Identification and characterization of HNV farmland areas in Spain

Georgina Alvarez (MARM), Beatriz Arroyo, Jesús Olivero & Ana Márquez (IREC-CSIC)

Background

"High Nature Value farmland comprises those areas in Europe where agriculture is a major (usually the dominant) land use and where that agriculture supports or is associated with either a high species and habitat diversity of the presence of species of European conservation concern, or both".

Background

Typology (Andersen et al. 2004)

- Type 1. Farmland with a high proportion of semi-natural vegetation

- Type 2. Farmland with a mosaic of habitats or land uses (as a measure of low intensity)

- Type 3. Farmland supporting rare species or a high proportion of European or World populations.

Background

High Nature Value farming systems:

Low intensity systems…
Maintain semi-natural habitats…
Maintain features important for conservation…

Criteria for the definition of HNV farmland (IEEP 2007)

1) Degree of intensification

2) Presence of semi-natural vegetation and items

3) Mosaic

Background

- There may be variation according to territorial (national, regional) characteristics.

- Different factors may matter more in some areas than others.

- Expert opinion vs modelling.

Methods

- **1- Predictive model of farmland biodiversity**

- Based on atlas (birds, mammals, invertebrates, flora, amphibians and reptiles)
- Total farmland species per grid cell
- Number of farmland vulnerable species per grid cell

- Control for climate or biogeographic factors:
- Original model includes location, climate, land use
- Partition of variance (modelling the pure effect of farmland land use)

- *(same approach for HNV forestry)*

Methods

- **1- Predictive model of farmland biodiversity**

- Representativity: biogeographical areas (atlantic, mediterranean, islands)


López Fernandez et al. 2008

- Results represented at 1x1 km scale

Methods

- **2- Characterization of HNV farmland**

- Average value per municipality

- Agricultural census (1999): variables describing farmland exploitations and their management (profit, staff, management, mechanization, irrigation, field size, output, inputs, grazing levels, land use diversity, etc) and presence of seminatural vegetation.

