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BioBio indicator factsheet

Patch Size (PatchS)

Refers to Chapter 5 'Habitat indicators' of the Guidebook 'Biodiversity Indicators for European Farming Systems'

Patch Size (PatchS)

Description

Average size of habitat patches on a farm. The **unit** of measurement is hectares. **Sub-indicators** can be generated such as the 'Patch Size of Cultivated Forage and Food Crops' as compared to the 'Patch Size of Extensively Managed and 'Semi-natural Habitats'. Further sub-indicators can also be calculated.

Surveyor skills

The indicator is based on habitat mapping, which requires basic GIS, ecological and botanical skills.

Data collection method

The habitat mapping method is described in [Deliverable 2.2¹](#).

Calculation method

PatchS is obtained by dividing the size of the farm by the number of habitat patches:

$$PatchS = \frac{UAA}{N}$$

In which *PatchS* is Patch Size, *UAA* the farm size (Utilized Agricultural Area in hectares) and *N* the number of habitat patches on the farm.

Area per patch can also be easily obtained from digital maps, and summarized as average patch size per habitat type or for any desired group of habitat types.

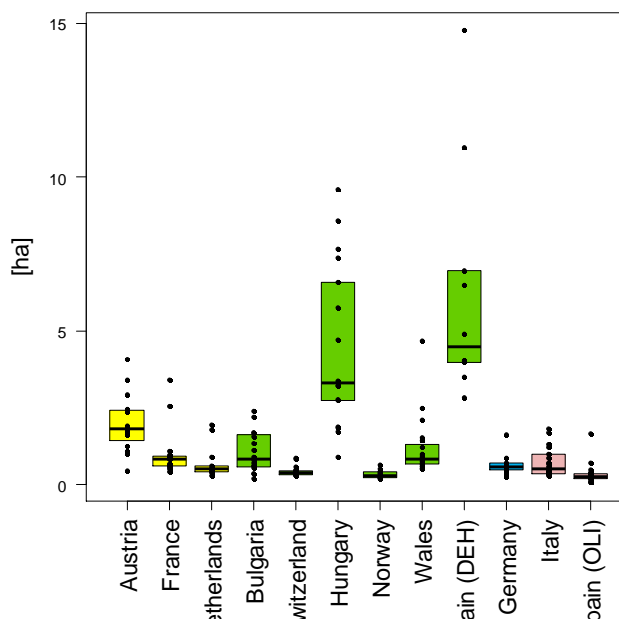
Results from BioBio case studies

The graph shows the mean values and their distribution across the 12 BioBio case study regions. The largest average Patch Size was observed in the Spanish Dehesas and in the grasslands of Hungary. Low values occurred in the Norwegian and the Swiss grassland case studies and on the olive farms in Spain. In all case study regions, there is a reasonable spread of values between farms.

The sub-indicators 'Patch Size of Intensively Cultivated Forage and Food Crops' and 'Patch Size of Extensive Agricultural and Semi-natural Habitats' yield more differentiated information (see the graphs below). In many situations extensive agricultural and semi-natural habitats were smaller. In the arable case study regions in particular (Austria, Germany, France), the average size of arable fields was significantly higher than fields of extensive agriculture and semi-natural habitats (and the mean value for the indicator as a whole). Large extensively managed patches, which may be particularly valuable for farm wildlife, were observed in the Spanish Dehesa farms and in the grassland farms in Hungary, Bulgaria, Switzerland and Wales.



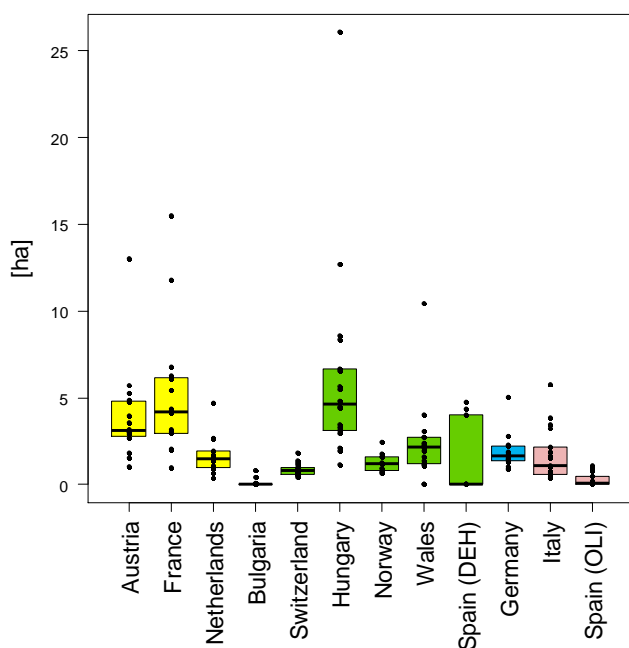
A single farm may own fields in a range of sizes, illustrated here with examples from the Norwegian case study. Photos: H. Timmermann, NFLI



