



Looking back and the way forward: assessing the vulnerability and resilience of High Nature Value farmlands in time

LOMBA A.

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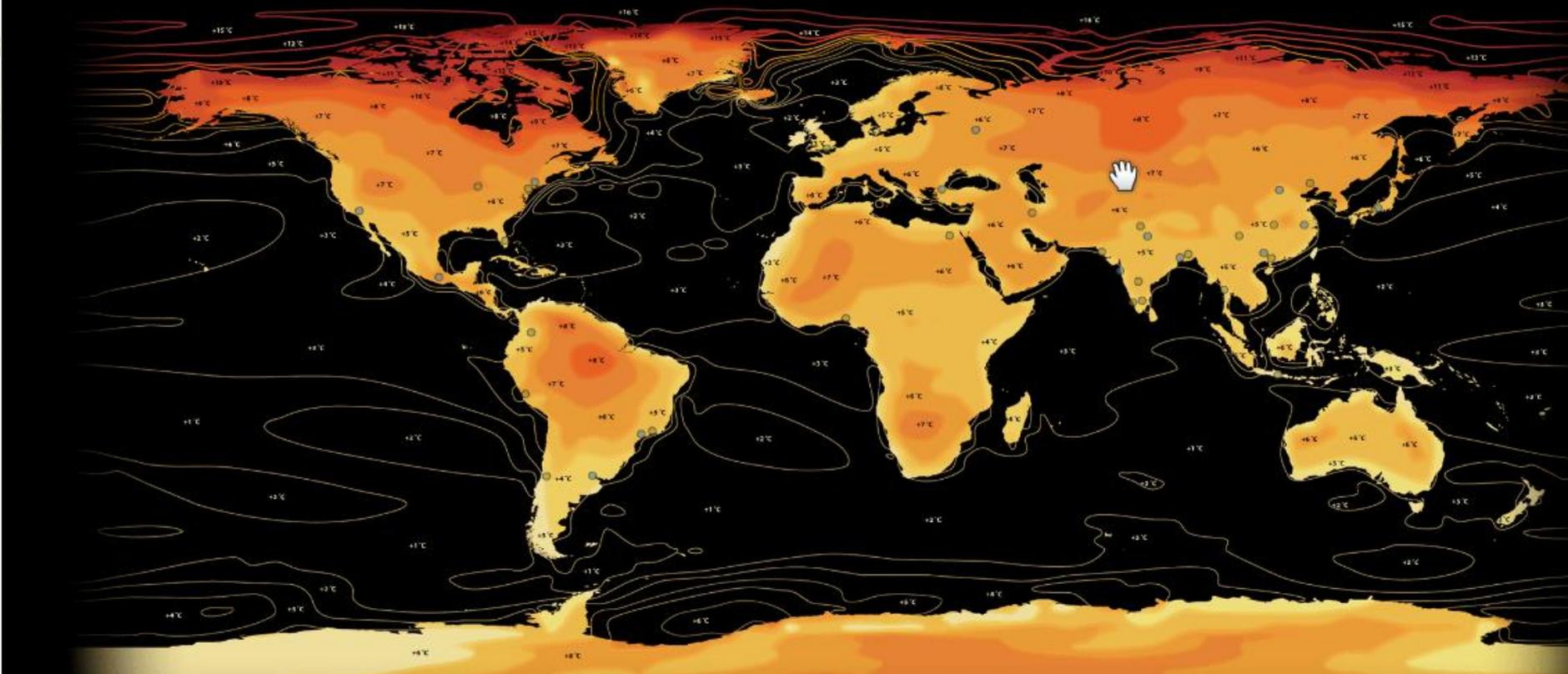
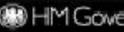
ECOLOGY AT THE INTERFACE
21 | 25 SEPTEMBER 2015 ROME

