



Assessing the risk of farmland abandonment in the EU

Technical assistance from JRC to DG AGRI to define key factors and drivers, process datasets, and provide results

Administrative arrangement #AGRI-2011-0295

Background on AE indicators

IRENA operation 2002-2005

Indicator reporting on the integration of environmental concerns into Agricultural policy

Objective: to develop and compile the set of 35 agri-environmental indicators for EU-15 (Nuts2/3)

Outputs: indicator factsheets (42 indicators and sub-indicators) and their corresponding data sets, report and evaluation.

Memorandum of Understanding

Signed in April 2008 by DG AGRI, DG ENV, DG ESTAT, JRC and the EEA to develop and maintain a system of AEIs.

AEI 17

AEI 14: Risk of Farmland abandonment

[COM(2006)508]

Monitoring frame, 28 AEI were listed for the EU-27

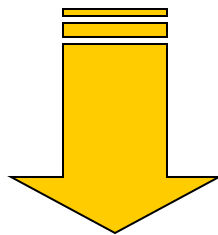
Monitoring the integration of environmental concerns into the Common Agricultural Policy

- To provide information on the farmed environment
- To track the impact of agriculture on the environment
- To assess the impact of agricultural and environmental policies on environmental management of farms
- To inform agricultural and environmental policy decisions
- To illustrate agri-environmental relationships to the broader public

Who is doing what

DG AGRI Leader

- Responsible for the AEI14
- Steering the study
- Overall coordination



**Facsheet and Map of risk
by end 2012**

JRC

- Scientific and technical support
- Coordination of the expert panel,...
- Conceptual and methodological improvement and data availability
- Progress reports
- Drafting and updating the factsheet
- Compiling the indicator
- Preparatory work (report FLA (2008))

Expert Panel

Support on the development of the indicator and its validation

JRC Preparatory work

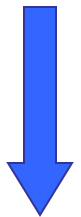
- **Complex situation:**

- FLA is local-specific, can vary significantly at sub-region level.
- No clear-cut division among factors which could affect FLA, depend on their interaction.
- FLA tends to be minor in some MS but can occur everywhere.



- **Option proposed:**

Drivers to be classified into a limited number of blocks corresponding to the main dimension of the FLA. Related indicators (definition, threshold, weight and interaction) will be set-up to give the best possible proxy of the risk.



**Unsuitable biophysical
conditions**

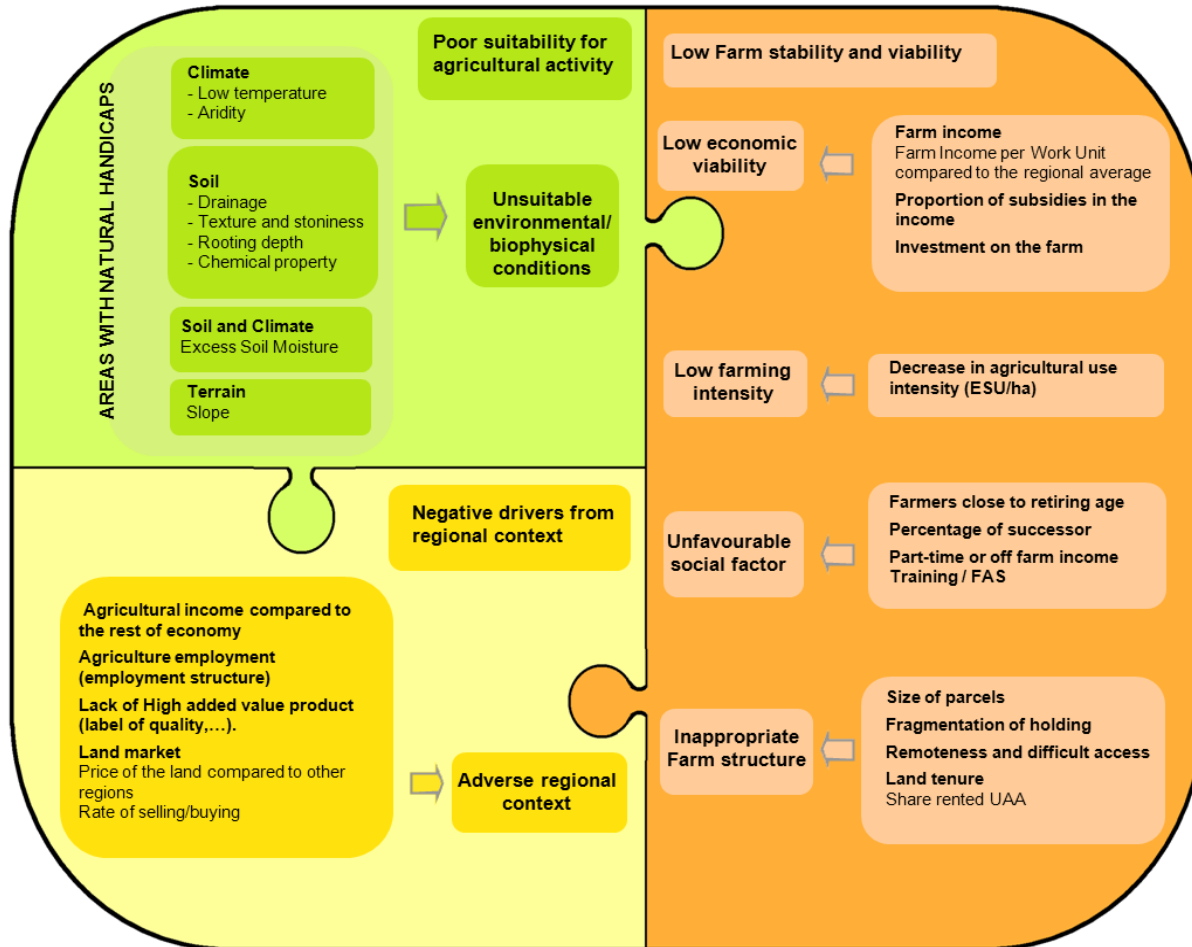
Low Farm stability and viability

Adverse regional context



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JRC Preparatory work



The complete picture



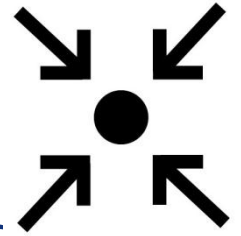
Discussed,
Revised and
updated by experts

The expert panel

- Objectives:
 - a. Conceptualise definition of farmland abandonment
 - b. Identify most relevant factors for the risk of farmland abandonment
 - c. Proposals for developing the indicator taking into account data availability

- Based on literature review and on experts meetings, a list identifying experts for the panel was set and completed by DG AGRI.

- 12 experts confirmed their interest in being part of the panel (from Universities, Ministries, Institutes, Associations and European Organisations) – 3 meetings took place at JRC



Expert panel exercise

Refinement of the list of drivers

- Based on factsheets and first screening, list of drivers was refined.
- Rationale, calculation options, thresholds and identification of data.

List of selected criteria:

- Farm income under regional average
- Low investment in the farm
- Age of farm holder (> 65 years)
- Low farmer qualification (education/training)
- Remoteness and low population density
- Small farm size
- Farm enrolment in specific schemes
- Weak land market
- Previous trend of FLA (methodology from JRC report)

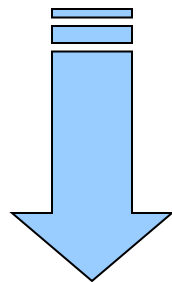
Challenges

Indicator must be calculated on the basis of **available data** at **EU level**, based on **harmonised methodology**.

+ Farmland abandonment process occurring at **local level** (infra NUTS3).

+ **Risk** assessment and not only measurement (past FLA).

= Studying the risk of occurrence of a local phenomenon at EU scale, **challenging and heavy process!**



Literature review, JRC report

Most recurrent drivers

Expert panel exercise

Definition, drivers, methodology and calculation

Factsheet

Assessing the risk of farmland abandonment in the EU

Definition : *Farmland abandonment is defined as a cessation of management which leads to biodiversity loss and undesirable changes in ecosystem services (=simpler and more complete, exclusion of marginalisation).*

Purpose of the indicator: *to help assessing the risk of farmland abandonment at EU-27 level(=probability of occurrence) through the identification of the most relevant factors (**drivers**) and the integration of the meaningful drivers into a **Composite Index**.*

The indicator will exclusively address the risk and not the consequences of FLA or the extend to which FLA actually happens.