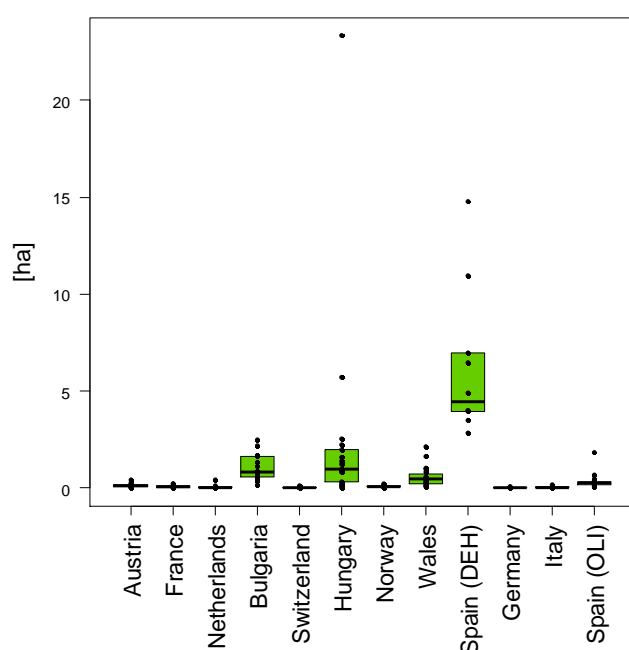
Distribution of indicator 'Patch Size'.

Each point displays the indicator value of a farm. Farms are grouped in the respective case studies. Yellow: field crops & horticulture in Austria, France and the Netherlands, green: specialist grazing livestock in Bulgaria, Switzerland, Hungary, Norway, Wales and Dehesa in Spain, blue: mixed crops & livestock in Germany, pink: permanent crops in Italy and Olives in Spain. The colored box contains the values of 50 % of the farms of a case study. The line marks the median.

¹ Dennis P. et al. 2012. *Biodiversity in organic and low-input farming systems* ALTErrA Report 2308.



'Patch Size of Intensively Cultivated Forage and Food Crops'. See the legend for 'Patch size' for the explanation of the graph.



'Patch Size of Extensive Agricultural and Semi-natural Habitats'. See the legend for 'Patch size' for the explanation of the graph.



Arable landscape in Germany, the semi-natural elements are largely removed to increase field size and farming efficiency. Photo: Sebastian Wolfrum, TUM

Estimated effort and costs (labour effort required, analysis)

The indicator measurement requires habitat mapping and subsequent GIS analysis. Medium effort.

Patch Size change as an indicator

An increase in indicator value (change in state) particularly for the sub-indicator 'Patch Size of Intensively Cultivated Forage and Food Crops' may indicate an increase in field size, which is often a goal in arable farming systems to improve the efficiency of agricultural management. This type of change is often associated with the removal of small semi-natural lines and patches such as field edges, small grassy strips, etc.

Interpretation

Patch Size and its sub-indicators complement the indicators 'Habitat Richness' and 'Habitat Diversity', which solely relate to the number of habitat types and the relative share of their distribution at farm level. PatchS additionally yields information about the actual (average) size of patches in hectares, which is an important value in relation to the ecological interpretation of the indicators.

None of these indicators allows conclusions on the quality of habitats in terms of promoting species diversity. Similar values can be reached by either intensively managed fields or semi-natural habitats. It is also important to be aware that e.g. loss of small semi-natural habitats may lead to an apparent increase in the average size of remaining patches. The indicator needs therefore to be interpreted in the light of other indicator results (e.g. SemiNat.; the share of Semi-Natural Habitat on the farm).

Strengths and weaknesses

Habitat mapping requires fieldwork, but the indicator is easily computed once the habitat map is available. Indicator values depend strongly on the definition of habitats and on the habitat mapping method (thematic and spatial resolution), so comparisons between farms/countries require standardization (as in BioBio). Sub-indicators are needed to separately evaluate intensively farmed and extensively farmed (and semi-natural) habitats. Other indicators should also be examined when interpreting changes in indicator values.

This factsheet is part of the Guidelines **Biodiversity Indicators for European Farming Systems**.

More detailed information on the set of indicators developed in the EU FP7 research project BIOBIO (Biodiversity indicators for organic and low input farming systems, KBBE-227161) is given in a printed report, published as ART Publication Series Nr. 17. The report can be downloaded from the [BioBio website](http://www.bioagro.admin.ch).

Printed versions can be ordered at www.agroscope.admin.ch or at Agroscope, Reckenholzstrasse 191, 8046 Zurich, Switzerland

BioBio Indicator Factsheets

Genetic diversity

Breeds:	Number and amount of different breeds
CultDiv:	Number and amount of different varieties
CropOrig:	Origin of crops

Species diversity

Plants:	Vascular plants
Bees:	Wild bees and bumblebees
Spiders:	Spiders
Earthworms:	Earthworms

Habitat diversity

HabRich:	Habitat richness
HabDiv:	Habitat diversity
PatchS:	Average size of habitat patches
LinHab:	Length of linear habitats
CropR:	Crop richness
ShrubHab:	Percentage of farmland with shrubs
TreeHab:	Tree habitats
SemiNat:	Percentage of semi-natural habitats

Indirect management indicators / parameters

EnerIn:	Total direct and indirect energy input
IntExt:	Intensification/Extensification - Expenditure on inputs
MinFert:	Area with use of mineral nitrogen fertiliser
NitroIn:	Total nitrogen input
FieldOp:	Field operations
PestUse:	Pesticide use
AvStock:	Average stocking rate
Graze:	Grazing intensity