 **InBIO** RESEARCH NETWORK
Biodiversity and Evolutionary Biology

Unprecedented global environmental change

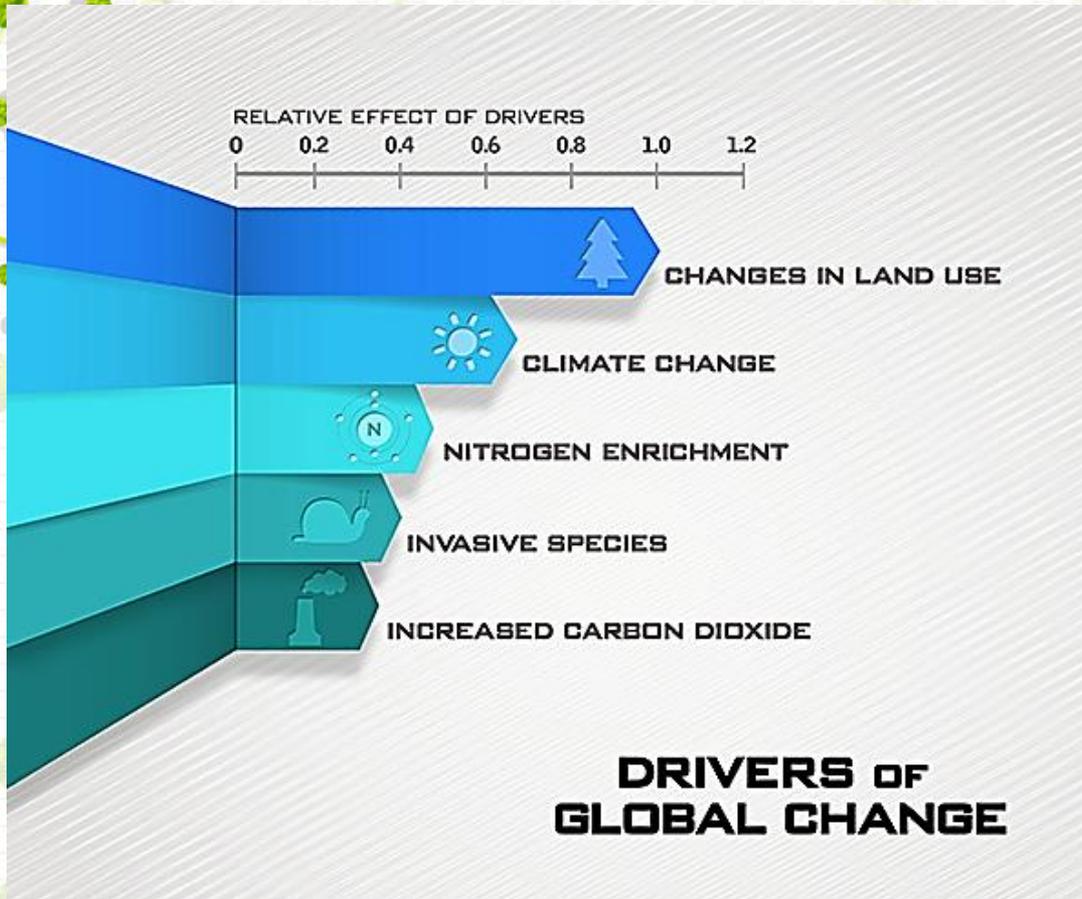


The impact of a global temperature rise of 4°C (7°F)



[<http://www.metoffice.gov.uk/climate-change/guide/impacts/high-end/map>; accessed 19.06.2013]