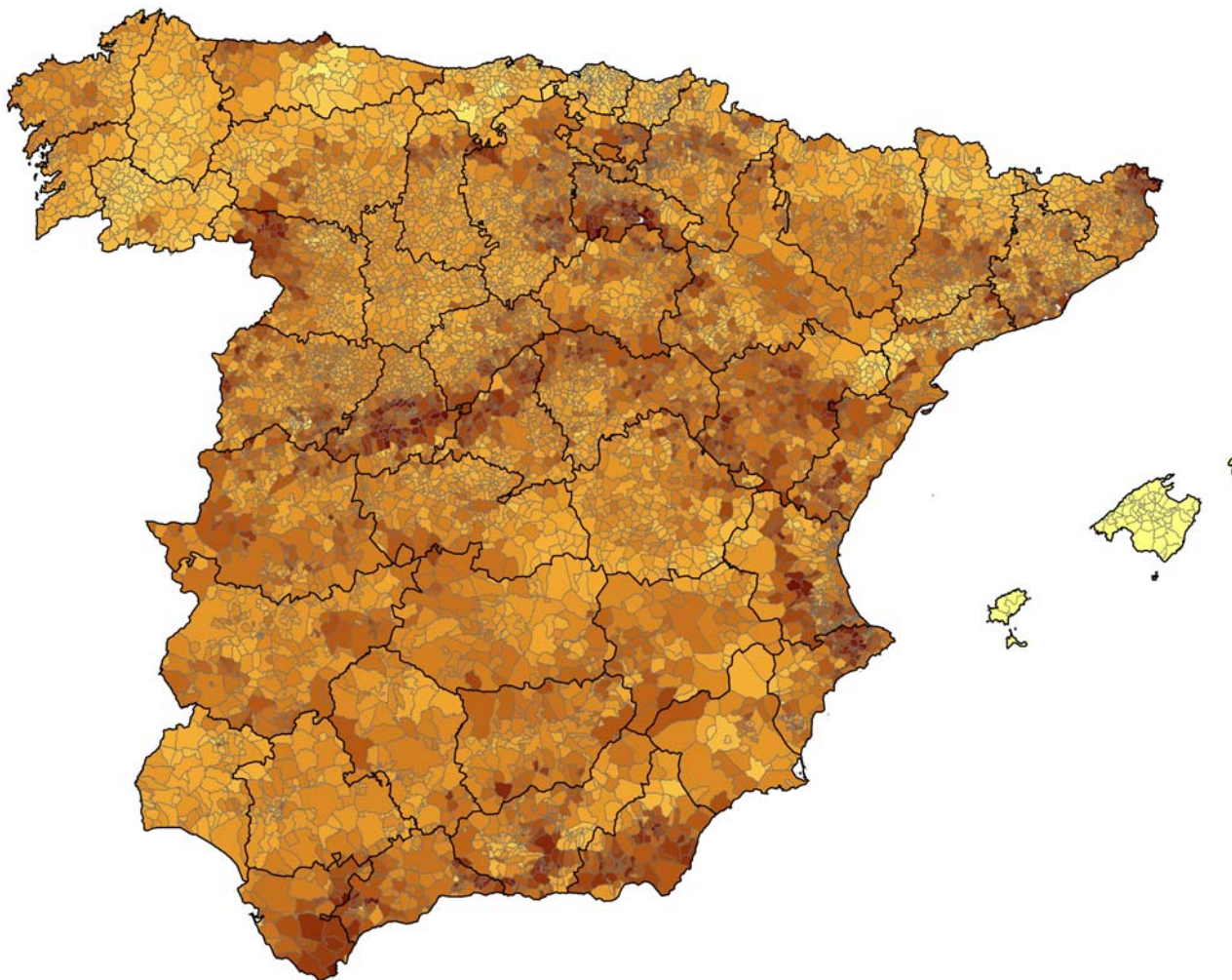- Relationship between both (correlations and stepwise regressions)
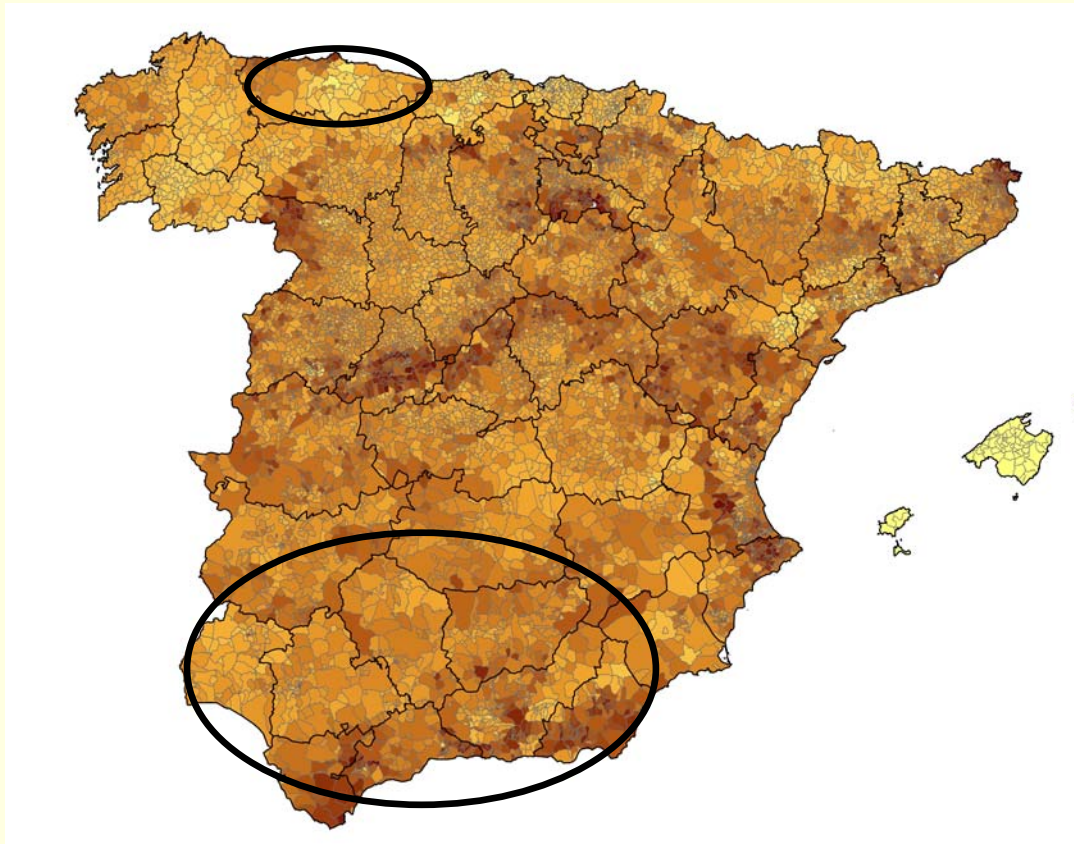
Results

