Drawing on national experience for identifying
HNV farmland at European scale:
HNV farmland monitoring in Germany

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Setting up a national HNV farmland monitoring scheme

Accurate evaluation of available data on suitability:

- ➢ Integrated Administration and Control System (IACS)
- ➢ available remote sensing data (CIR aerial photos, Laser scan data)
- ➢ monitoring programmes
  - grassland monitoring (some Federal States),
  - monitoring of selected species (differing between Federal States)
- ➢ biotope mapping programmes (differing between Federal States)
- ➢ monitoring according Habitats Directive

Setting up a national HNV farmland monitoring scheme

Frame conditions, requirements and demands :

- Statistical reliability
- Adequate sensitivity regarding changes in farmland biodiversity
- Adequate temporal resolution (resampling rate suitable to information requirements of the CAP)
- Both size and condition/quality of HNV farmland units must be recordable
- Small HNV areas must be detectable
- Reasonable costs
- Homogeneity on national level
- Exclusive focus on the agricultural landscape

Setting up a national HNV farmland monitoring scheme

Shortcomings of available monitoring programmes and data sets:

- ➢ heterogeneity between the mapping programmes of the Federal States concerning spatial and temporal resolution as well as monitoring objectives

- ➢ limited extent and selectivity of monitoring programmes, not matching the total UAA

- ➢ resampling after long time or repetition often in question

- ➢ enormous costs of high resolution remote sensing data suitable to focus on the relevant issues

- ➢ monitoring according to the Habitats Directive within a small random sample, not matching the total UAA and not matching all relevant categories

- ➢ IACS data availability restricted due to data privacy regulations

Setting up a national HNV farmland monitoring scheme

Conclusions from the evaluation:

➢ Implementation of a reliable HNV farmland indicator based solely on available monitoring programmes and data sets not possible

➢ Improvement, extention or harmonisation of existing monitoring programmes to match the objectives of the HNV farmland indicator too expensive

➢ Development of a targeted monitoring programme with common methodology on national basis less expensive

➢ Use of the already existing random sample design established for the Common Breeding Bird Monitoring

➢ Costs should be devided between Federal Government and the Federal States

➢ Development of methods and coordination by BfN

Methodological approach

Base sample consists of 1,000 sample plots of 1km² each.

For more detailed results on regional level an extended sample (about 2,600 plots) can be used.

All sample plots of the base sample containing more than 5% of UAA are included in the HNV farmland monitoring programme.
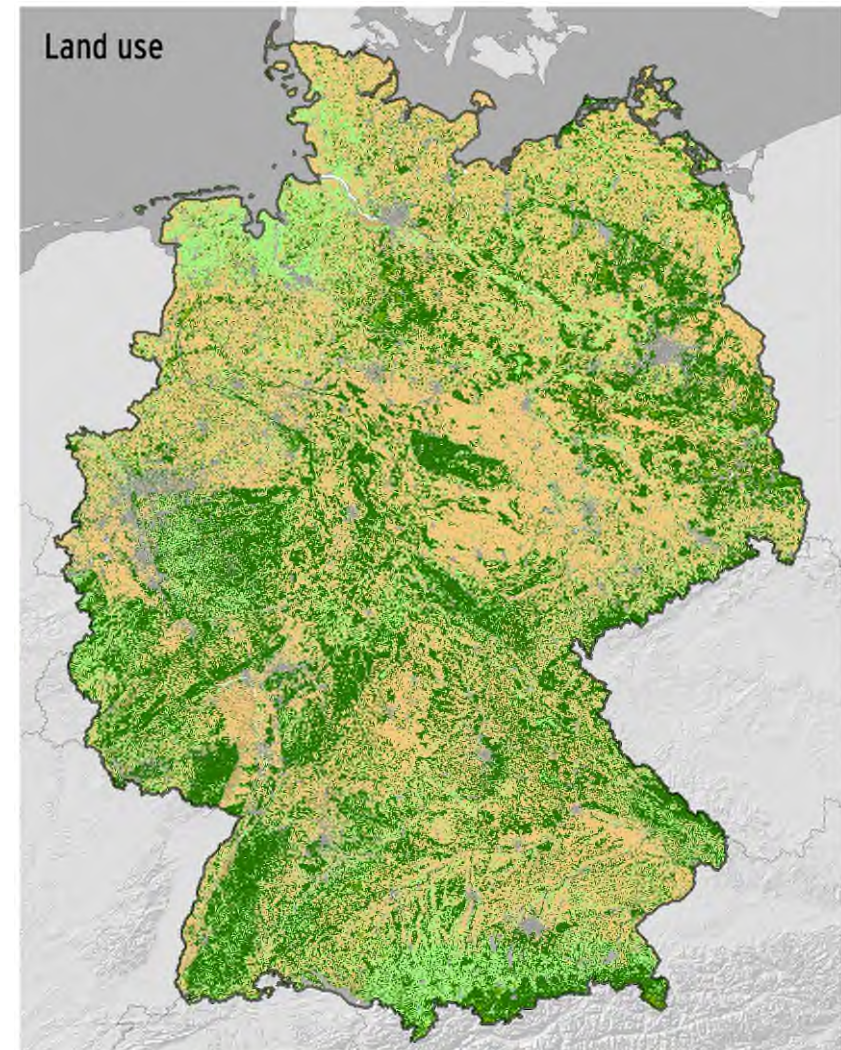
Baseline survey in 2009 used base sample in 10 and extended sample in 3 Federal States. Up to 2016 more Federal States introduced the extended sample (Σ1278 plots).

