



BioBio indicator factsheet

## Area with Use of Mineral N-Fertiliser (MinFert)

Refers to Chapter 8 'Management related indicators' of the Guidebook 'Biodiversity Indicators for European Farming Systems'

## Area with Use of Mineral N Fertiliser (MinFert)

### Description

Proportion of Utilised Agricultural Area (UAA) where mineral-based nitrogen fertiliser is applied.

**Unit of measurement:** % UAA with use of mineral N fertiliser.

It is a **pressure indicator**. The non-use of mineral-based nitrogen fertilisers is a principle of organic farming (regulations EC 834/2007, EC 889/2008). The abandonment of mineral-based fertiliser may imply enhanced application of legumes in the crop rotation and the recycling of organic material including crop residues and manure to the soil.

### Surveyor skills

Data collection and indicator calculation can be done by technical staff (farm interviews, retrieval from databases).

### Data collection method

In farm-level surveys, farmers must be interviewed based on a structured questionnaire. In regional surveys, data can be retrieved from official farm accounting databases.

### Calculation method

Record total Utilised Agricultural Area (UAA) and the area on which mineral N-fertiliser is applied.

$$\text{MinFert} = A_m / A_{\text{UAA}} \frac{A_n}{A_t}$$

where  $A_m$  is the area with mineral N-fertiliser application and  $A_{\text{UAA}}$  is the total UAA.

### Results from BioBio case studies

The figure shows a wide range of variation for BioBio case study areas. The median close to 0 (i.e. farms without any use of mineral N fertiliser) reflects case studies with organic/non-organic study design. Organic farms must refrain from the use of mineral N fertiliser. In Bulgaria, Switzerland, Dehesas and Dutch horticultural farms, the majority do not apply any mineral N fertiliser, apart from some outliers marked with dots. In the Hungarian case study, only small parts of the farm are treated with mineral N fertiliser.

### Synergies with other indicators

In conjunction with the indicator AvStock the indicator reflects nutrient inputs from synthetic fertilisers and farmyard manure, and thus the fertilisation intensity on the farm.

### Estimated effort and costs

#### (labour effort required, analysis)

The indicator is easy to record and to calculate. It can be derived from the input data for the indicator 'Nitrogen input' (NitroIn). But it can also be recorded independently of this indicator.

### Correlation with other indicators

Species diversity indicators either decreased with increasing MinFert values or no significant correlation occurred. The only positive correlation was observed for 'Wild Bees and Bumblebees' in the Dutch horticultural farms. Negative correla-

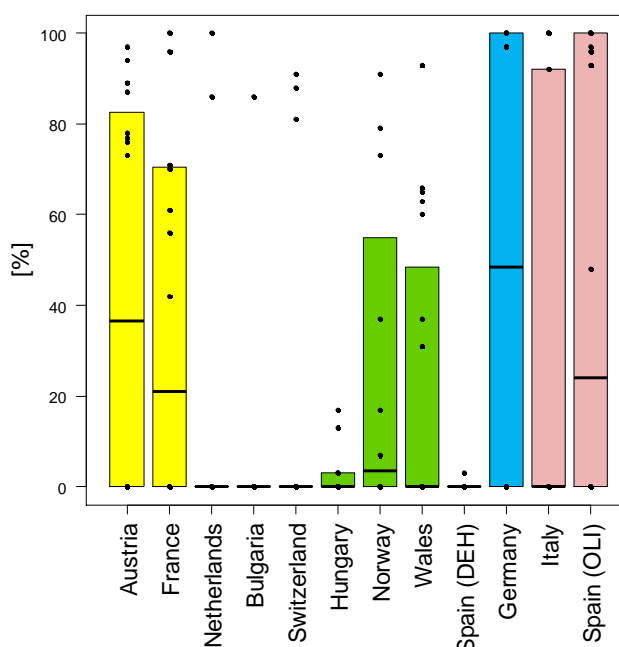
tions were observed for 'Vascular Plants' in the arable and mixed farming case studies (Austria, France, Germany) and in the Spanish olive groves and vineyards. 'Wild Bees and Bumblebees' showed a negative correlation within the French arable case study, the German mixed farming case study, and the olive groves. Spiders also were negatively correlated with the mixed farming case study, the olive groves and in the grassland farms of Norway. 'Earthworms' decreased with an increased area of mineral fertiliser use in the olive groves.

### MinFert Change as an indicator

A decrease indicates that the share of land treated with readily soluble mineral nitrogen is decreasing which can signify a trend towards extensification. This may be the consequence of conversion to organic farming where synthetic mineral N fertilisers are banned. In marginal regions, less land treated with mineral fertiliser may signal land-use change, e.g. the abandonment of agriculture, the conversion to other types of farming.

An increase in the indicator is related to more widespread use of mineral fertiliser. In e.g. developing economies, this may indicate a trend towards more intensive farming, because of easier excess to external farm inputs or triggered by attractive market prices that encourage farmers to boost production. It may also indicate other forms of intensification such as the expansion of arable land to, so far, extensively managed areas, etc.

The relationship to actual fertilisation levels is not stringent. In livestock systems with excess of farmyard manure, most farmers will refrain from the application of additional mineral nitrogen-based fertiliser. However, these farms can be very intensive with high values of total N-Input.



### 'Area with use of mineral nitrogen fertilizer' in 12 BioBio case study regions (percentage of utilized agricultural area)

*Legend: the colour of the bars signify the type of land management. Yellow: arable including horticulture; green: grassland; blue: mixed arable and grassland; pink: tree-based systems.*

**Strengths and weaknesses**

The indicator is based on two very basic input variables. In contrast to the indicator 'Nitrogen input', it does not require collection of crop management and livestock and conversion of primary data to units of nitrogen. It is, therefore, much easier to determine.

The indicator does not quantify the amount of nitrogen applied.

The relationship between reduced N fertiliser input and extensification of farm management is not stringent. It depends on the socioeconomic context in which the farms under investigation are embedded.

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](#).

Printed versions can be ordered at [www.agroscope.admin.ch](http://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 fertiliser

NitroIn: Total nitrogen input

FieldOp: Field operations

PestUse: Pesticide use

AvStock: Average stocking rate

Graze: Grazing intensity