Unprecedented global environmental change

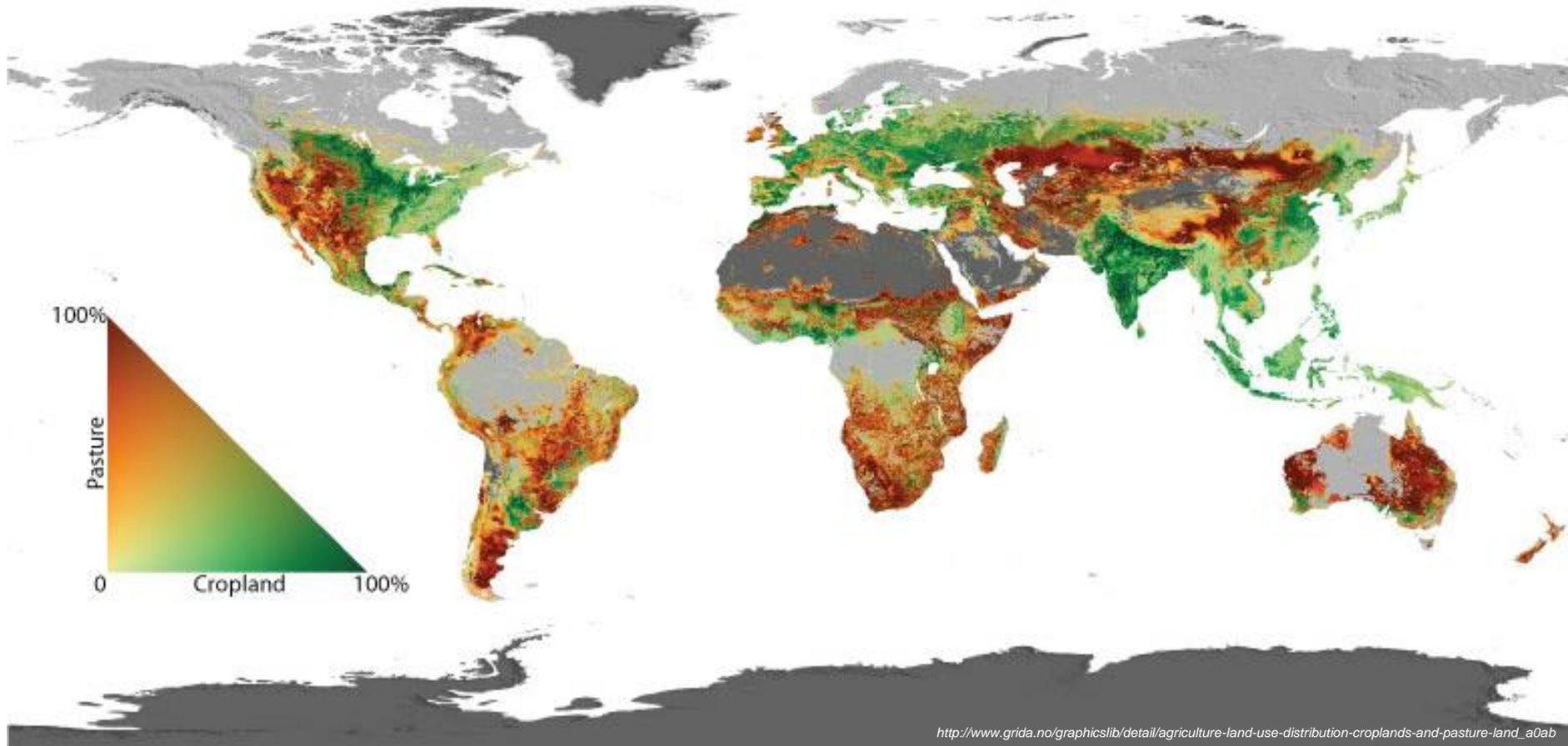


http://www.lifeafterearthscience.com/gc_climatechange.php



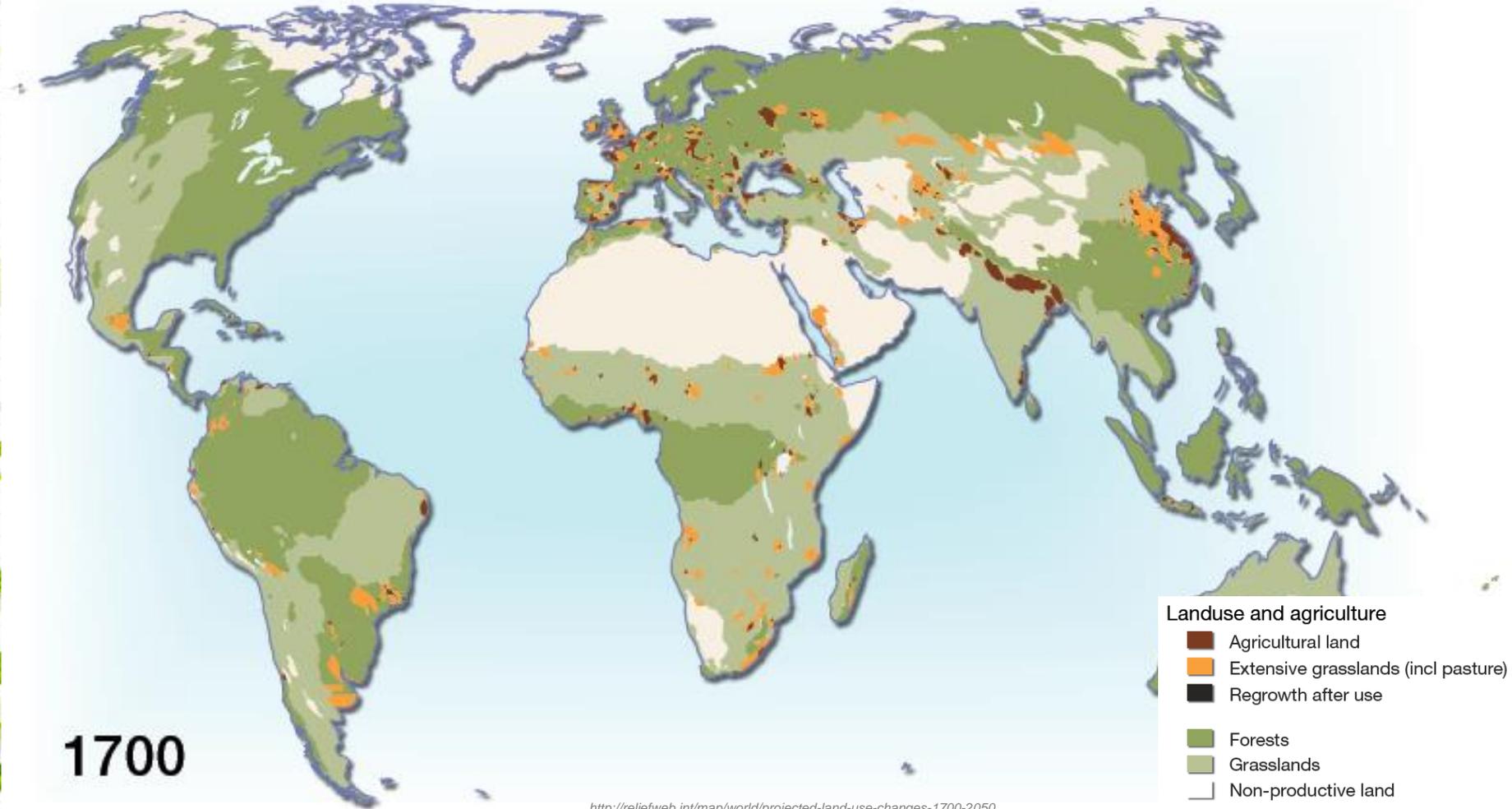
<http://www.frankfurter-zukunftsrat.de/english/global-change/global-change.asp>

