

Pesticides in sensitive areas

Pesticides on insects in German Natura 2000 areas and consequences for protection

26 September 2022 European Parliament Brussels & online

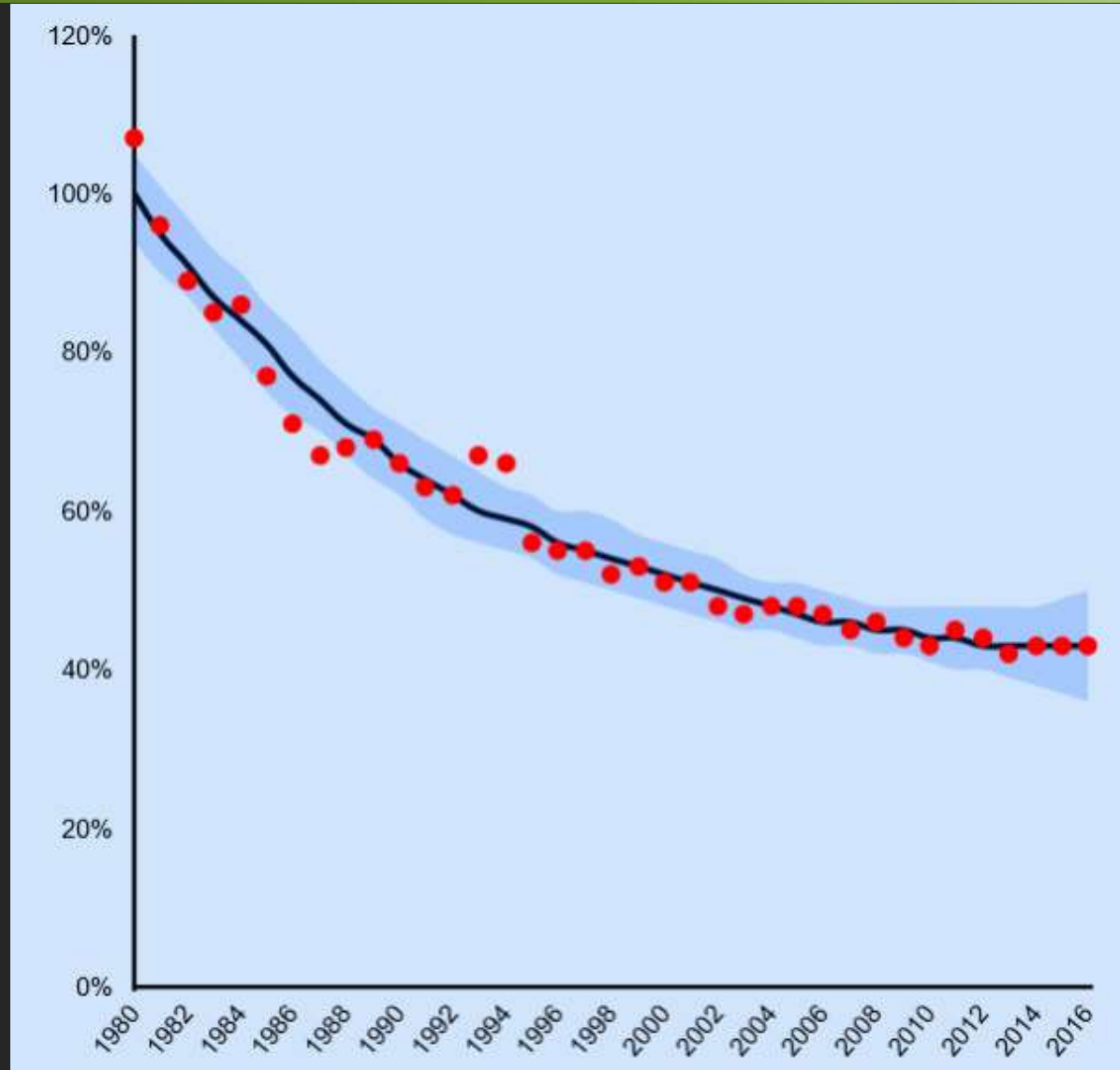


Two thirds of the agricultural land is used for the cultivation of crops.
>25% of the EU-28 area.

PESTICIDES IN THE EU

- Approx. 380.000 t active ingredients / year.
- On average > 3 kg of a.i. / ha / year.
- Ca. 500 molecules registered in > 1000 (?) products.
- Pesticides influence fundamental biological processes such as nerve conduction, photosynthesis, respiration, protein synthesis,

FARMLAND BIRDS IN EUROPE



Population trend:

Decline: 24

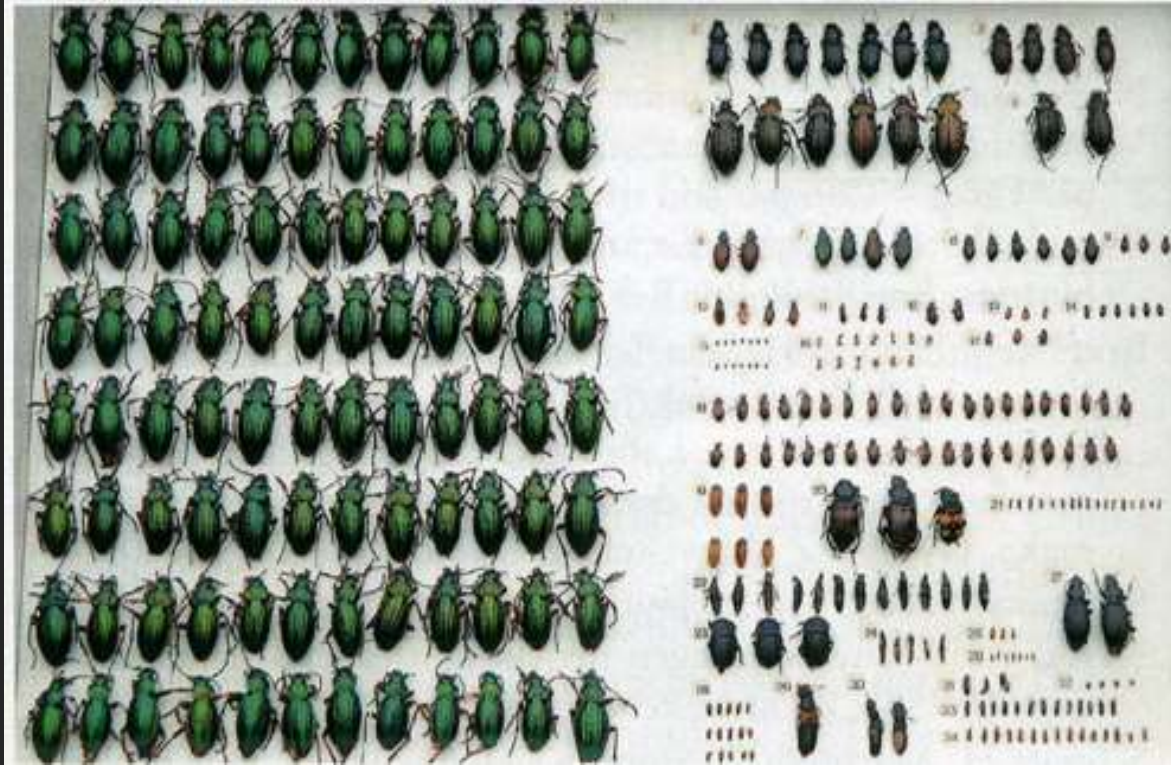
Increase: 7

Stable: 5

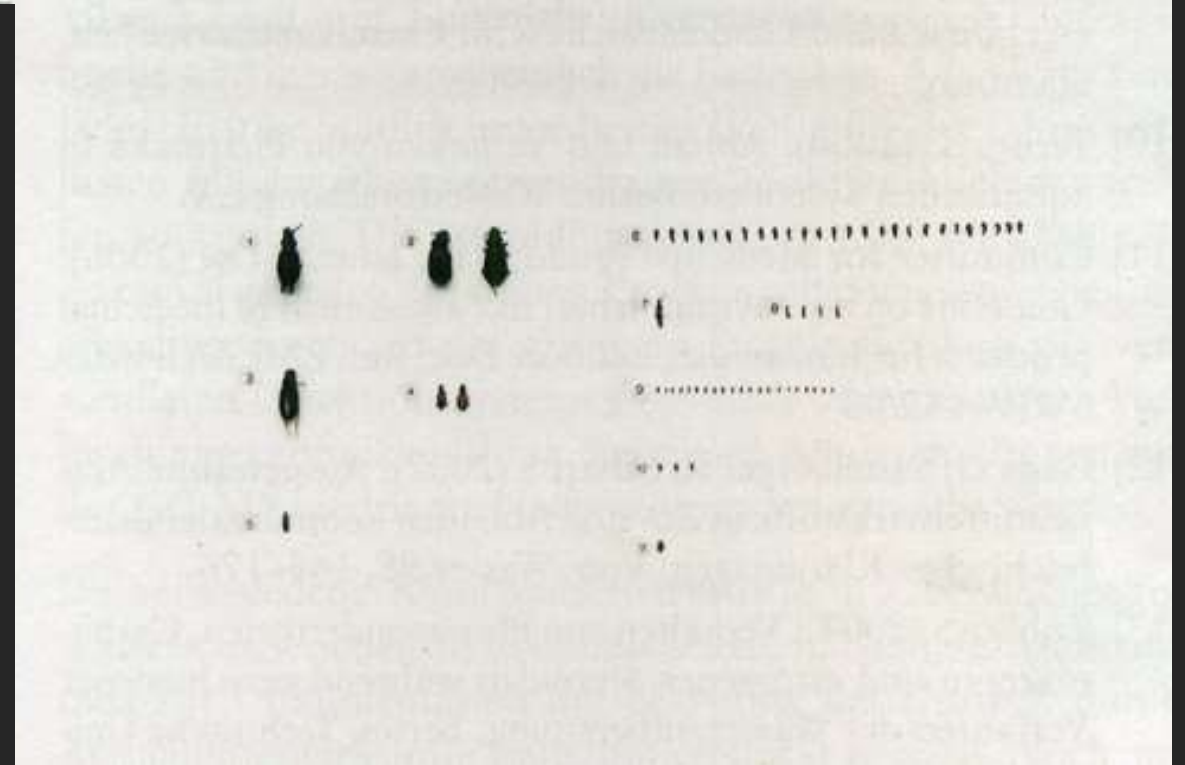
no trend: 3

European Bird Census Council (EBCC) 1980-2016 (ebbc 2016).