extended sample as of 2016
baseline survey 2009

Methodological approach

Ecoregions
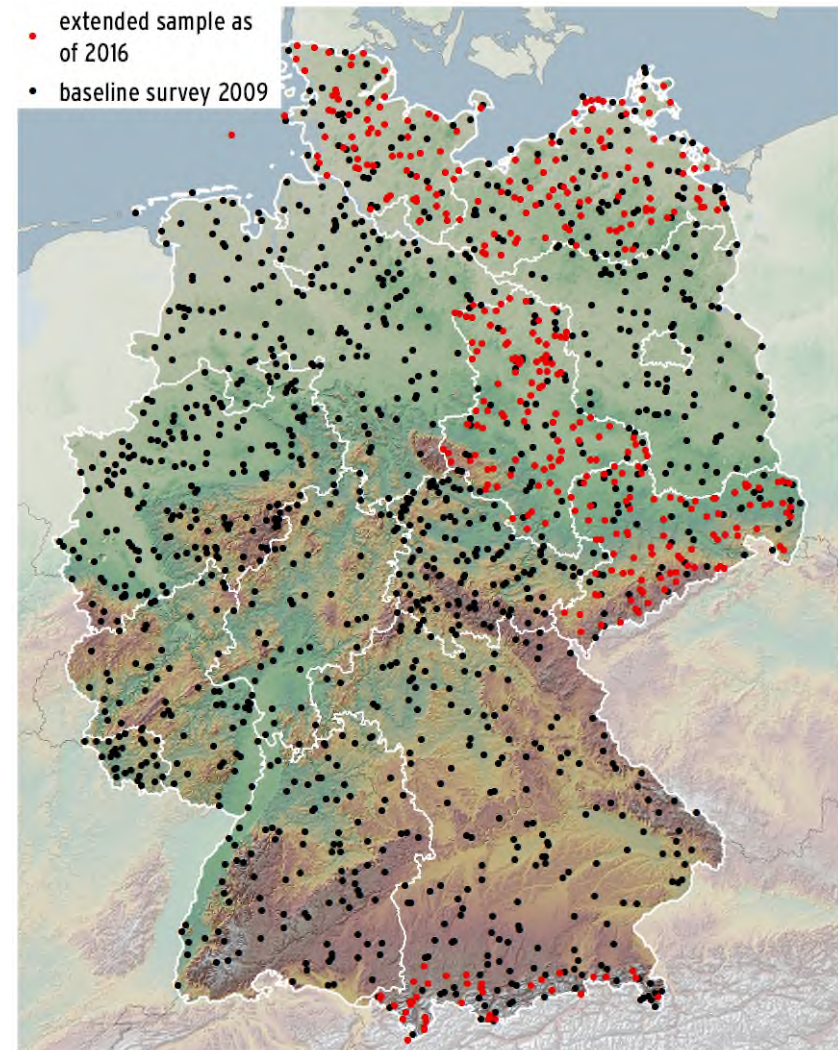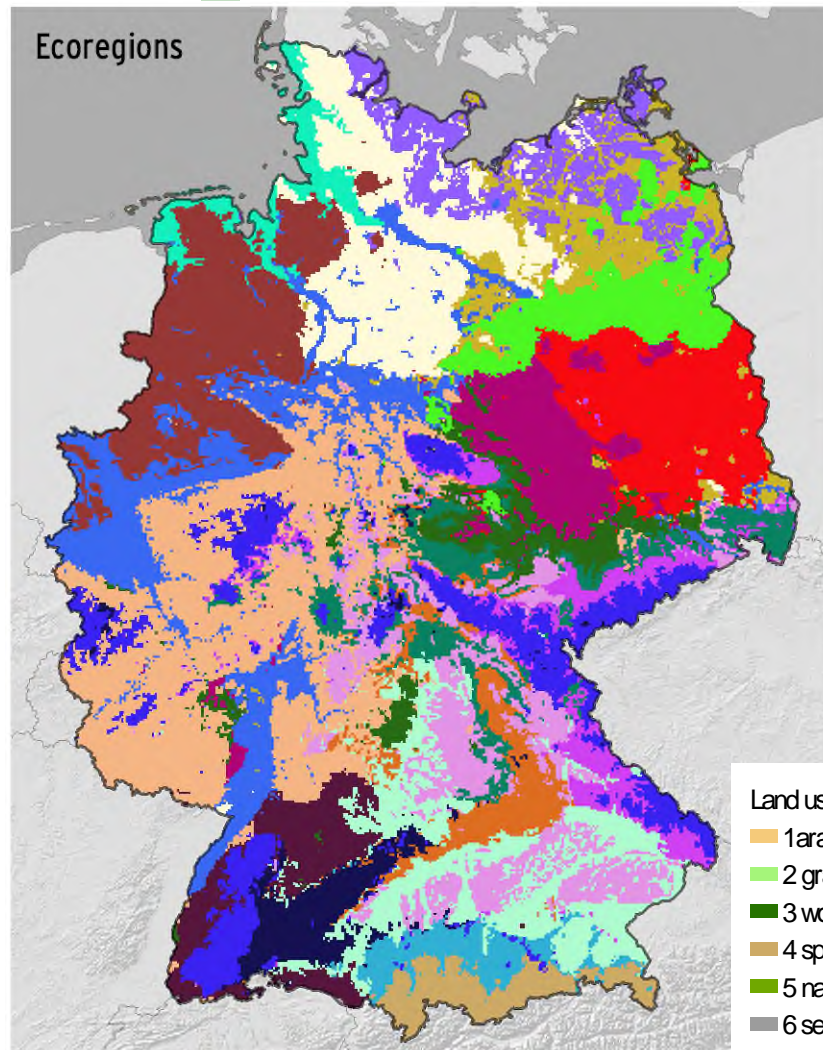
Land use

Land use class:
- 1 arable
- 2 grassland
- 3 woodland
- 4 specialised crops
- 5 natural vegetation
- 6 settlements

Vienna, 12th June 2017, Expert workshop "Revising the JRC/EEA EU-level HNV Farmland methodolgy"