Drivers	Data Source
<p>Weak Land Market: Increase in land sales and rental prices is generally linked to a high incidence of land transactions which typically signals a high demand for agricultural land and hence a lower risk of land abandonment.</p>	<p>FADN-DG AGRI.L3</p>
<p>Low Farm Income: Farmland is typically abandoned as an economic resource when it ceases to generate an income. Although this is not a sole cause, and although it can be triggered by a number of factors, there is a powerful link.</p>	<p>FADN-DG AGRI.L3</p>
<p>Low Investment in the Farm: Investments reflect farm dynamism, its adaptation capacity and expectations about the future. New investments are a signal of a medium/long term strategy and can be proxy for willingness to continue farm activity.</p>	<p>FADN-DG AGRI.L3</p>
<p>Age of Farm Holder: Farmland abandonment is more likely to occur when the farmer is old and close to retirement.</p>	<p>Eurostat public database</p>
<p>Low Farmer Qualification: Education/training and use of advisory services can be assumed as a proxy for the professionalism of the farm, and willingness to invest in terms of human capital and knowledge. An Inverse correlation exists between the level of education/training and risk of land abandonment</p>	<p>Eurostat public database</p>
<p>Previous trend of FLA: It is not possible to study the trend because the results for FSS 2010 will only be available in 2013.</p>	
<p>Remoteness / Low Population Density: Farmland with remote and/or difficult access is more prone to abandonment.</p>	<p>SIRE DB, GISCO DB</p>
<p>Low farm Size: Larger farms can benefit from lower production costs, are more competitive in term of agricultural practices (machinery, better inputs efficiency) and usually more competitive and viable in economical terms.</p>	<p>FSS – Eurostat</p>
<p>Farm Enrolment in Specific Schemes : Use of the Agri–Environment Measure (AEM) scheme. When a large share of AEM uptake, farmers commit to continue farming for a certain period of time, BUT a low level of AEM cannot be a proxy for a risk of abandonment.</p>	<p>Eurostat public database</p>

Data sources:

Farm Accountancy Data Network (FADN) – DG AGRI.L3

Drivers: Land Market, Farm Income, Investment in the Farm

- at holding level
- level of geographic reference: NUTS3
- level of processing and reporting selected for the analysis: NUTS2 (NUTS1 for UK and DE)

Problems:

- threshold on the minimum size farm may lead to a certain under-representation of the smallest farms
- FADN is only statistically representative at NUTS 0, 1 and 2 levels

Farm Structure Survey (FSS) –EUROSTAT

Drivers: Low farm size

- level of geographic reference: NUTS3 – LAU2
- processing and results : NUTS3 – LAU2

Problems:

- FSS census data 2010 will only available in 2013.
- No access to micro or local (LAU1-2) FSS data.
- Last deliverable from ESTAT is missing (Percentage of farms with a UAA under 50% of the NUTS 2 average UAA per holding, by NUTS 3 and by farm-type).

Data sources:

Farm Structure Survey (FSS) – Eurostat public database

Drivers: Age of Farm Holder, Farmer Qualification, Farm Enrolment in Specific Schemes

- level of geographic reference: NUTS2 – NUTS3
- processing and results : NUTS2

Geodatabases: Euro Regional Map road network (© EuroGeographics), Urban Audit cities (2007, DG REGIO), SIRE database (2001, Eurostat), CORINE Land Cover (2006 and 2000, EEA), SRTM mosaic Europe (JRC).

Drivers: Remoteness / Population Density

- level of geographic reference: LAU2
- processing and results: LAU2

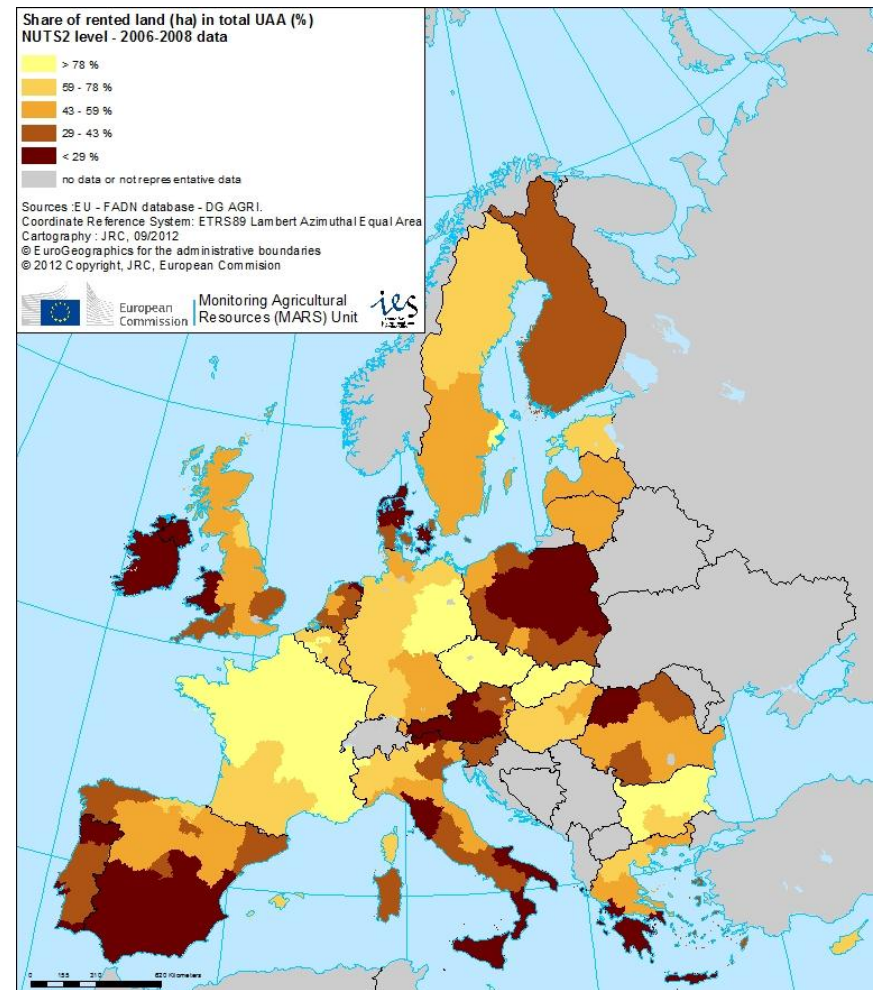
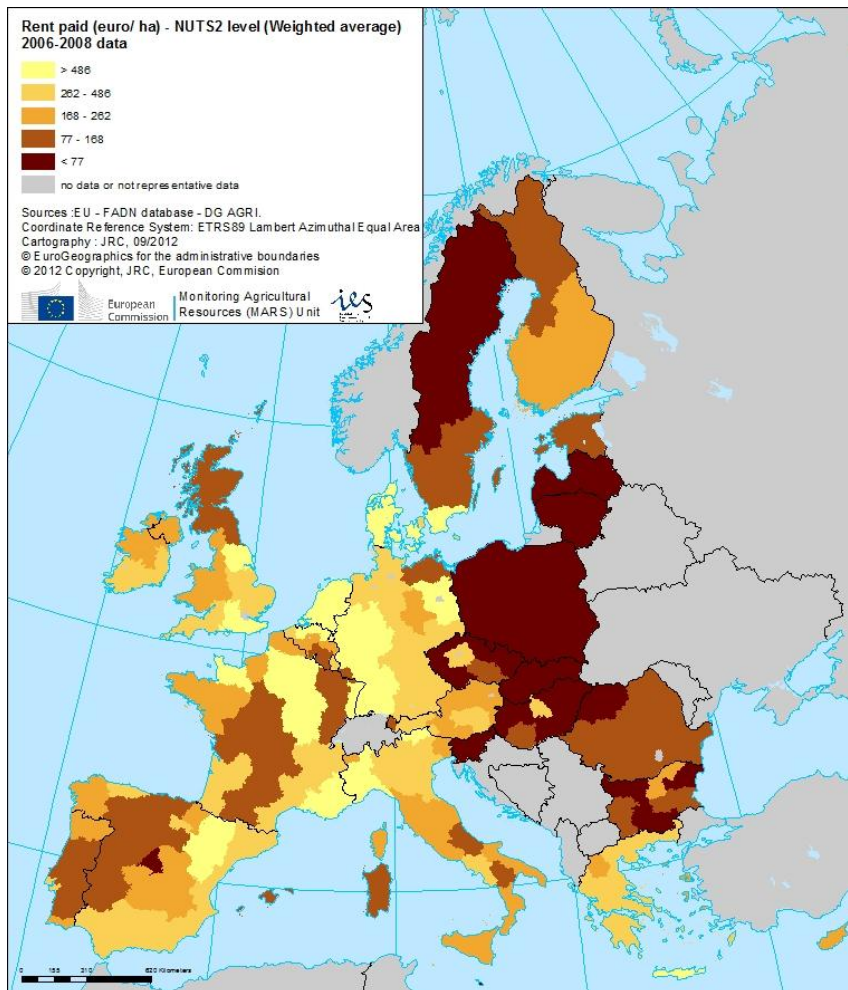
Driver 1: Weak land market