INSECTS



July 1951



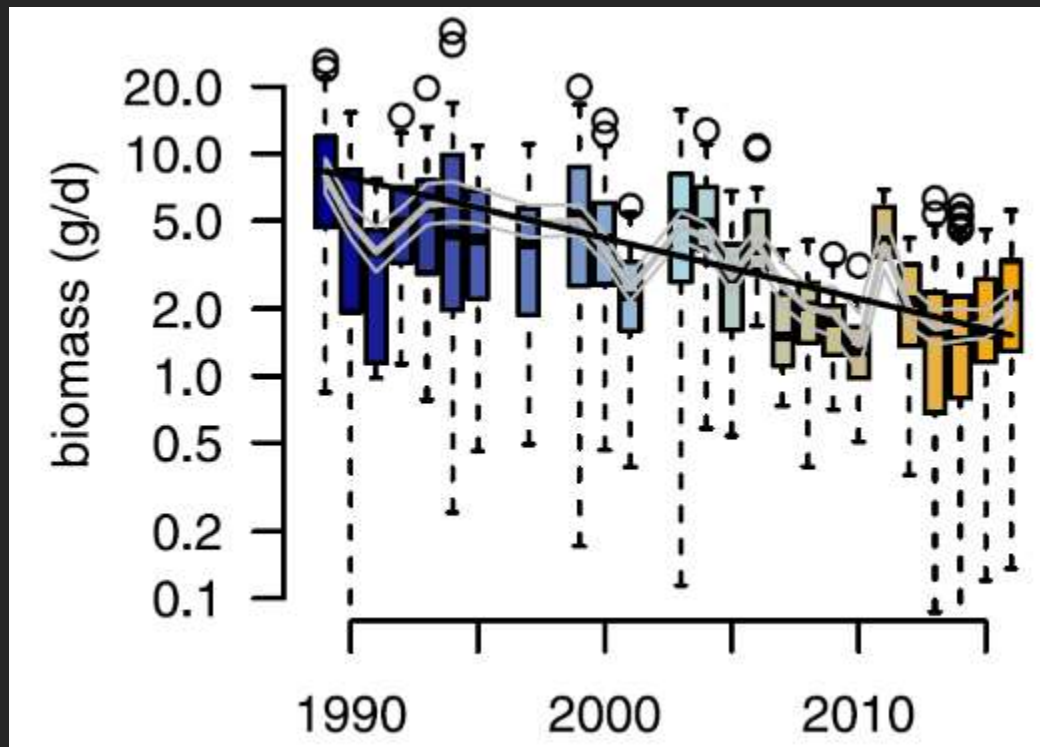
July 1981

Beetle community trapped in winter wheat close to Kiel (N-Germany). Typical species numbers and abundances of a pitfall trap left open for four weeks.

Heydemann & Meyer (1983) Auswirkungen der Intensivkultur auf die Fauna in den Agrarbiotopen. Landespflege und Landwirtschaft

INSECT BIOMASS DECLINE

Up to 82 % reduction of flying insect biomass in 27 years in conservation areas in the agricultural landscape of Germany (1989-2016).



"In light of previously suggested driving mechanisms, our analysis renders two of the prime suspects, i.e. landscape and climate change, as unlikely explanatory factors for this major decline in aerial insect biomass in the investigated protected areas."

Hallmann et al. (2017). More than 75 percent decline over 27 years in total flying insect biomass in protected areas. PloS one.

PESTICIDE APPLICATION SEQUENCES



Number of pesticides used per season in Germany (2014):

Wheat: **4** Potato: **13** Vineyards: **20** Fruit orchards: **34**

PESTICIDES IN AGRICULTURAL SOIL

Soil analysis in Czech Republic:

- 53 pesticides and 15 metabolites in wheat fields in November.
- 50% of soil samples with > 5 pesticides.

Hvězdová et al. (2018). Currently and recently used pesticides in Central European arable soils. Science of the Total Environment.

EU soil bank

- 76 pesticides detected
- 58% of samples with 116 different mixtures

Silva et al. 2019. Pesticide residues in European agricultural soils—A hidden reality unfolded. Science of the Total Environment.

PESTICIDES IN AGRICULTURAL SOIL

Soils in France:

- Conventional and organic agriculture, meadows, field margins.
- 1 insecticide, 1 herbicide & 1 fungicide in 90 % of all samples.

Pelosi et al. 2021. Residues of currently used pesticides in soils and earthworms: A silent threat? Agriculture, Ecosystems & Environment.

EU registration of pesticides with long half-lives in soil (examples):

- Fluopyram Fungicide (Bayer) 309 days
- Chlorantraniliprol Insecticide (DowDupont) 597 days
- Flutriafol Fungicide (BASF) 1358 days

„pseudo-persistent“
or
„continuously present“

OFF FIELD

Entry of pesticides in field margins, hedges, meadows, fallows and flower strips: drift and overspray.



PESTICIDE RESIDUES

- Residues in flowering plants in field margins reveal similar levels as crop plants (oil-seed rape).

Botías et al. (2015). Neonicotinoid residues in wildflowers, a potential route of chronic exposure for bees. Environmental Science & Technology.

- Residue levels are high enough to result in acute mortality in insects.

Botías et al. (2016). Contamination of wild plants near neonicotinoid seed-treated crops, and implications for non-target insects. Science of the Total Environment.

PESTICIDE RESIDUES

- Up to 34 residues of pesticides were found in a sample of pollen collected by honey bees.
- 96% of all samples contained pesticides.

Mitteilung Imkerverband RLP, Botens 2019.