Worldwide distribution of agricultural lands

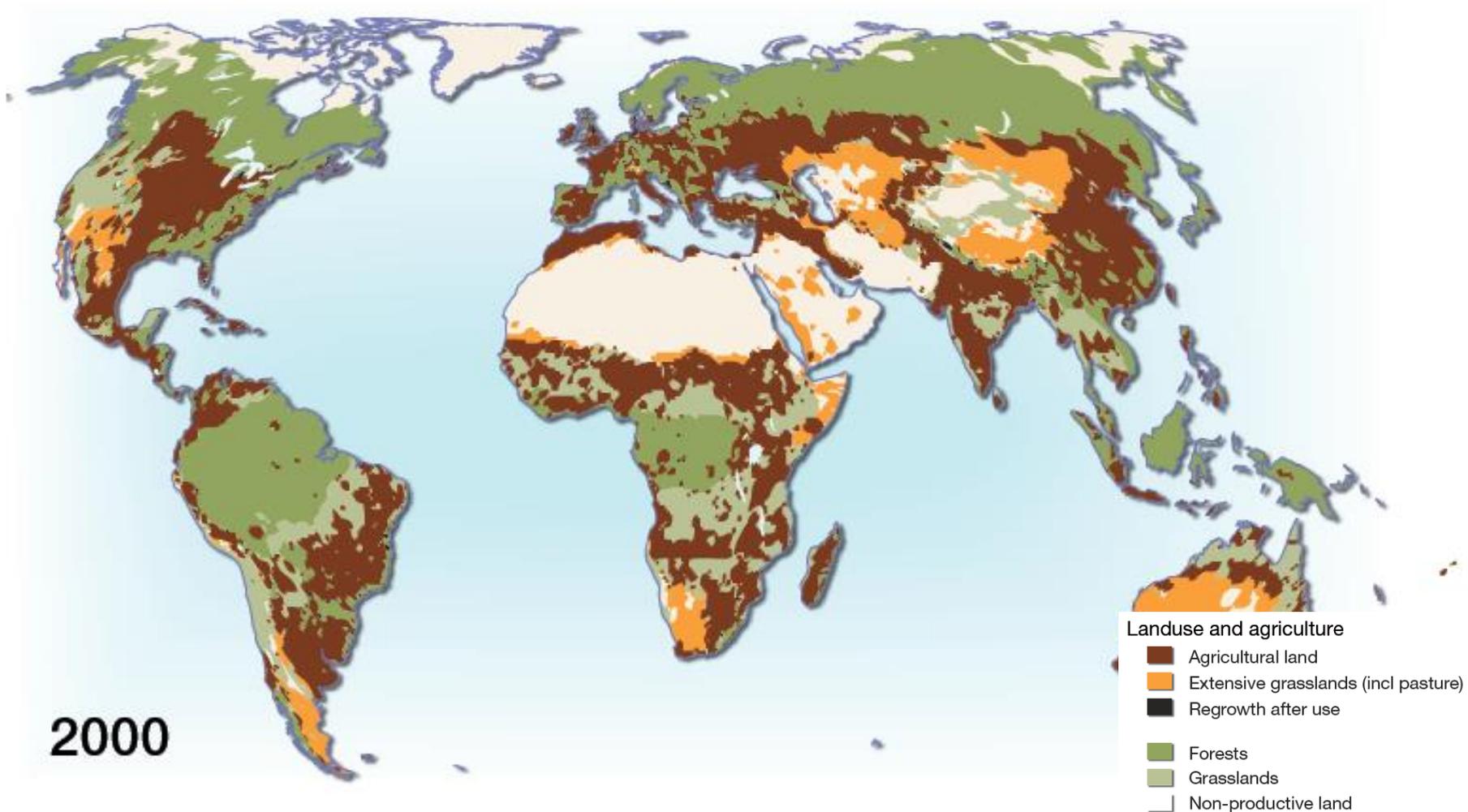


Agriculture is a *dominant* form of **land management globally**,
Agricultural ecosystems cover nearly **40%** of the terrestrial surface of the Earth;