Data	<ul style="list-style-type: none"><i>. Rent Paid, including rent for building, quotas,... FADN var. SE375</i><i>. Rented UAA (ha), FADN var. SE030</i><i>. Total UAA (ha), FADN var. SE025</i>
Threshold	<i>Results presented using 5 quintiles, having 20% of the distribution in each class</i>
Method	<ul style="list-style-type: none"><i>. Weighted average value of the rent per ha (euro ha⁻¹) paid by holding</i><i>. Share of rented land in the total UAA</i>
Evaluation	<ul style="list-style-type: none"><i>• Relevant, conceptually sound, complete</i>



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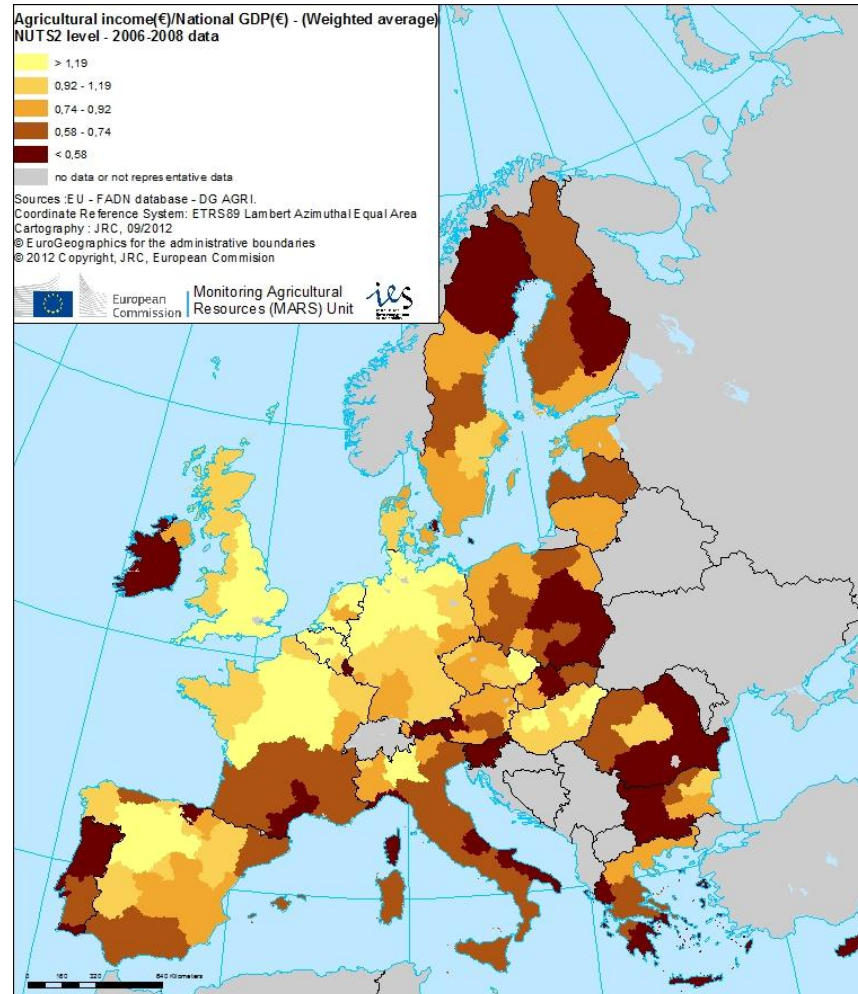
Driver 1: Weak land market



Driver 2: Low farm income

Data	<i>. Farm Net Value Added per Annual Working Unit, FADN Var. SE425 . Gross Domestic Product (GDP) at market prices - Euro per inhabitant from Eurostat website</i>
Threshold	<i>Results presented using 5 quintiles, having 20% of the distribution in each class</i>
Method	<i>. Weighted average of agricultural income / national GDP</i>
Evaluation	<i>Relevant, conceptually sound, complete</i>

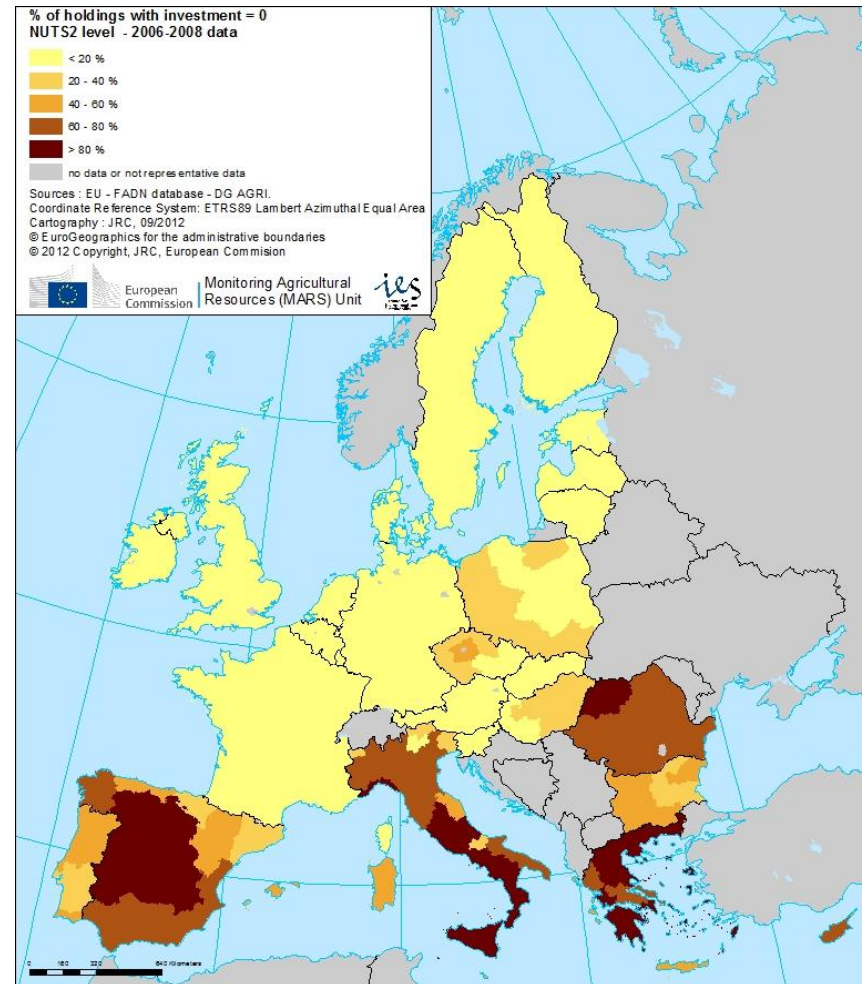
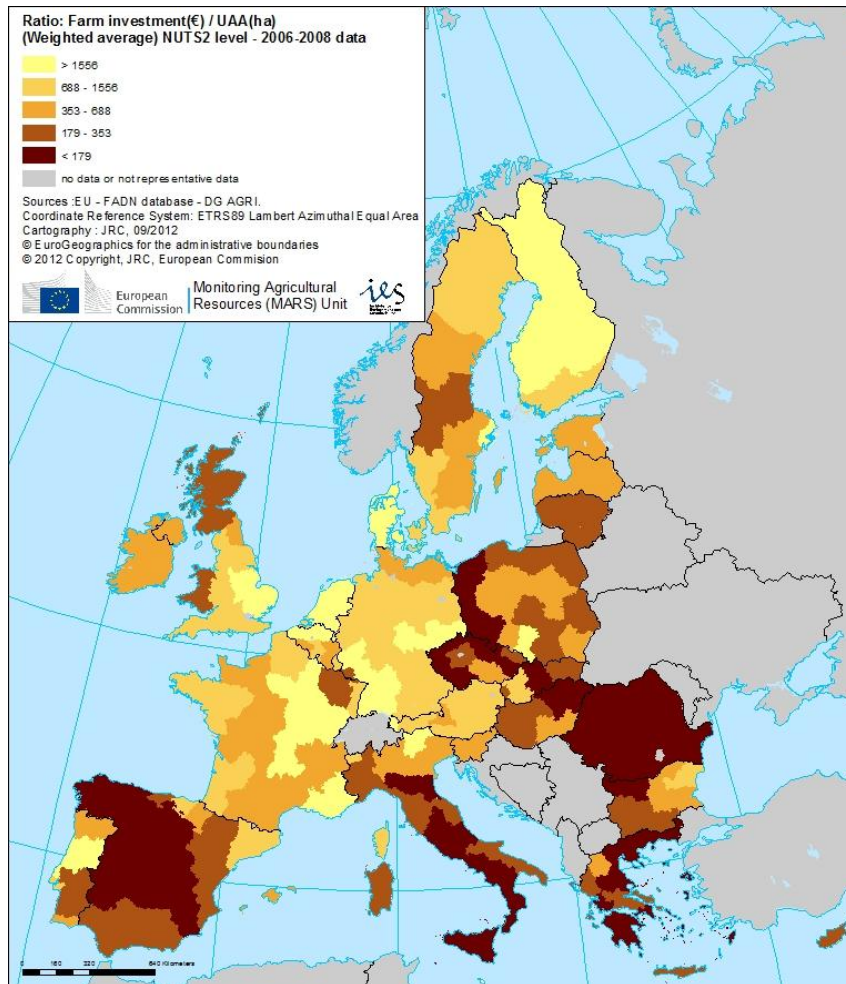
Driver 2: Low farm income