An aerial photograph of a rural landscape. In the foreground, there's a grassy field with scattered bushes. To the right, a large area is covered in dense, green vineyard rows. A dirt path winds through the vineyard. In the background, there are rolling hills covered in thick, dark green forests. The sky is blue with some light clouds.

Nature Conservation Area
(Naturschutzgebiet)

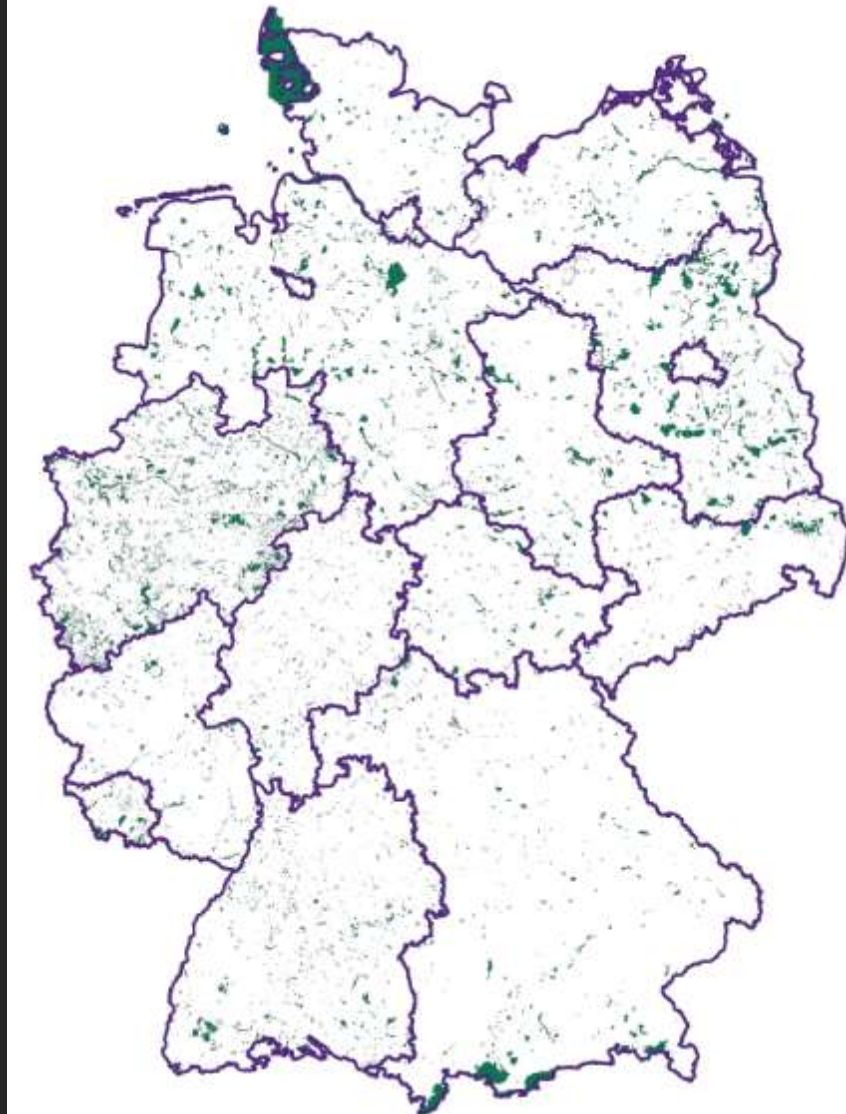


NATURE RESERVES

8836 nature reserves:

- 15,842.74 km² total
 - mean size 19.7 ha
 - protection of 440,71 km² of agricultural land
- = 0.36% of total agricultural area

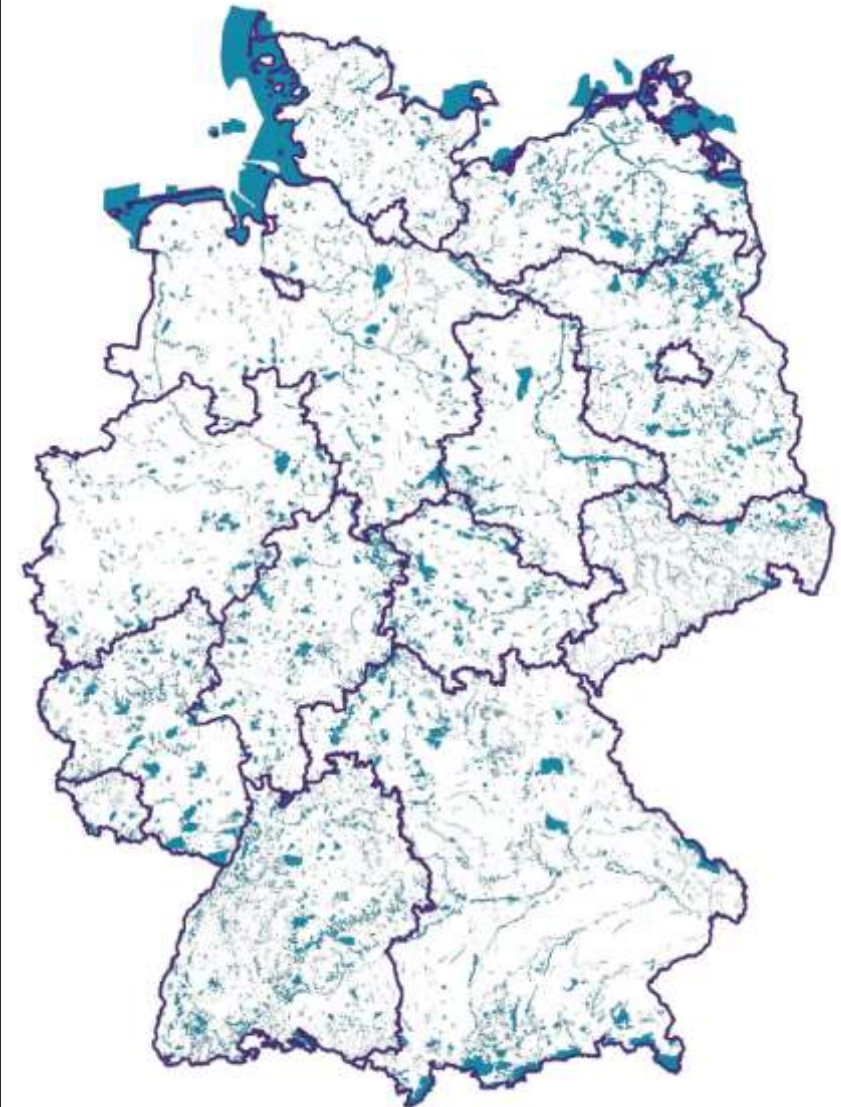
Eichler et al. 2021. Raumanalyse der ackerbaulichen Flächennutzung in Naturschutz- und FFH-Gebieten in Deutschland. Natur und Landschaft.