Predictive model of farmland HNV
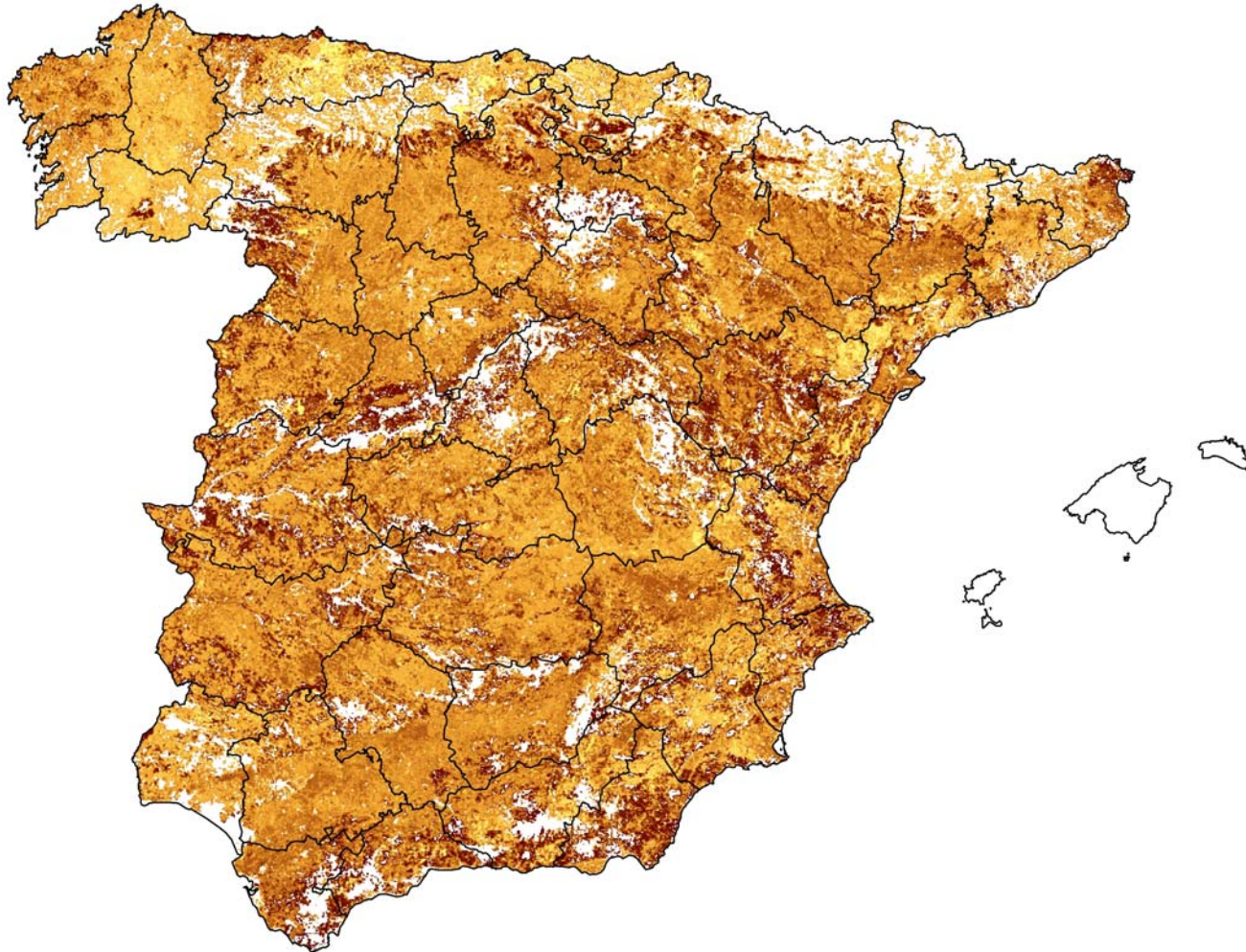
Results

Average values per municipality

Results

Characterization of HNV farmland:
Relationships with agricultural census information

Results

Characterization of HNV farmland:
Correlations with variables in the agricultural census

	ANDALUCÍA
FARM CHARACTERISTICS	
Livestock units in farm	**-.106**
% dry vineyards	**.080**
% dry orchards	**.082**
% irrigated orchards	**.218**
% cereal crops	**-.161**
INDICATORS OF INTENSIFICATION	
Less favoured areas	**.325**
Organic farming	**.091**
Successive crops (% surface) - non irrigated	**-.091**
Successive crops (% surface) - irrigated	-.031
Gross profit margin	**-.143**
Workers per surface unit	**-.115**
Proportion of family workers	-.068
Tractors 55 CV	**.118**
Tractors > 82 CV	**-.271**