Driver 3: Low investment level in the farm

Data	<i>. Total investments before deduction of subsidies, FADN var. GI103IG: covers agric. land, building, rights, forest, machinery, circulating capital . Total UAA (ha), FADN var. SE025</i>
Threshold	<i>Results presented using 5 quintiles, having 20% of the distribution in each class</i>
Method	<i>. Weighted average of investment per holding (normalised by physical size)</i>
Evaluation	<i>Relevant, low reliability in some MS, some variability</i>

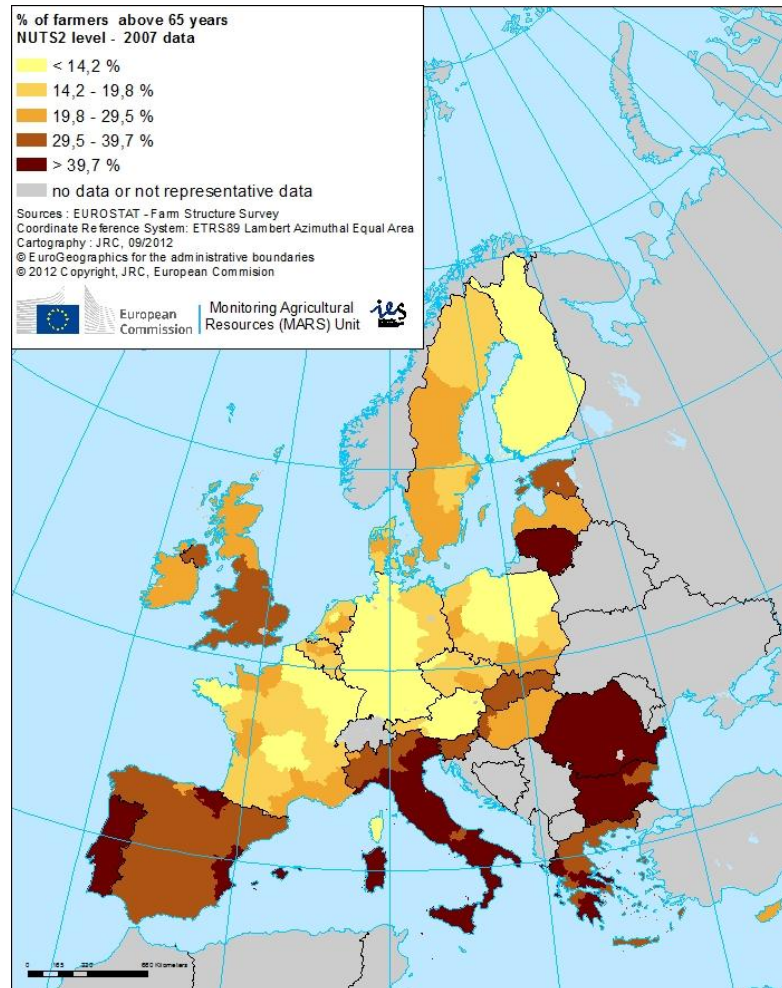
Driver 3: Low investment level in the farm



Driver 4: Age of farm holder

Data	<i>. Farmer's (being a natural person) by age from Eurostat public database</i>
Threshold	<i>Results presented using 5 quintiles, having 20% of the distribution in each class</i>
Method	<i>. Share of farm holders aged more than 65 years</i>
Evaluation	<i>Relevant, low reliability in some MS, some variability</i>

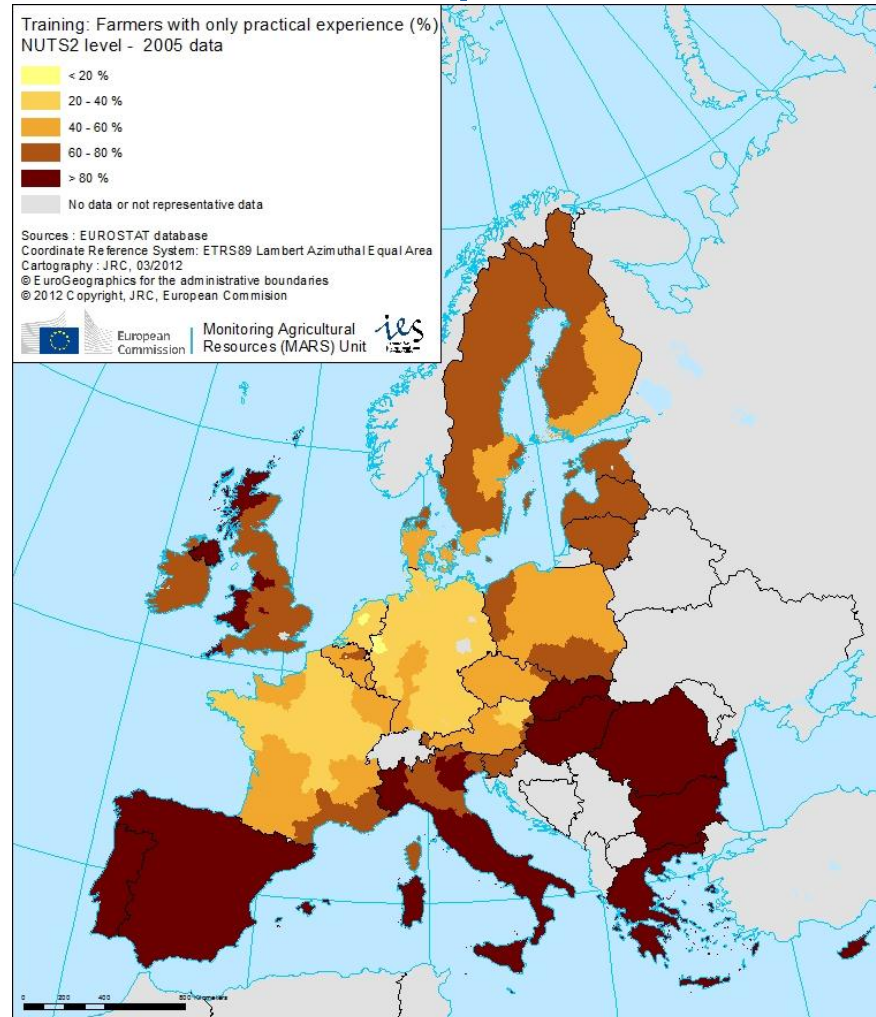
Driver 4: Age of farm holder



Driver 5: Low farmer qualification

Data	<i>. Agricultural training of farmer from Eurostat public database (FSS) (Practical experience only / Basic training / Full agricultural training)</i>
Threshold	<i>Results presented in 5 classes</i>
Method	<i>. Share (percentage) of farmers with practical experience only</i>
Evaluation	<i>Low relevance, low reliability in some MS, some variability</i>