SPECIAL AREAS OF CONSERVATION (SAC)

4536 special areas of conservation (SAC) of the European Natura 2000 network:

- 45,034.91 km² total
- mean size 60.17 ha
- protection of 1,283.23 km² of agricultural land
= 1.04% of total agricultural area



EXPOSURE OF INSECTS

Diversity of insects in nature conservation areas (DINA)

- Conventional agriculture around nature conservation areas
- High spacial resolution

Lehmann et al. 2021. Diversity of Insects in Nature protected Areas (DINA): an interdisciplinary German research project. Biodiversity and Conservation.



PESTICIDE RESIDUES ON INSECTS

- Insects collected in Malaise traps
- 2 samples: May & August 2020
- 3 positions in conservation area
- HPLC MS/MS for 92 current use pesticides

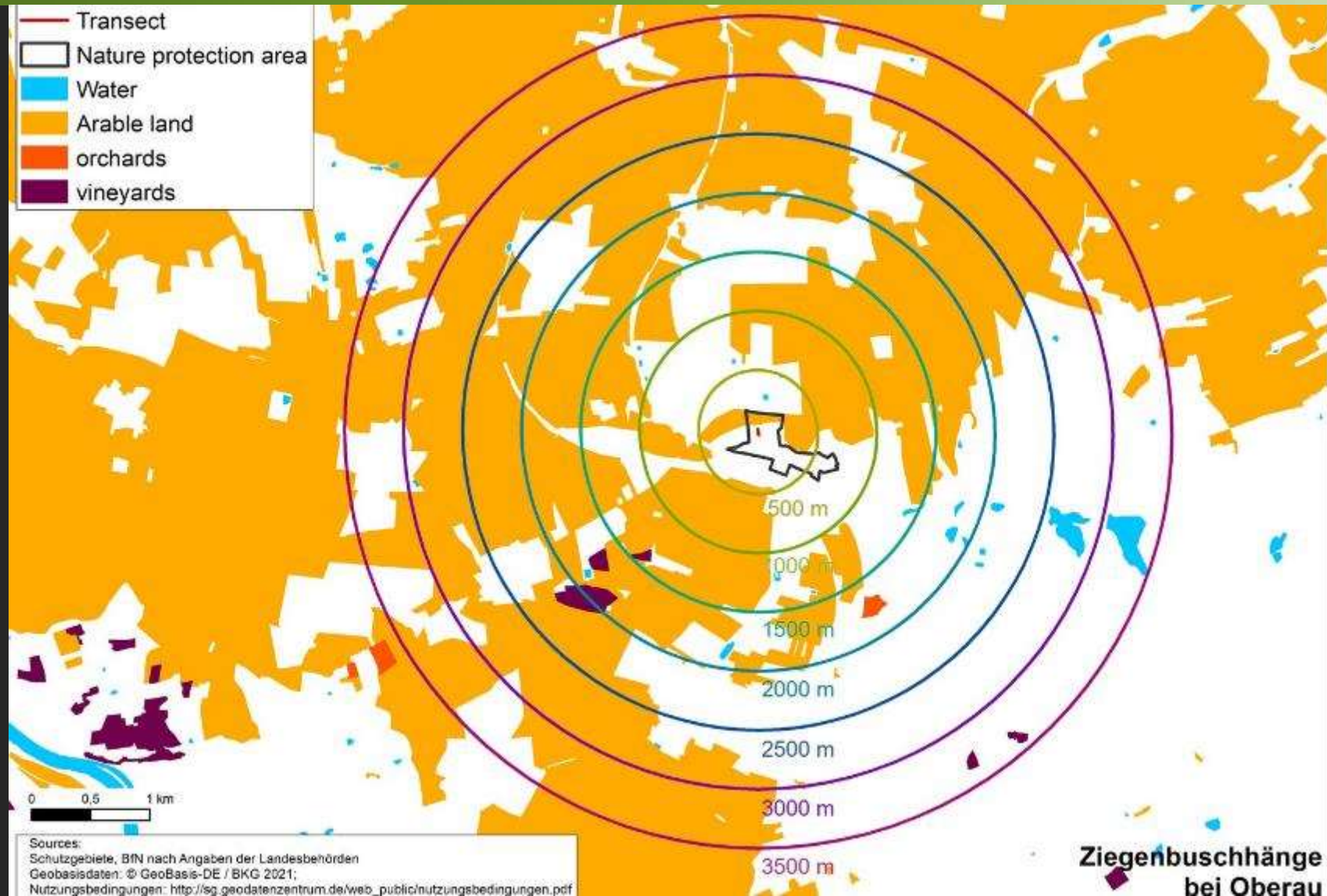
Brühl et al. 2021. Direct pesticide exposure of insects in nature conservation areas in Germany. Scientific reports.