Agriculture impacts on biodiversity

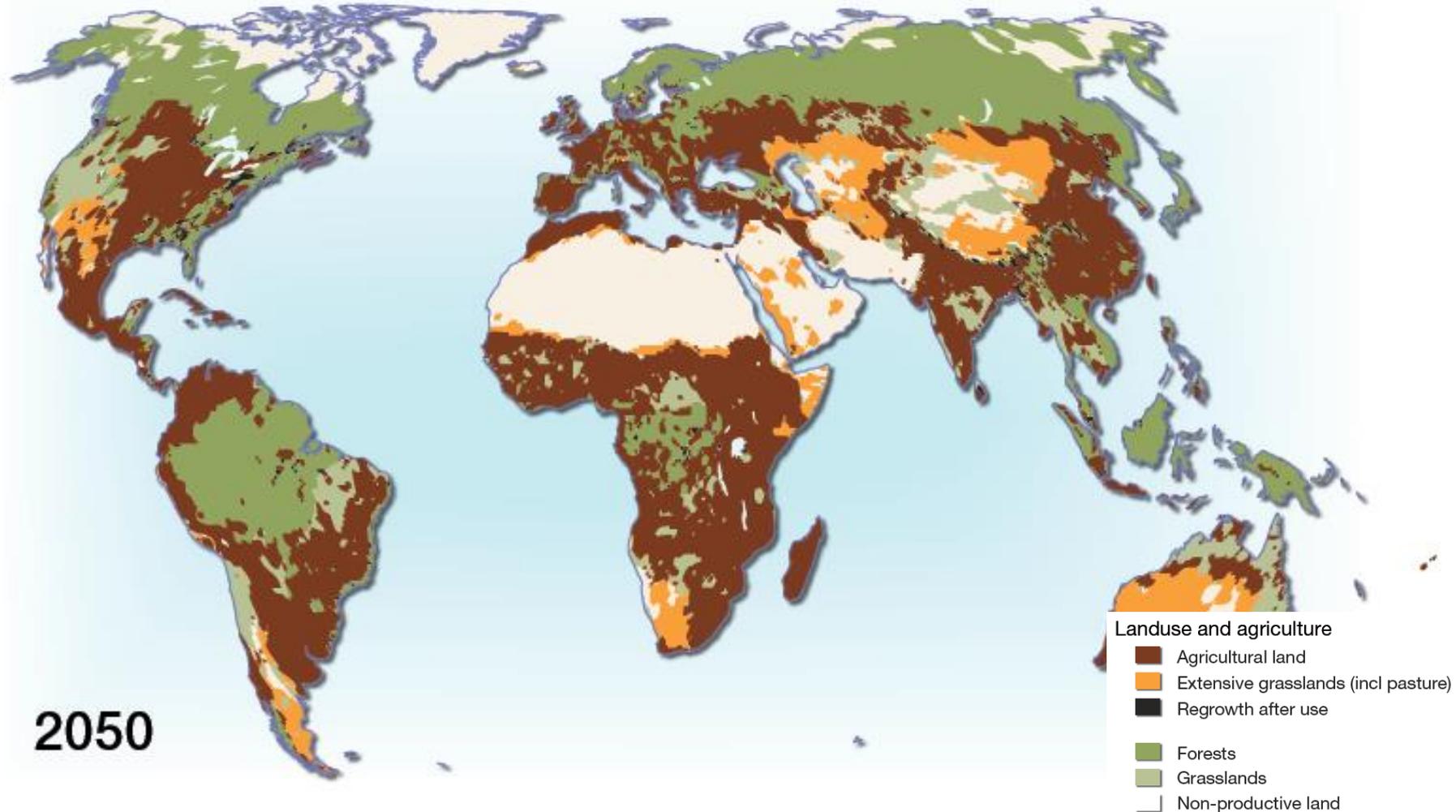


Agriculture impacts on biodiversity



<http://reliefweb.int/map/world/projected-land-use-changes-1700-2050>

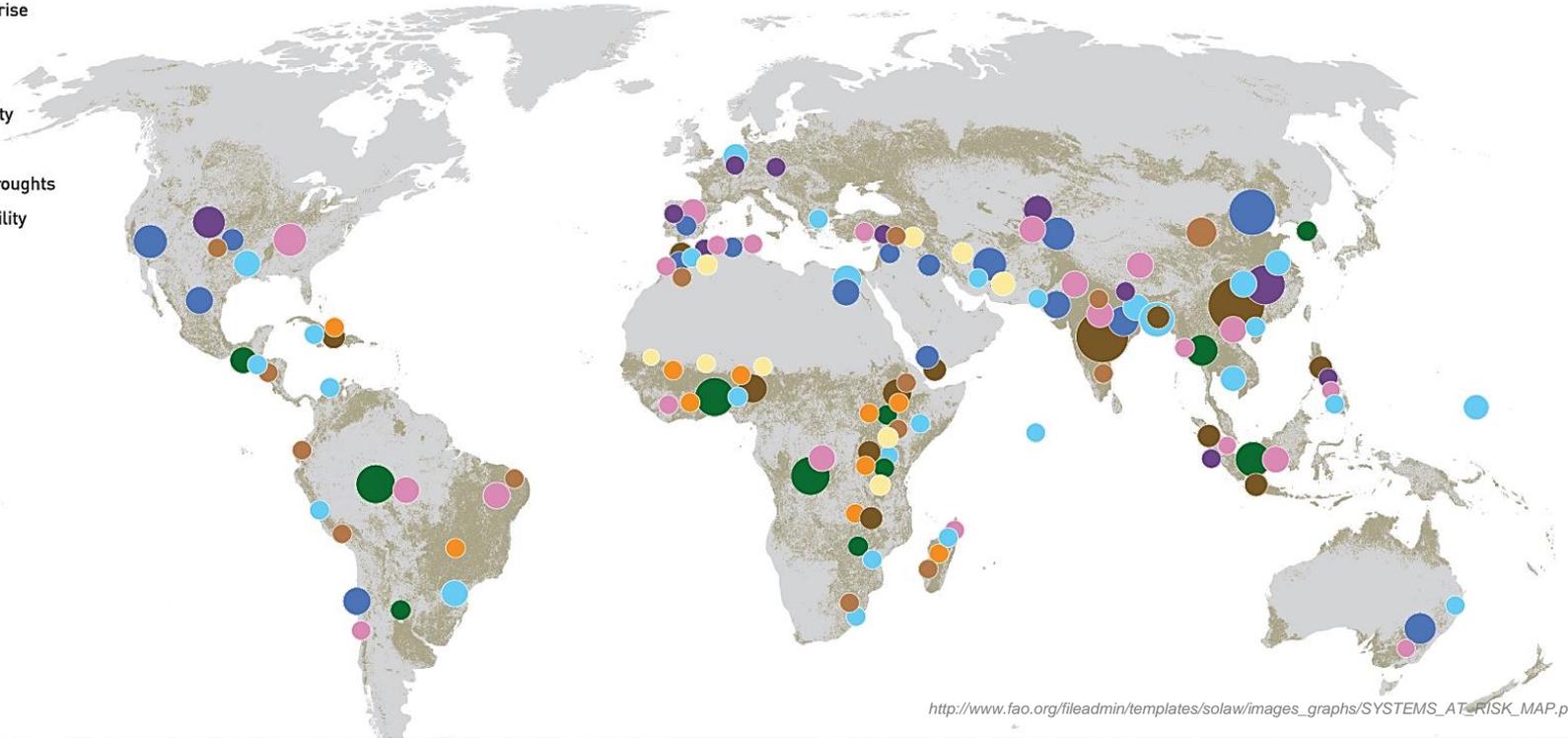
Agriculture impacts on biodiversity



<http://reliefweb.int/map/world/projected-land-use-changes-1700-2050>