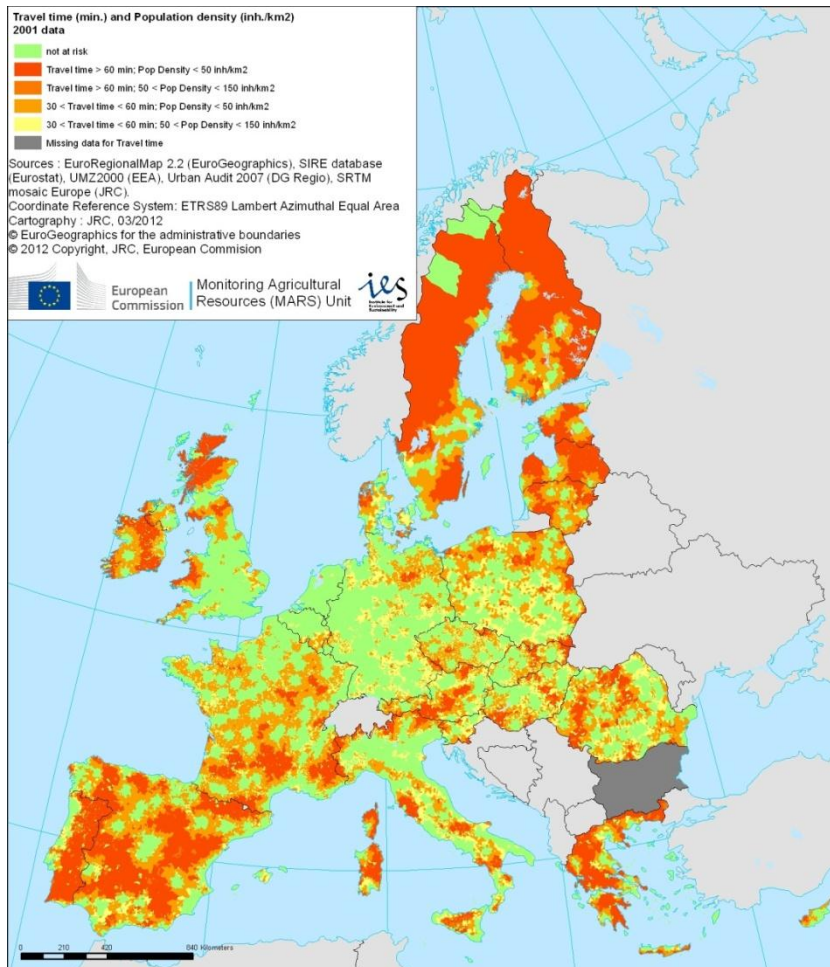
Driver 5: Low farmer qualification



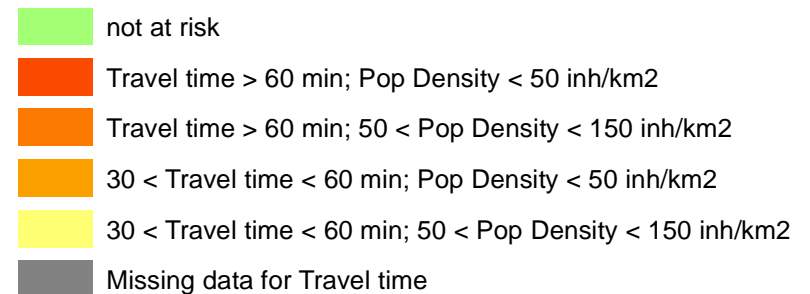
Driver 7: Remoteness / low population density

Data	<ul style="list-style-type: none"> . <i>Travel time</i> . <i>Population density</i>
Threshold	<p><i>Travel time to reach an urban center (> 50.000 inhabts): > 60 min (tested also for more than 2 hours)</i></p> <ul style="list-style-type: none"> . <i>Population density: < 50 inhabts / Km2.</i> . <i>Travel time and population density layers combined: > 60 min AND < 50 inhabts / Km2</i>
Method	<ul style="list-style-type: none"> . <i>Travel time: GIS network analysis</i> . <i>Population density: at commune level</i>
Evaluation	<i>Relevant, conceptually sound, complete, detailed scale</i>

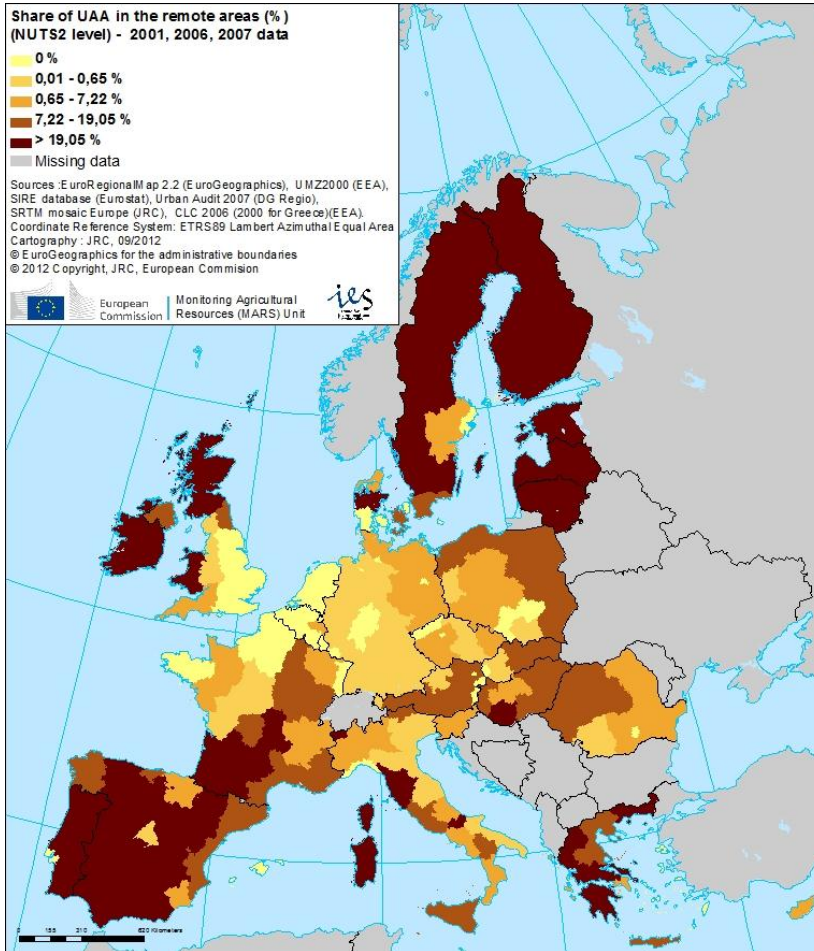
Driver 7: Remoteness / low population density



Travel time and population density layers combined



Driver 7: Remoteness / low population density



Ratio: UAA at risk / UAA total (%) at NUTS2 level

Travel time and population density layers combined with UAA at risk

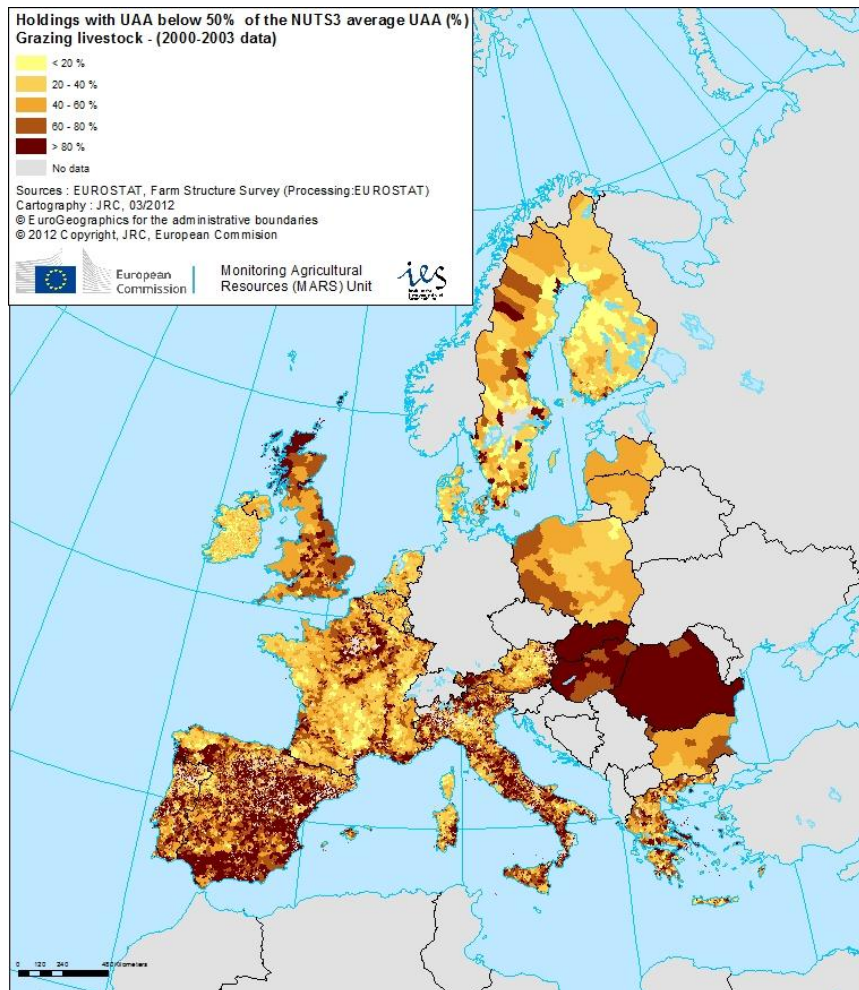
UAA at risk = Agricultural areas with "Travel time > 60 min AND Pop Density < 50 inh./km²"

CORINE LAND COVER used to estimate UAA at LAU2 level.