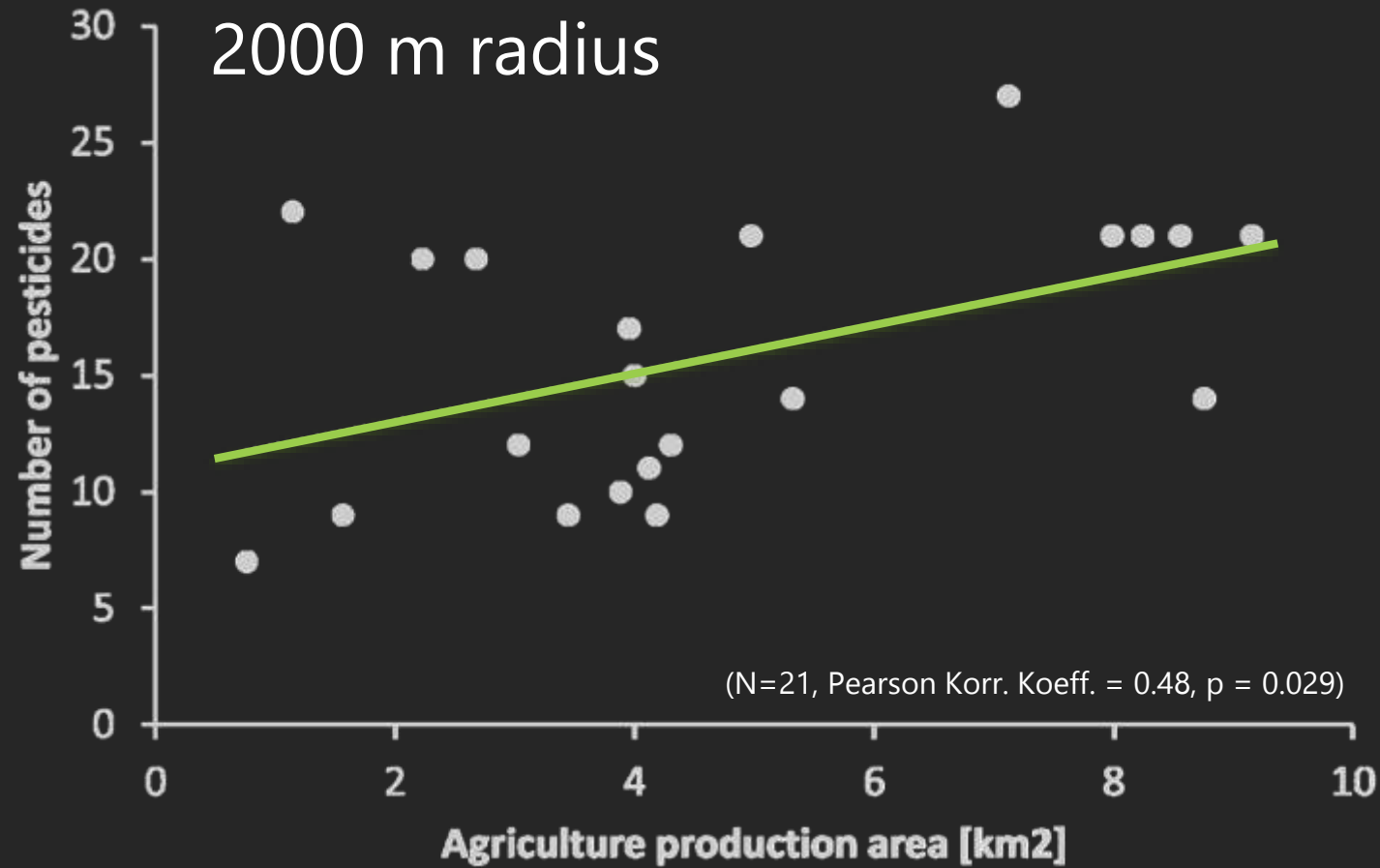
PESTICIDE MIXTURES

- 47 pesticides (of 92) recorded
- 13 herbicides, 28 fungicides und 6 insecticides
- Ø 16.4 pesticides (Min. 7, Max. 27)
- Some pesticides recorded at all 21 conservation areas: Metolachlor-S, Prosulfocarb, Terbutylazin, Azoxystrobin, Fluopyram
- At 16 locations: Thiacloprid

