

### 10.3.1 Abundance of ecotones/Shannon diversity

**Project Name:** PHUSICOS (Grant Agreement no. 776681)

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Abundance of Ecotones/Shannon Diversity	Biodiversity
<b>Description and justification</b>	The indicators assess the landscape connectivity and the mosaic diversity.
<b>Definition</b>	Biodiversity is one of the primary interests of ecologists; nevertheless, quantifying the species diversity of ecological communities is complicated. The Shannon Diversity index (Barnes et al. 1998) was developed from information theory and is based on measuring uncertainty. The degree of uncertainty of predicting the species of a random sample is related to the diversity of a community. If a community has low diversity (dominated by one species), the uncertainty of prediction is low; a randomly sampled species is most likely going to be the dominant species. However, if diversity is high, uncertainty is high.
<b>Strengths and weaknesses</b>	The index inclusion of both components of biodiversity can be seen as both a strength and a weakness. It is a strength because it provides a simple, synthetic summary. On the other hand, it may be viewed as a weakness because it makes it difficult to compare communities that differ greatly in richness. Data used for biodiversity richness indicators can be used for the estimation of Shannon Index.
<b>Measurement procedure and tool</b>	The Shannon diversity index $H'$ is calculated as: $H' = \sum_i p_i \cdot \ln(p_i)$ where $p_i$ is the proportion of individuals found in species $i$  For a well-sampled community, we can estimate the proportion as: $p_i = \frac{n_i}{N}$ where $n_i$ is the number of individuals in species $i$ and $N$ is the total number of individuals in the community.

	The Shannon index increases as both the richness and the evenness of the community increase.
<b>Scale of measurement</b>	Dimensionless Typical values are generally between 1.5 and 3.5 in most ecological studies, and the index is rarely greater than 4.
<b>Data source</b>	
<b>Required data</b>	Number of individuals of different species in the study area
<b>Data input type</b>	Quantitative
<b>Data collection frequency</b>	Annually
<b>Level of expertise required</b>	High
<b>Synergies with other indicators</b>	Related to indicators estimating the richness of a certain species (e.g., species richness indicator, bird richness indicator).
<b>Connection with SDGs</b>	3; 15
<b>Opportunities for participatory data collection</b>	Local stakeholders can be involved in the individuals survey
<b>Additional information</b>	
<b>References</b>	Barnes, B. V., Zak, D. R., Denton, S., Spurr, S. (1998), <i>Forest ecology</i> . John Wiley and Sons, INC. Magurran, A.E. (2004), <i>Measuring Biological Diversity</i> . Blackwell

## 10.4 Length of ecotones

**Project Name:** CONNECTING Nature (Grant Agreement no. 730222)

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Length of ecotones	Biodiversity
<b>Description and justification</b>	Measurement of the length of ecotones can be a proxy for quantifying the extent of transition habitats. This can represent an important aspect of habitat characterisation and quality that is often overlooked.
<b>Definition</b>	Ecotones are transition areas dividing ecological communities or ecosystems. They occur in both terrestrial