Driver 8: Low farm size

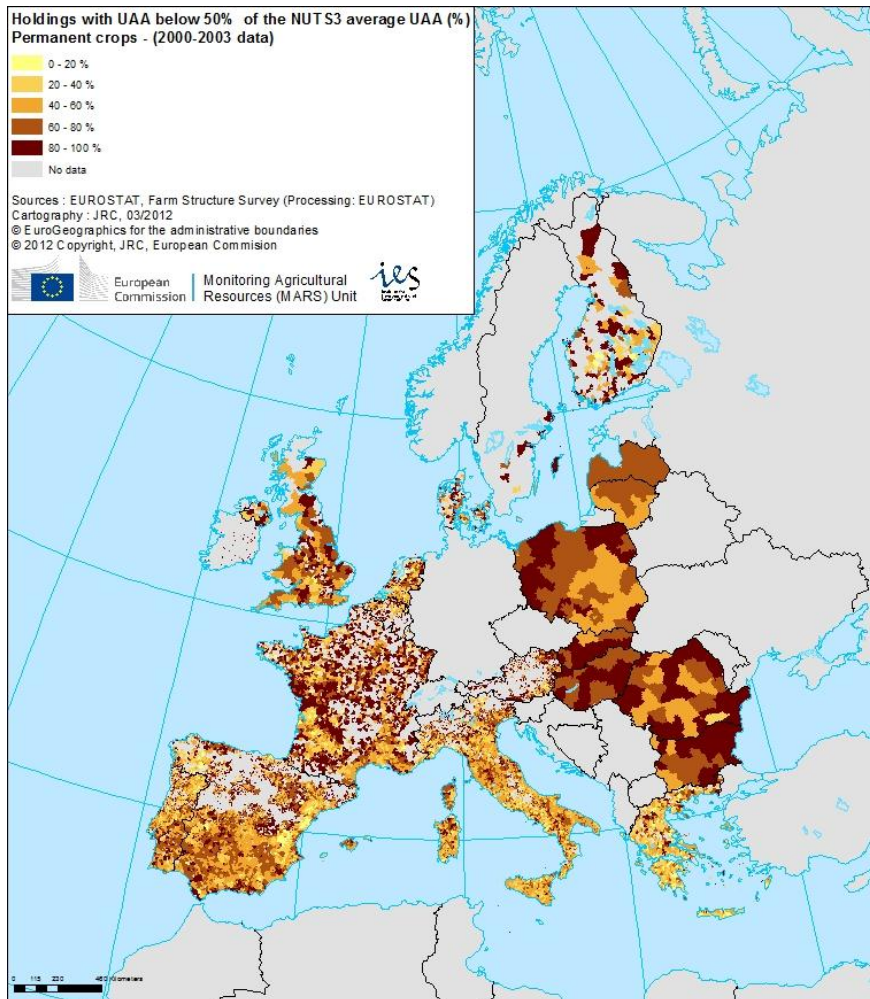
Data	<i>. FSS UAA by FT: % holding with UAA per holding below 1/2 regional average (by FT) at lowest possible geographic level (NUTS3, LAU1, LAU2)</i>
Threshold	<i>Results presented in 5 classes</i>
Method	<i>. Regional average (by FT) calculated at NUTS3 level</i>
Evaluation	<i>. Relevance, low reliability in some MS, conceptual issues, some variability amongst MS</i>

Driver 8: Low farm size



Share of “grazing livestock” holdings (percentage) with UAA below half the NUTS3 average of “grazing livestock” farms

Driver 8: Low farm size

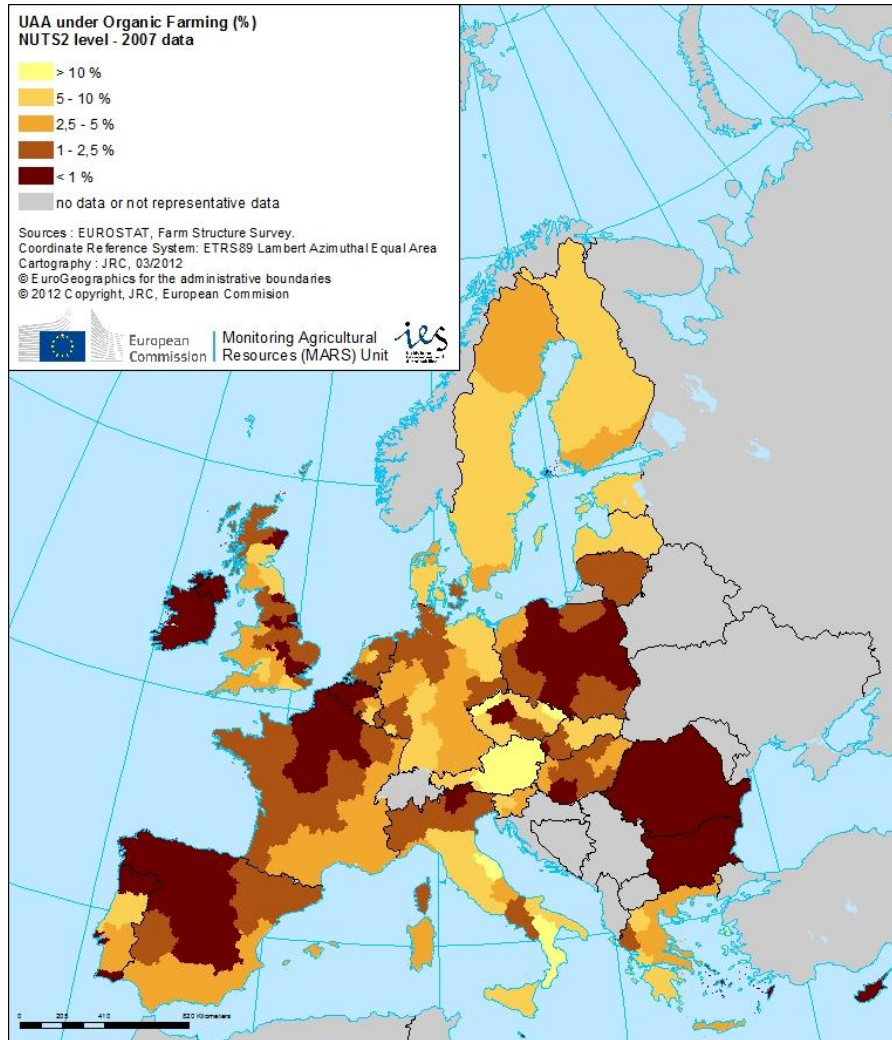


Share of “permanent crops” holdings (percentage) with UAA below half the NUTS3 average of “permanent crops” farms

Driver 9: Farm enrolment in Specific Schemes

Data	<i>. AEM data on "organic farming" from FSS Eurostat public database</i>
Threshold	<i>Results presented in 5 classes</i>
Method	<i>. Share of UAA (percentage) in organic farming (certified)</i>
Evaluation	<i>. Reliable, conceptual deficiency</i>

Driver 9: Farm enrolment in Specific Schemes



The Composite Index

Combination of meaningful drivers into an index following a methodology proposed by the OECD (2008).

Theoretical aspects

Data selection. Drivers should be selected on the basis of their analytical soundness, measurability, country coverage, relevance to the phenomenon being measured and relationship to each other.

Normalisation. Drivers should be normalised to render them comparable. Attention needs to be paid to extreme values as they may influence subsequent steps in the process of building a composite index.

Weighting and aggregation. Indicators should be aggregated and weighted according to the underlying theoretical framework.