...and Ecosystem Services

- Floods/sea-level rise
- Water scarcity
- Pollution
- Loss of biodiversity
- Deforestation
- Desertification/droughts
- Loss/low soil fertility
- Erosion
- Land scarcity
- Cropland

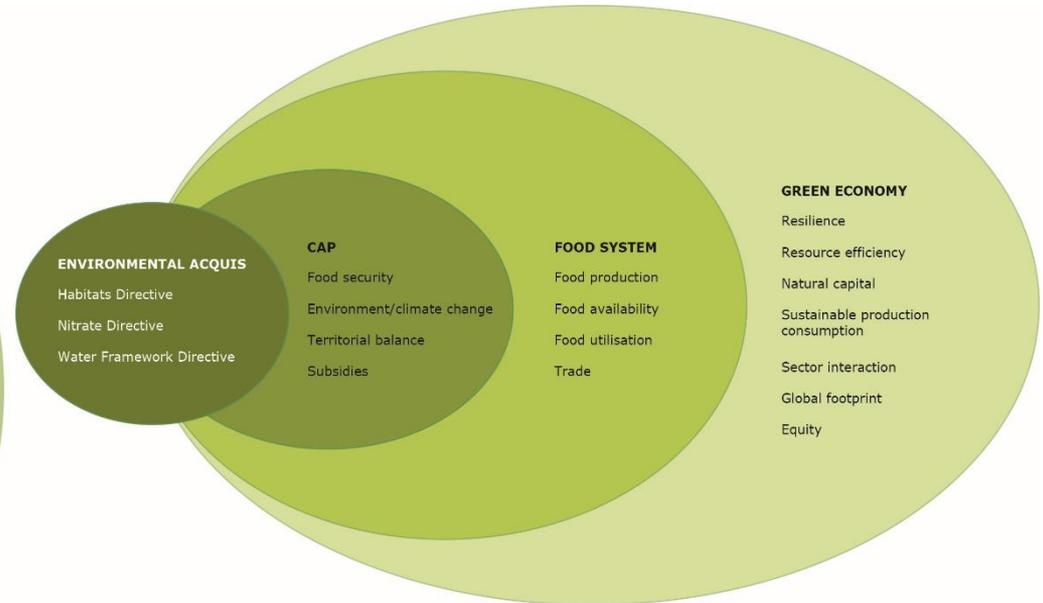
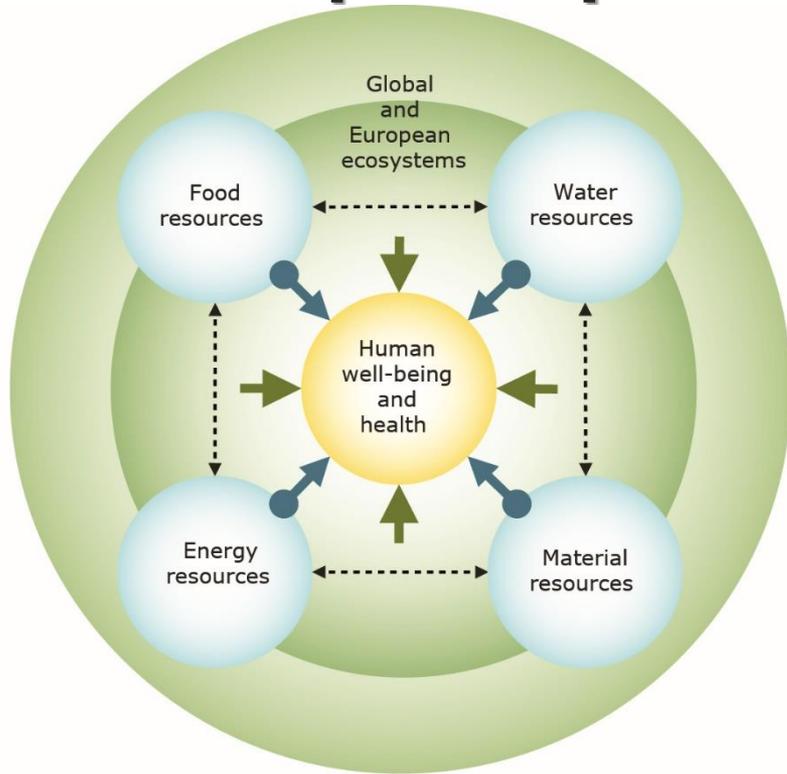


