burkhard et al. (2009; DOI: 10.3097/LO.200915) and modified for the context of riparian zones.	Index 0 - 1	<u>.</u>



## **References**

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