Robustness and sensitivity. Analysis should be undertaken to assess the robustness of the composite indicator in terms of, e.g. the choice of weights.

Links to other variables. Attempts should be made to correlate the composite index with other published indicators.

Results:

The combination of data selection and normalisation procedures result in 4 scenarios:

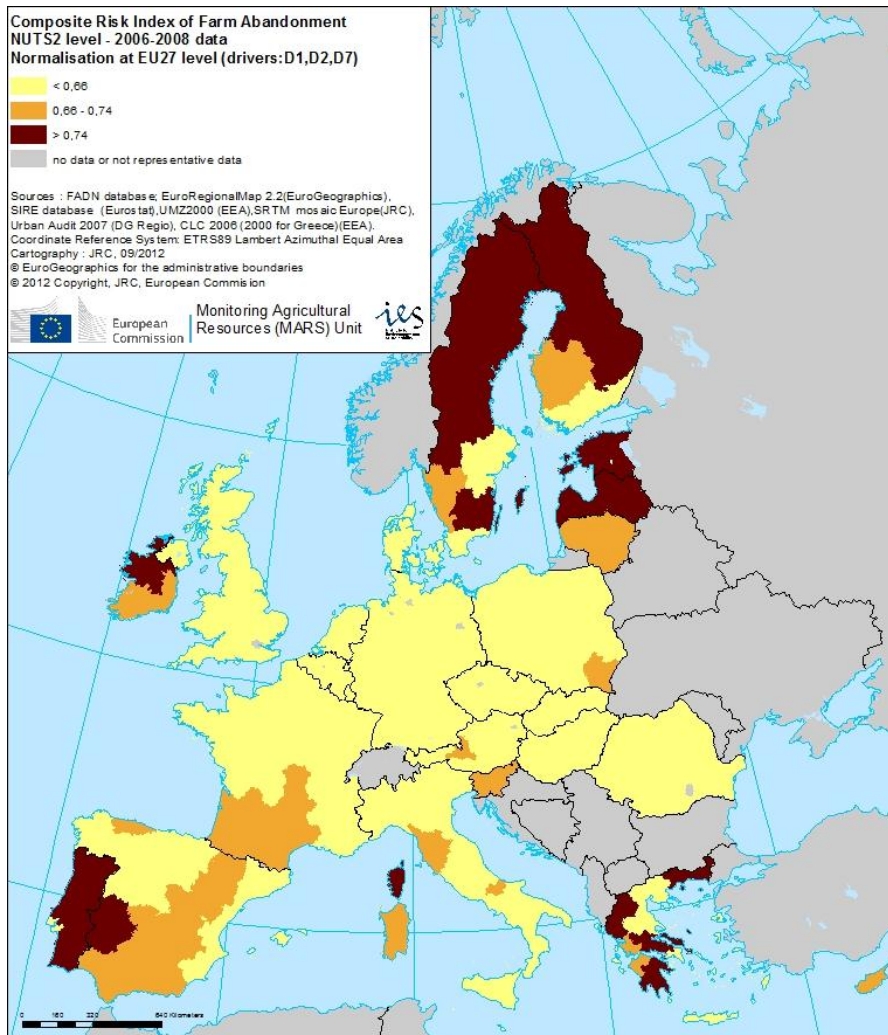
Drivers meaningful and complete: <ul style="list-style-type: none"> • <i>Weak land market</i> • <i>Farm income</i> • <i>Population density and remoteness</i> 	Normalised at EU27 level	S1
	Normalised in each MS	S2
Drivers meaningful and complete added with drivers: <ul style="list-style-type: none"> • <i>Low farm investment</i> • <i>Age of farm holder</i> 	Normalised at EU27 level	S3
	Normalised in each MS	S4

- **Normalisation method:** Min-Max [0 – 1]
- **Weighting:** equal weight assigned to each driver
- **Aggregation:** linear combination



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Results: Scenario 1

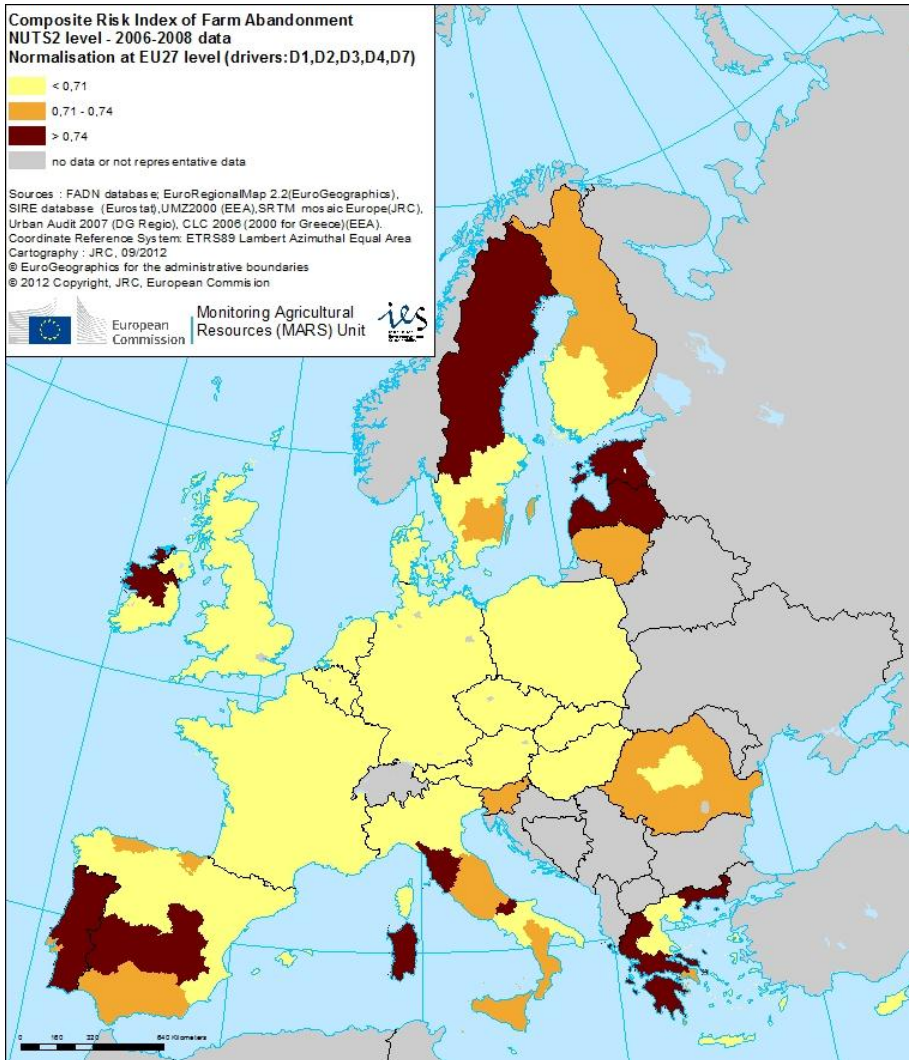


Composite indicator of the risk of farmland abandonment based on drivers D1, D2, D7, normalised at EU27 level. Quintile 0-80% (yellow), 80% - 90% (light brown) and 90% - 100% (dark brown)