http://www.fao.org/fileadmin/templates/solaw/images_graphs/SYSTEMS_AT_RISK_MAP.pdf



<http://willhead.blogspot.pt/2011/03/crop-tops-strand-agricultural.html>

HNVf: bridging nature conservation and rural development policies



<http://www.eea.europa.eu/themes/agriculture/greening-agricultural-policy>

Capitals

-  Natural capital (i.e. air, water, land, seas, biodiversity)
-  Produced capital (i.e. along resources life-cycle)
-  Social and human capital

Services

-  Resource needs for consumption (e.g. provisioning services)
-  Access and exposure to environment (e.g. regulating and cultural services)
-  Links between resource uses (e.g. water needed for food production)



HNVf are complex social-ecological systems



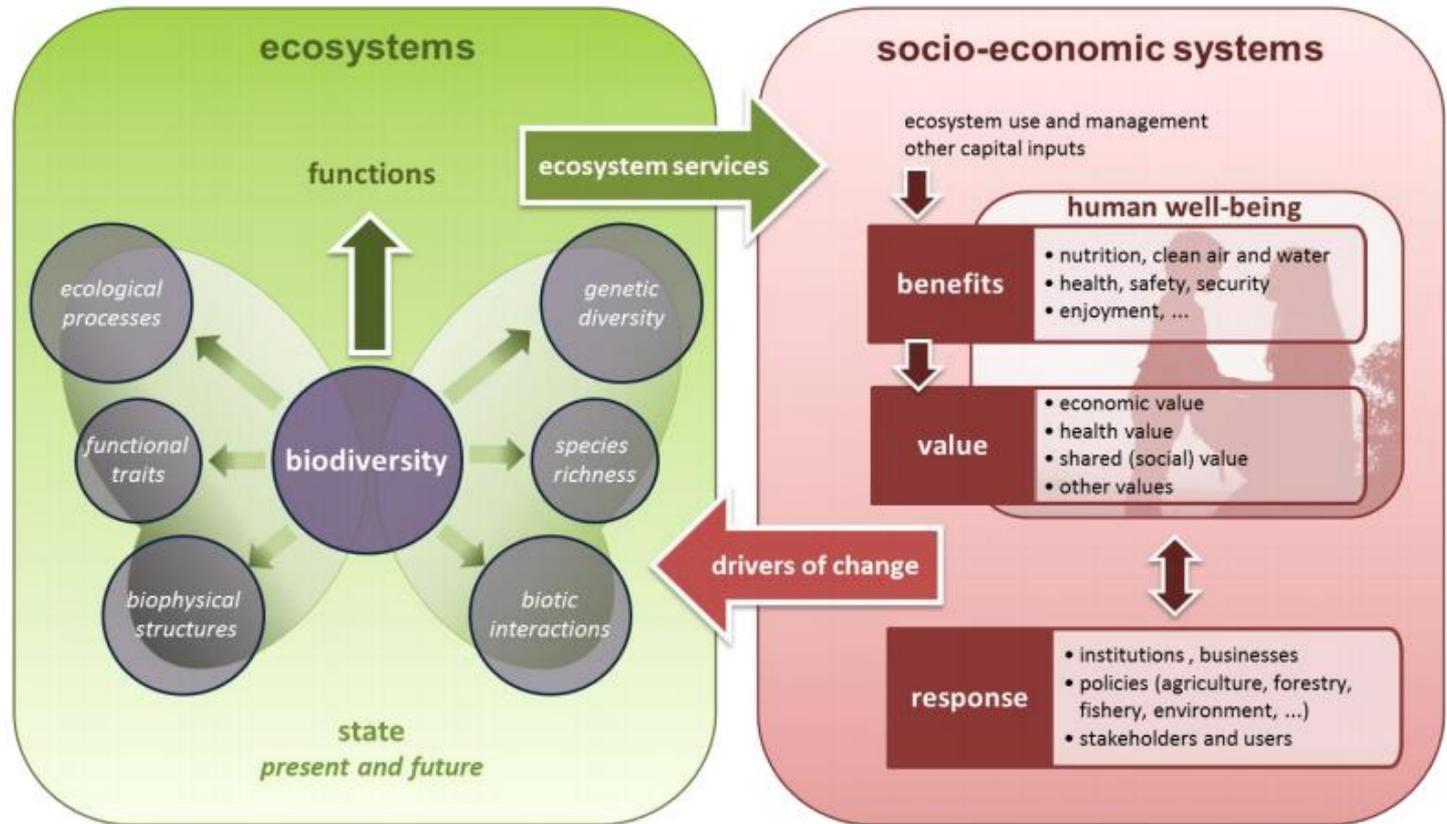
HNVf are complex social-ecological systems