Methodological approach

Methodological approach

type of HNV farmland:
- grassland
- set aside
- arable
- orchard
- tree, alley
- hedge, scrub
- complex element
- dry wall
- tall herb fringe
- reedbed
- pond
- stream, spring
- ditch
- track, path
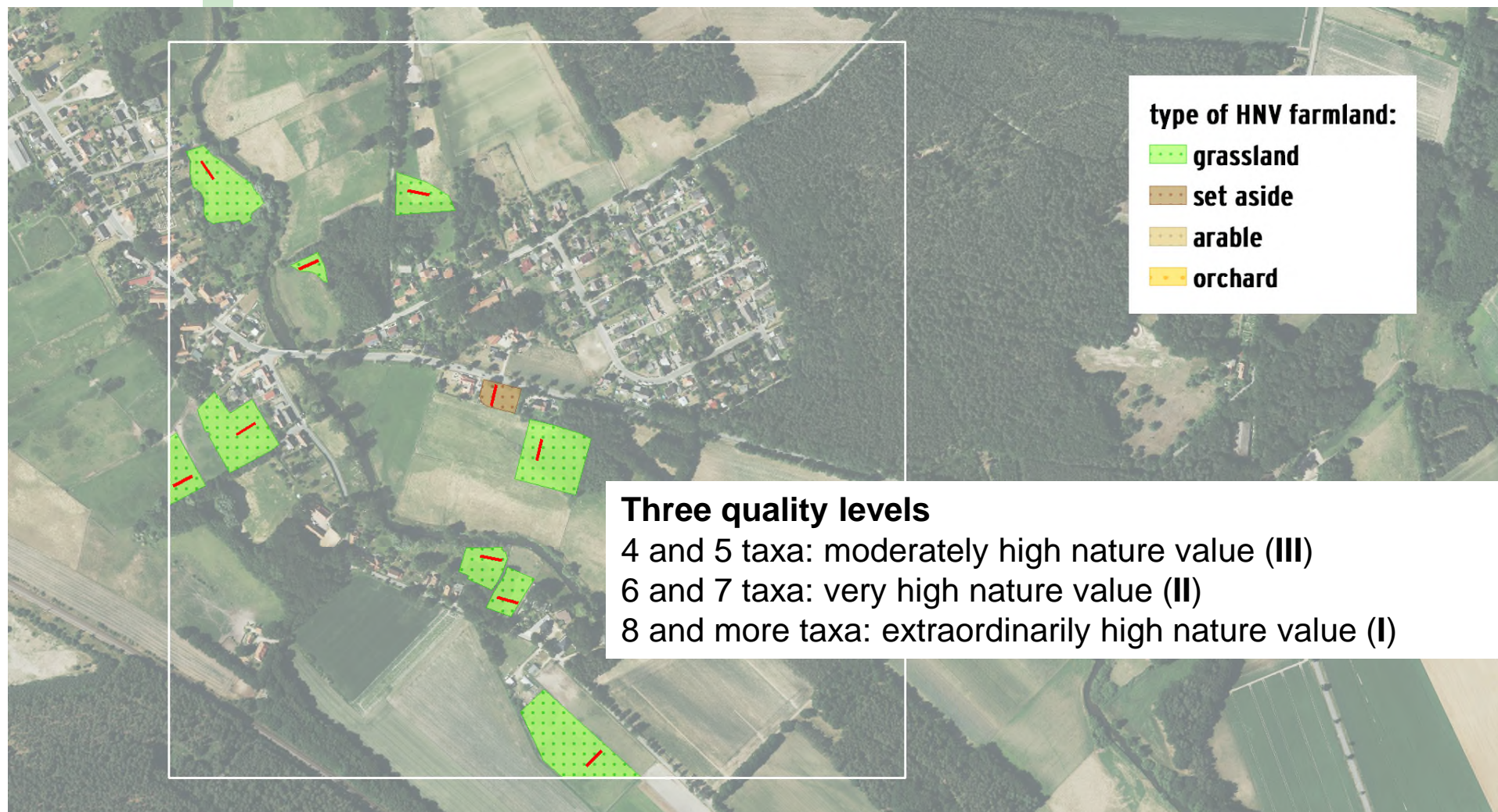
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Methodological approach

type of HNV farmland:
- grassland
- set aside
- arable
- orchard

Three quality levels
4 and 5 taxa: moderately high nature value (**III**)
6 and 7 taxa: very high nature value (**II**)
8 and more taxa: extraordinarily high nature value (**I**)

Methodological approach

**Example –
Quality levels for HNV hedges**

HNV I: Extremely diversely structured and species rich, multi-level and/or with fringe, width > 10 m or > 8 locally indigenous woody species

HNV II: Diversely structured or species rich, multi-level or with fringe, width > 5 m or > 5 locally indigenous woody species