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Results: Scenario 3

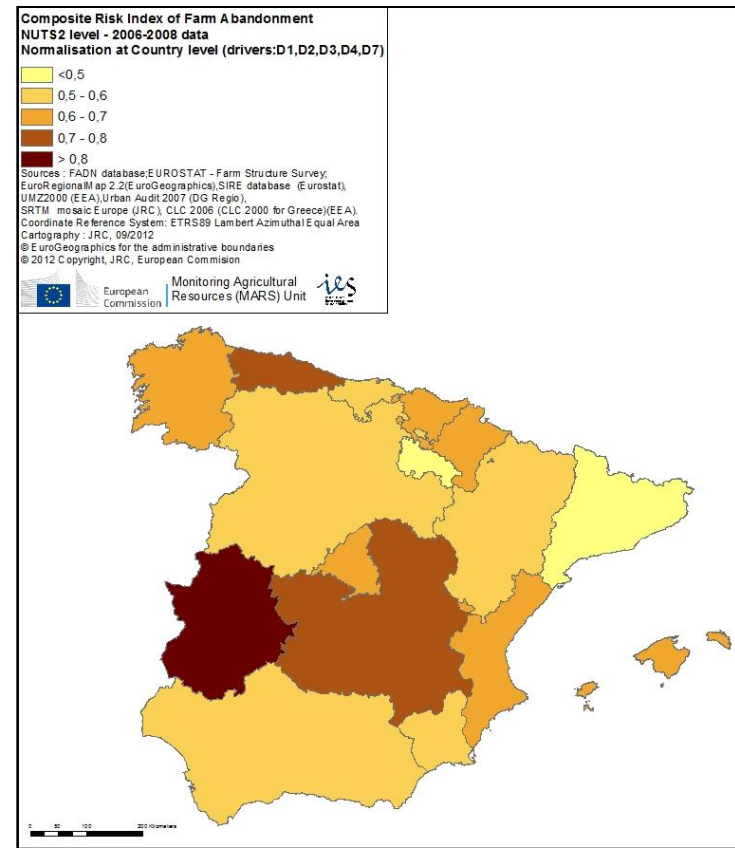
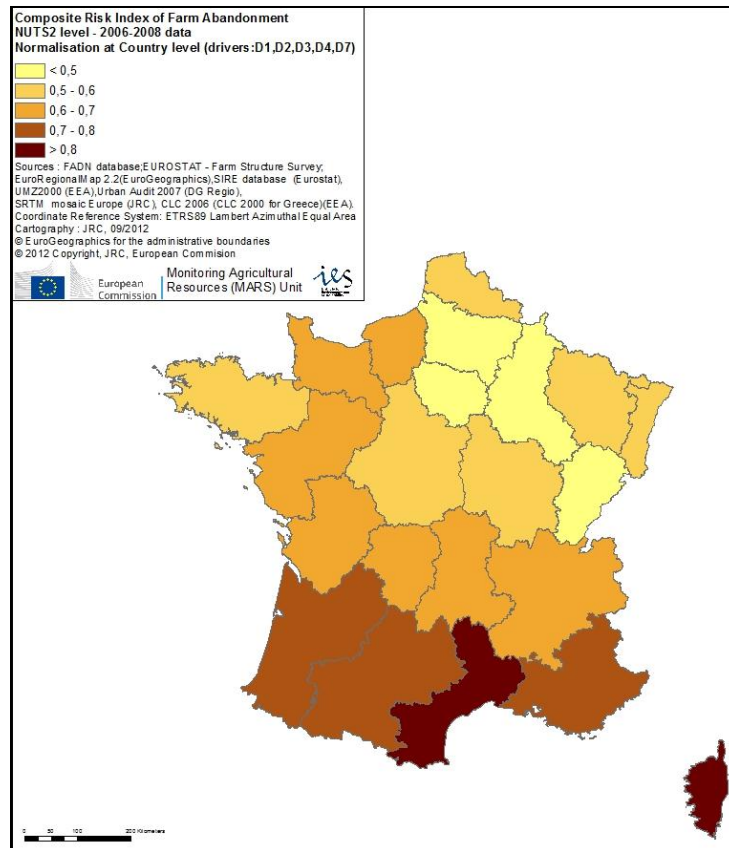


Composite indicator of the risk of farmland abandonment based on drivers D1, D2, D7, normalised at EU27 level. Quintile 0-80% (yellow), 80% - 90% (light brown) and 90% - 100% (dark brown)



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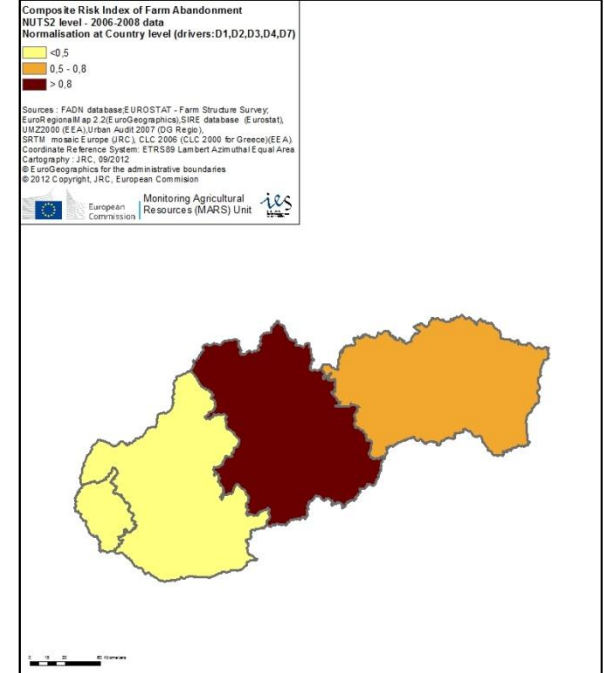
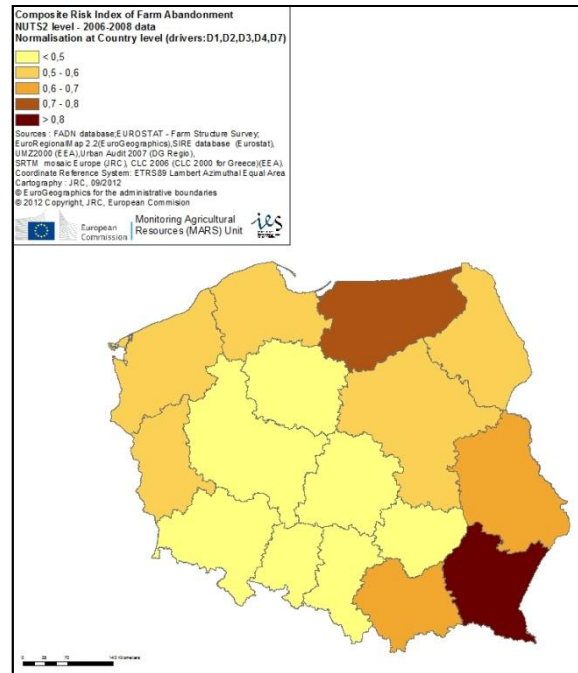
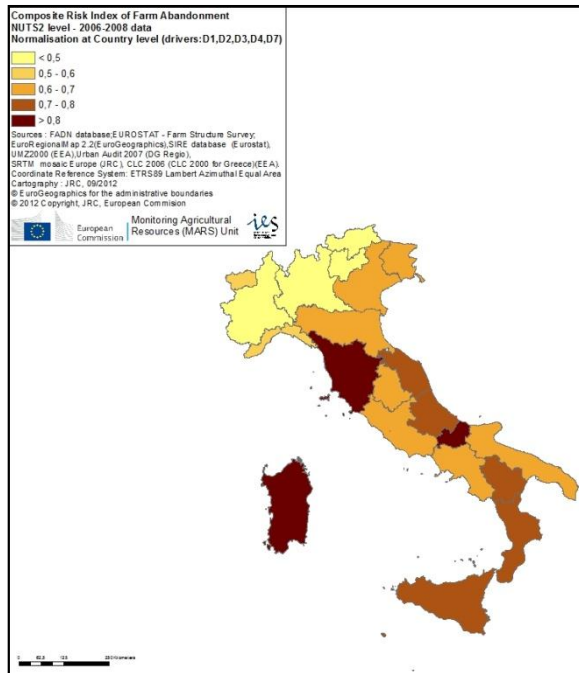
Results: Scenario 4 - examples





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Results: Scenario 4 - examples



Conclusions

Regions with higher risk (European level – scenario3):

- PT, SP(Extremadura & Castilla la Mancha), IT (Tuscany, Molise, Sardinia), EL, LV, EE, FI (northern), SE (northern), IE (Donegal, Connacht)

Farm-types in regions with higher risk:

- Specialist grazing livestock, specialist permanent crops

Environmental impact:

- Negative for extensively managed land (biodiversity, semi-natural habitats...)
- However, can be beneficial under specific conditions (fragmented landscape)
- Abandoned land for agriculture but options for reversion to natural woodland, hunting, recreation ...

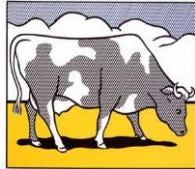
Conclusions

Methodology

- Manifold causes and interactions for FLA, varying amongst MS
- Ranking of regions at risk rather than absolute value
- National level more reliable than EU27

- Data needed at better spatial scale
- Some issues related to FADN data on investment, land rent, 'household' or external income
- Better FSS data needed (LAU2 or anonymised)
- Spatial downscaling possible – improve results (e.g Tuscany)
- Issue with codes of administrative units (changing in time)
- FLA observations needed to validate the model

Data availability



At detailed scale (LAU2)

A good picture of reality



Local level NUTS3

Cubism/patterns of reality



Regional / National level (NUTS2, 1, 0)

Abstract painting

But we did it !!