SPACIAL ANALYSIS



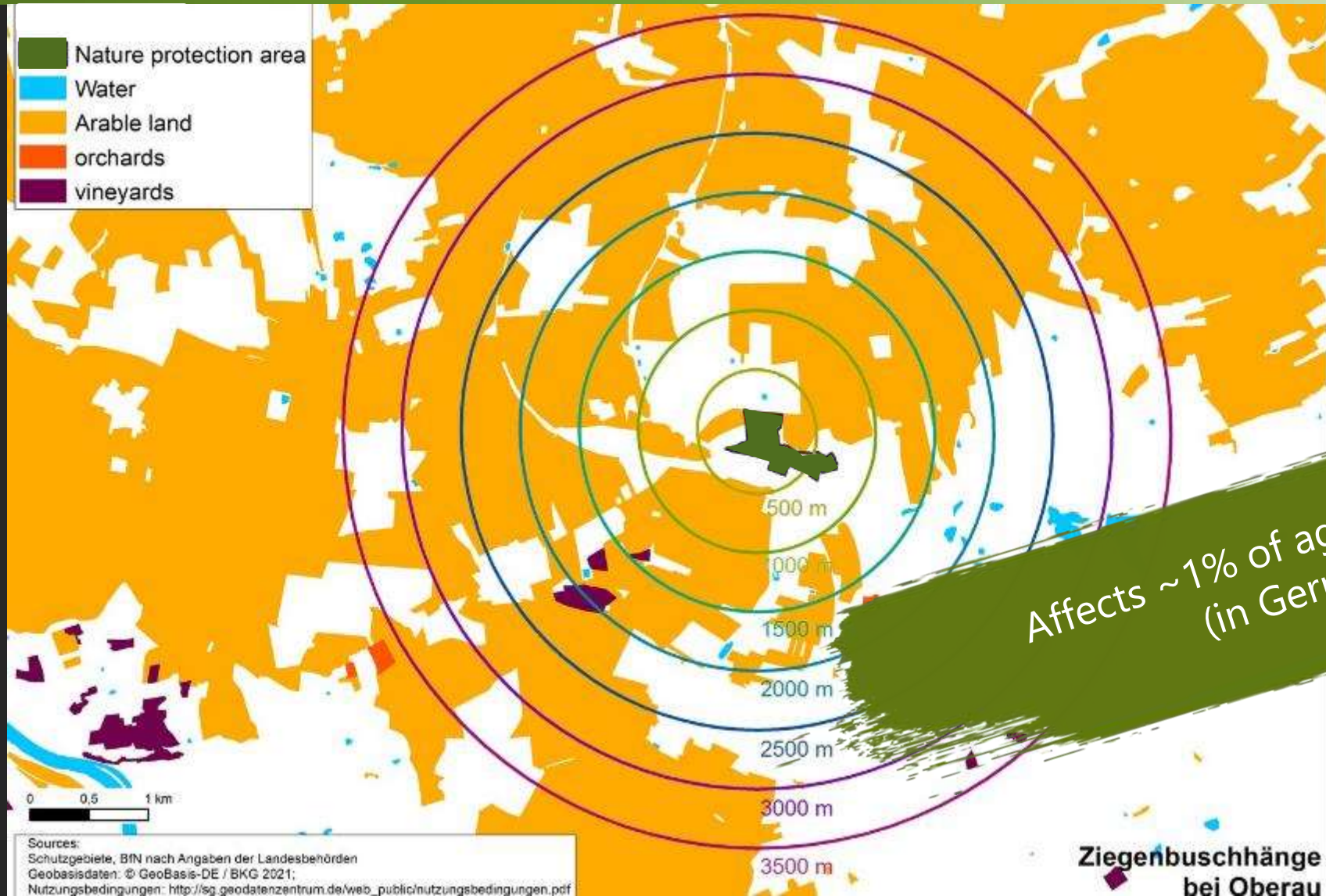
SPACIAL ANALYSIS



FARM TO FORK STRATEGY AIMS 2030

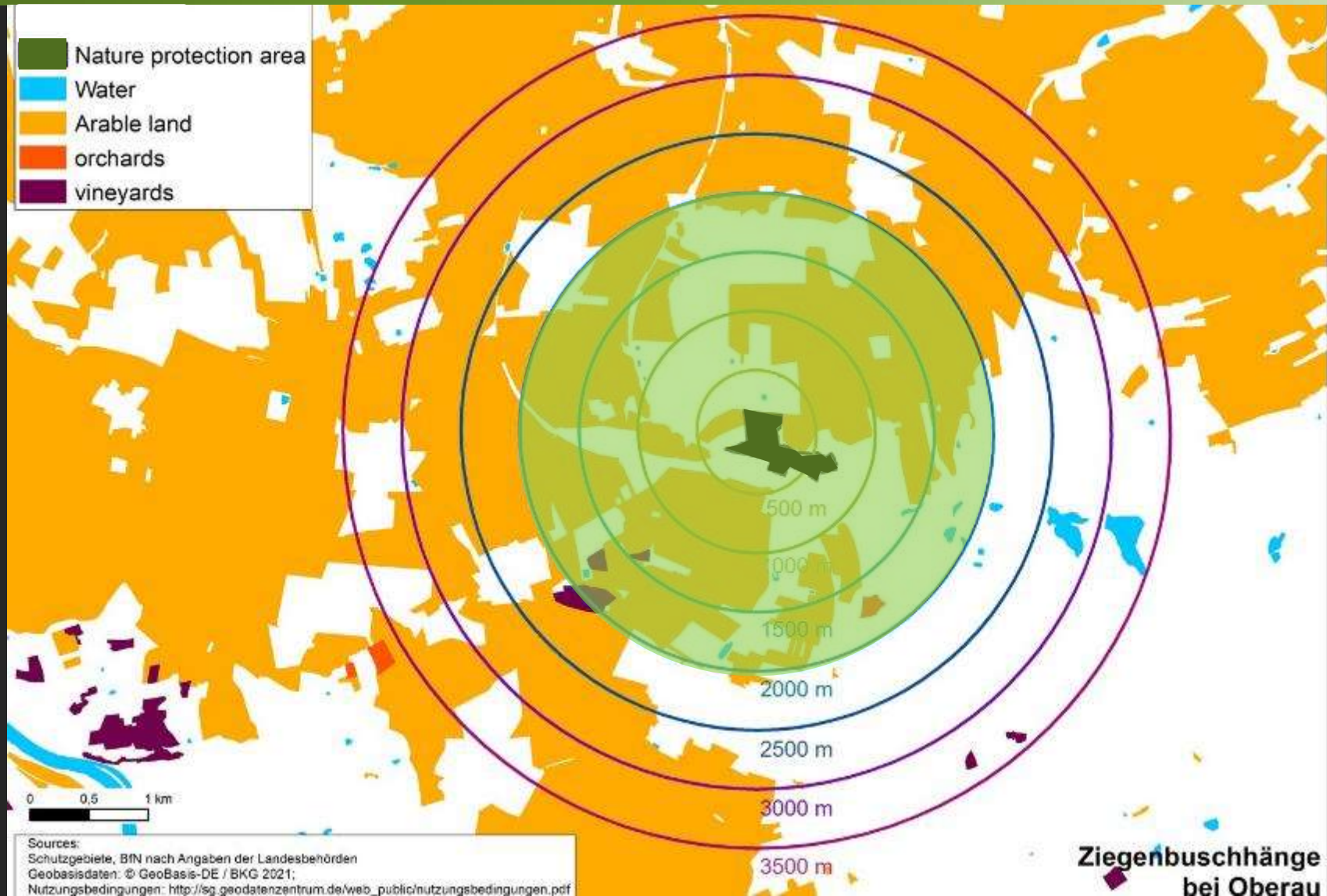
- reduction in the use and risk of chemical pesticides (-50%)
- Implementation of Integrated Pest Management 'IPM'
- increase of organic farming area (=25%)
- **ban** on use of all pesticides in ecologically sensitive areas

ECOLOGICALLY SENSITIVE AREAS



Affects ~1% of agricultural area
(in Germany)

BUFFER AREAS



BUFFER AREAS



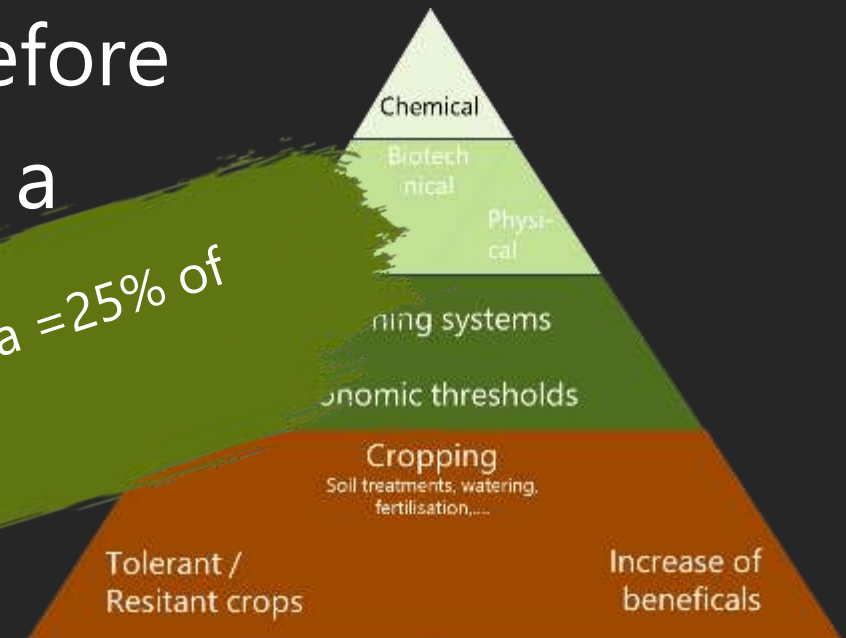
- Organic farming in radius of 2 km around conservation areas
 - For all nature conservation areas (NSG): 30% of croplands required
- = Aim of German government: 30% organic agriculture until 2030

Affects 30% of agricultural area
(in Germany)

INTEGRATED PEST MANAGEMENT

Strict new rules to enforce environmentally friendly pest control: ...all farmers practice Integrated Pest Management 'IPM', in which all alternative methods of pest control are considered first, before chemical pesticides can be used as a last resort measure.

Affects total agricultural area = 25% of EU land area!



PESTICIDE REDUCTION

Legally binding EU-level targets to reduce by 50% the use and risk of chemical pesticides and the use of the more hazardous pesticides by 2030.

Affects total agricultural area + entire
EU landscape

CONCLUSION

- Sensitive areas (Nature conservation areas & FFH) are representing only a comparatively small proportion of the agricultural landscape.
- Pesticides work on the landscape scale and therefore reductions at this scale (50% / IPM) have most effects and should be kept in focus.

Thank you!



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