HNV III: Simply structured hedges, scrub or copses with up to 5 woody species

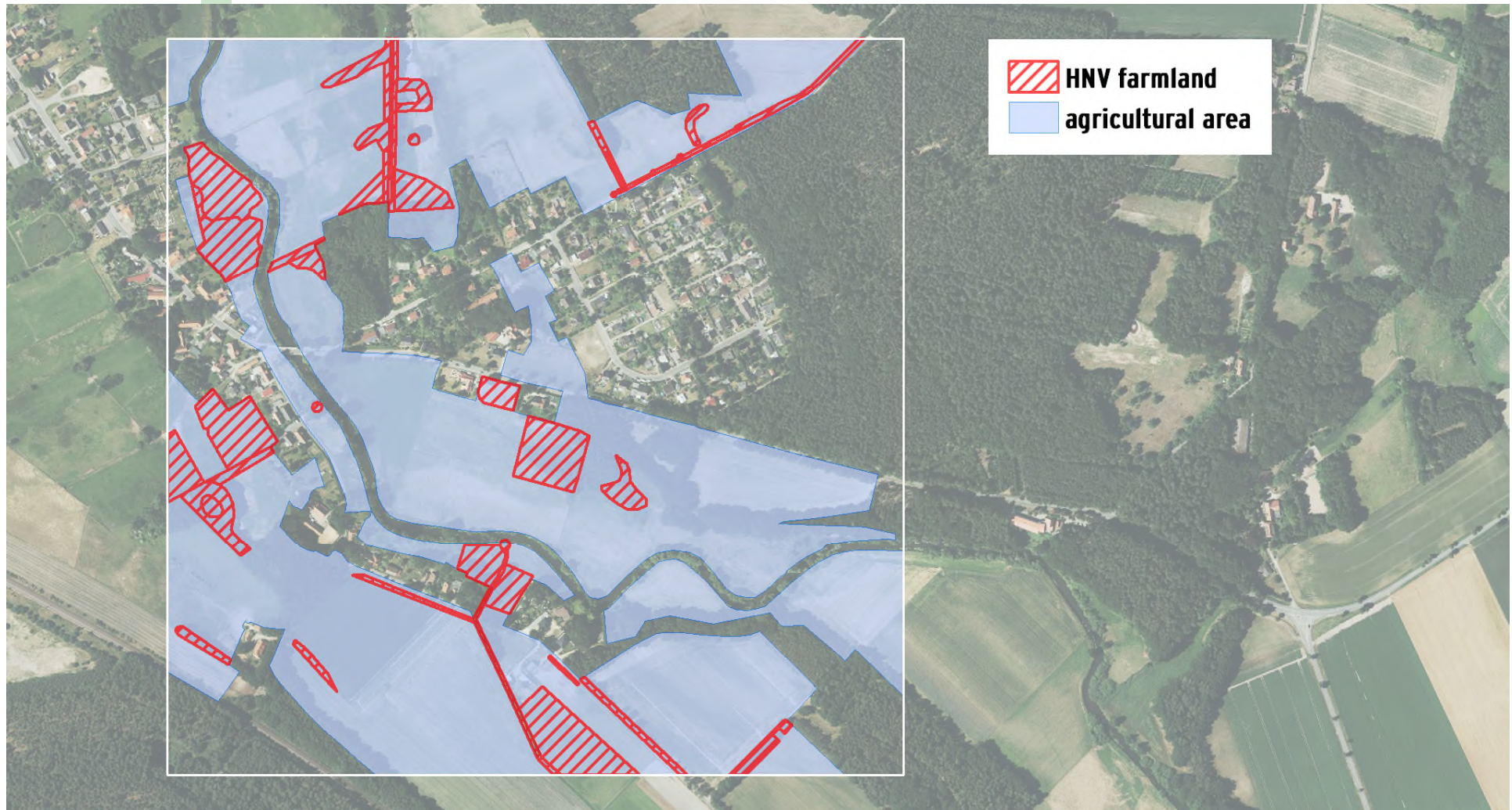Vienna, 12th June 2017, Expert workshop "Revising the JRC/EEA EU-level HNV Farmland methodolgy"