Results

Characterization of HNV farmland:
Correlations with variables in the agricultural census

NATURAL VEGETATION, LANDSCAPE FEATURES AND MOSAIC	ANDALUCÍA
Teselation (n fields)	**.249**
Mosaic of annual crops	**.088**
Mosaic of permanent crops	**.180**
Dry pastures	**.136**
Irrigated pastures	**.150**
Non-cultivated areas	**.115**
Shrubs	**.300**
Forested areas	**-.201**
Annual crops with isolated trees	.009
Pastures with hedges	.020
Dehesas	**-.189**

Results

Characterization of HNV farmland:
Correlations with variables in the agricultural census

	ANDALUCÍA	ASTURIAS
FARM CHARACTERISTICS		
Livestock units in farm	**-.106**	**.290**
% dry vineyards	**.080**	.073
% dry orchards	**.082**	-.206
% irrigated orchards	**.218**	**.455**
% cereal crops	**-.161**	**.500**
INDICATORS OF INTENSIFICATION		
Less favoured areas	**.325**	-.048
Organic farming	**.091**	.045
Successive crops (% surface) - non irrigated	**-.091**	**.335**
Successive crops (% surface) - irrigated	-.031	-.034
Gross profit margin	**-.143**	**.258**
Workers per surface unit	**-.115**	-.213
Proportion of family workers	-.068	**.242**
Tractors 55 CV	**.118**	.126
Tractors > 82 CV	**-.271**	**.445**

Results

Characterization of HNV farmland:
Correlations with variables in the agricultural census

NATURAL VEGETATION, LANDSCAPE FEATURES AND MOSAIC	ANDALUCÍA	ASTURIAS
Teselation (n fields)	**.249**	-.115
Mosaic of annual crops	**.088**	.127
Mosaic of permanent crops	**.180**	.013
Dry pastures	**.136**	.054
Irrigated pastures	**.150**	.067
Non-cultivated areas	**.115**	**.276**
Shrubs	**.300**	.201
Forested areas	**-.201**	**.467**
Annual crops with isolated trees	.009	
Pastures with hedges	.020	**-.736**
Dehesas	**-.189**	

Results

Characterization of HNV farmland:
Variables best defining HNV farms (multiple stepwise regressions)

ANDALUCIA

	Parameter estimates	P
LESS FAVOURED AREAS	.225	.000
WOODLAND	-.526	.000
% SAU	-.549	.000
DRY PASTURELAND	.288	.000
IRRIGATED PASTURELAND	.111	.000
DRY ORCHARDS	-.164	.000
TRACTORS > 82 CV	-.108	.002
SUBSIDIES FOR NON CULTIVATION	.090	.004
PERMANENT CROP MOSAIC	.079	.009
SUCCESIVE NON-IRRIGATED CROPS	-.075	.010
ORGANIC FARMING	.063	.031
LIVESTOCK DENSITY	-.066	.035

Results

Characterization of HNV farmland:
Variables best defining HNV farms (multiple stepwise regressions)

ASTURIAS

	Parameter estimates	P
PASTURES WITH HEDGES	-.471	.000
NON IRRIGATED SUCCESIVE CROPS	.126	.065
LIVESTOCK NUMBERS	.259	.000
% HERVIBORE LIVESTOCK	-.274	.001

Pastures with hedges: negatively correlated with:
Dry herbaceous crops, fallow and non-cultivated areas, srhubs

Conclusions

- Method allows identification and characterization of HNV farmland in Spain, integrating territorial and biogeographical variability

- Not all identificators of non-intensive farms are valid in all areas

- Not all criteria are similar in value in all areas

- Possible to calculate surface (models, or surface of farms with appropriate characteristics) and other indicators of quality.

Further development

- Further analyses on categorisation

- Use of results to define systems

- HNV farmland vs HNV forestry – unique set?

- The latter will enhance acceptance and understanding of results (e.g., dehesas: not in farmland model, but in forest HNV).

Discussion points

- Modelling results differ (somewhat) from manager´s views on "good areas" – models probably synthethise a higher amount of indices and are mainly based on biodiversity.

- HNV: Biodiversity values, landscape values, "naturality" values?

- How to integrate variables not in model (e.g. field edges).

- Developing indicators from results

Methods