Methodological approach

Quality level:
- I (extraordinarily high)
- II (very high)
- III (moderately high)

Methodological approach

HNV farmland
agricultural area

Extrapolation

$$Ind_{HNV} = \frac{HNV\ farmland\ (Germany)}{Agricultural\ area\ (Germany)}$$

Legend:
- HNV farmland
- agricultural area

$$Ind_{HNV(sp\_ni215)} = \frac{14.7\ ha}{57.8\ ha} = 25.4\%$$

$$Ind_{HNV} = \frac{HNV\ f\ (Germany)}{AA\ (Germany)} = \frac{\overline{HNVf\ (sample\ plots)}}{\overline{AA\ (sample\ plots)}}$$

Quality management

Only experienced field ecologists are commissioned to conduct field work for the HNV farmland monitoring.

The Federal Agency for Nature Conservation BfN has put a comprehensive quality management system in place to obtain maximum data precision:

- Annual surveyor trainings
- Control mappings
- Technical control
- Visual control on the basis of aerial photographs

Extrapolation results

	HNV farmld.	Sample error
2009	13.1 %	0.5 %
2011	12.4 %	0.5 %
2013	11.7 %	0.4 %
2015	11.4 %	0.4 %
2009 – 2015	**- 12.4 %***	(- 1.6 percentage points)

* statistically significant

Extrapolation results

Type:	grassld.	arable	set aside	elements
2009	5.6 %	1.6 %	0.8 %	4.0%
2011	5.5 %	1.3 %	0.7 %	3.9%
2013	5.3 %	0.9 %	0.6 %	3.9%
2015	5.1 %	0.9 %	0.6 %	3.9%
	-8.9 %*	**-46.0 %***	**-31.3 %***	-2.2 %

* statistically significant

Extrapolation results

Quality:	I	II	III
2009	2.3 %	4.5 %	6.3%
2011	2.2 %	4.4 %	5.8 %
2013	2.2 %	4.4 %	5.1 %
2015	2.2 %	4.3 %	4.9 %
	-5.1 %	-4.0 %	**-26.2 %***

* statistically significant

Extrapolation results

Federal state	HNV 2015	s.e.	2009 / 2015
Brandenburg	15.4 %	3.1 %	**-21.6 %** *
Baden-Württemberg	14.6 %	1.2 %	**-6.3 %** *
Bavaria	11.3 %	1.1 %	7.2 %
Hesse	14.5 %	1.7 %	-10.9 %
Mecklenburg-Vorp.	10.4 %	1.8 %	**-23.5 %** *
Lower Saxony	9.2 %	1.1 %	**-18.3 %** *
Rhineland-Palatinate	12.4 %	1.2 %	-1.9 %
Schleswig-Holstein	8.9 %	1.9 %	-8.6 %
Saarland	25.4 %	4.5 %	-2.5 %
Saxony	9.1 %	1.6 %	**-27.6 %** *
Saxony-Anhalt	9.7 %	1.1 %	-27.6 %
Thuringia	16.4 %	1.4 %	-0.7 %

* statistically significant

Extrapolation results

	HNV		Change		95-%-CI rel. Change	
	2009	2016	absolute	relative		
inside SCI	46.0 %	40.9 %	– 5.1 PP*	– 11.0 %*	– 21.2 %	– 0.8 %
outside SCI	11.4 %	10.1 %	– 1.4 PP*	– 11.9 %*	– 17.4 %	– 6.4 %
inside SAC	27.4 %	24.4 %	– 3.0 PP	– 10.8 %	– 23.2 %	1.5 %
outside SAC	12.1 %	10.6 %	– 1.4 PP*	– 11.9 %*	– 17.2 %	– 6.7 %
inside Natura 2000	30.5 %	27.5 %	– 3.0 PP*	– 9.9 %*	– 18.7 %	– 1.1 %
outside Natura 2000	11.3 %	9.9 %	– 1.4 PP*	– 12.3 %*	– 18.1 %	– 6.6 %
strong protected areas	49.0 %	43.6 %	– 5.4 PP	– 11.0 %	– 22.2 %	0.1 %
outside strong protected areas	12.3 %	10.8 %	– 1.4 PP*	– 11.8 %*	– 17.0 %	– 6.5 %

* statistically significant

Size of HNV farmland features

Distribution of HNV farmland features within size classes:
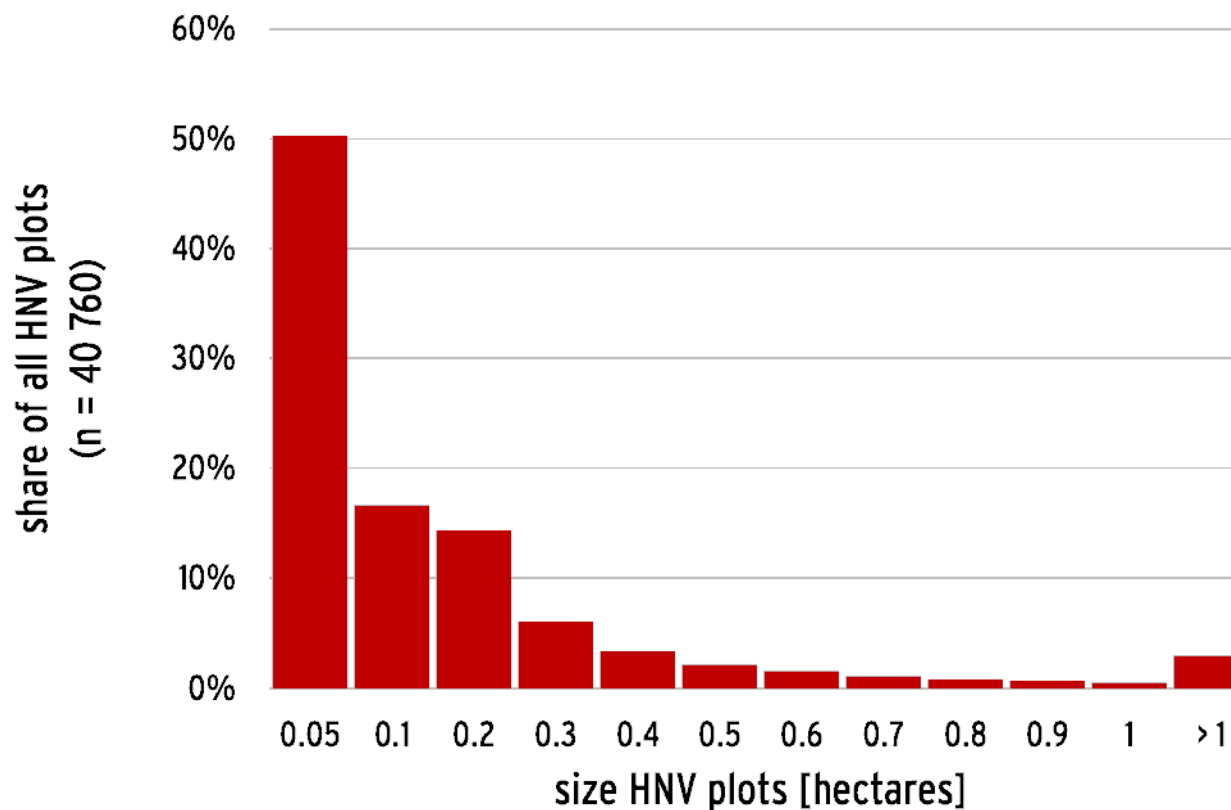
Conclusions

The methods proved to work properly and precisely to survey the trends of biodiversity within the agricultural landscape.

Both extent and condition of HNV farmland from 2009 onwards can be estimated annually on NUTS-0 and NUTS-1 levels.

Due to regular annual updates, changes in HNV farmland condition can be detected quickly.

By using standard statistical methods for sampling programmes, confidence levels for estimates and trends can be calculated.

The field keys for mapping HNV farmland can be used on all scales, eg. for estimating HNV farmland for single holdings or smaller administrative units.

Costs are moderate in comparison with other monitoring programmes (400 to 500 € per sample plot for fieldwork and preliminary data processing).

Thank you for your attention!

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