HNVf are complex social-ecological systems (SES)



Linking SES and ecosystem services



Work on ecosystem services can help strengthening local values such as sense of ownership, traditional knowledge, cultural values and social participation. [report EuroMAB workshop on ecosystem services July 2011]

Advances in HNVf assessment in EU countryside

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Journal of Environmental Management

journal homepage: www.elsevier.com/locate/jenvman



Review

Mapping and monitoring High Nature Value farmlands: Challenges in European landscapes

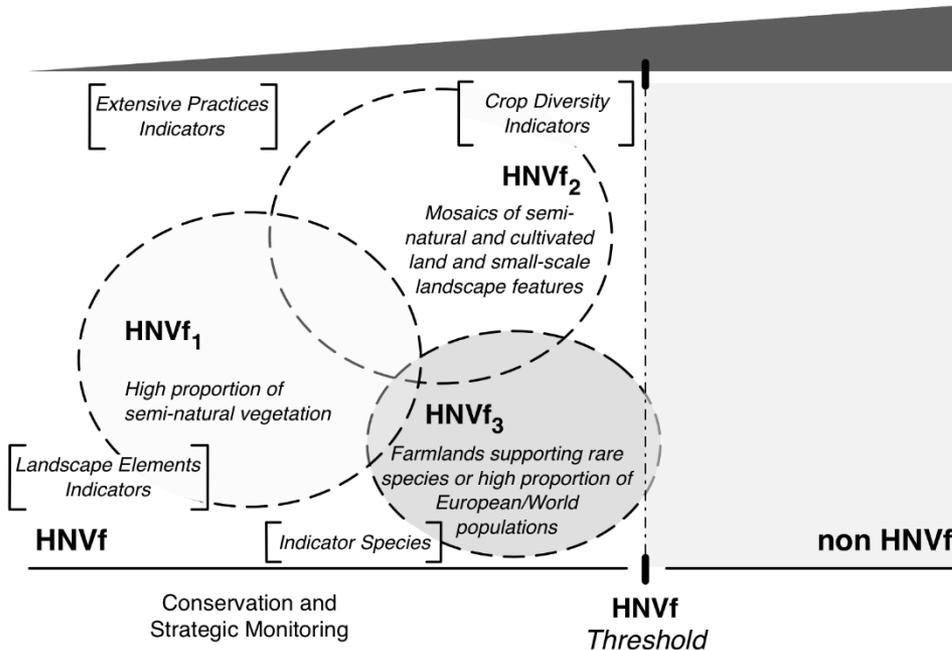


Angela Lomba^{a,b,*}, Carlos Guerra^{c,d}, Joaquim Alonso^d, João Pradinho Honrado^a, Rob Jongman^b, David McCracken^e

Extensive Agriculture

Farming System Intensity

Intensive Agriculture



Advances in HNVf assessment in EU countryside



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Ecological Indicators

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High Nature Value farming: From indication to conservation

Michael W. Strohbach^{a,b,*}, Marina L. Kohler^{b,c}, Jens Dauber^b, Sebastian Klimek^b

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^c University of Innsbruck, Institute of Ecology, Sternwartestraße 15, A-6020 Innsbruck, Austria

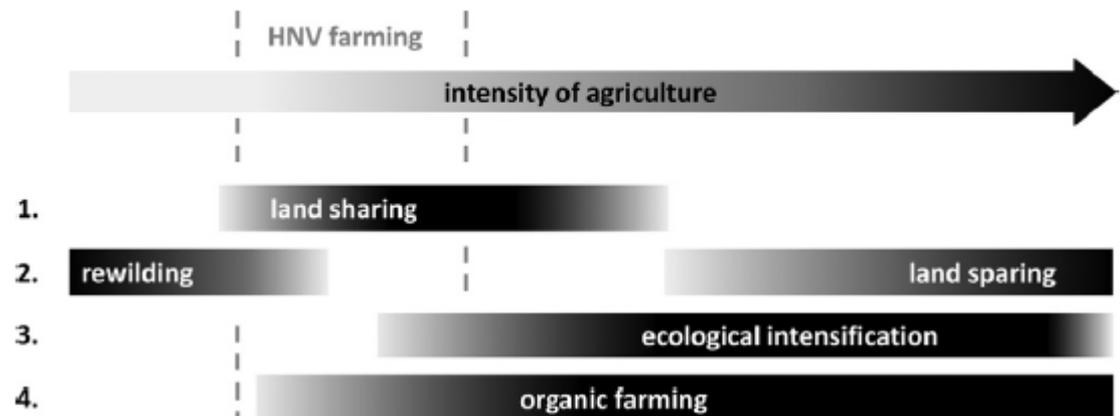


Fig. 2. The conceptualized relationship between the intensity of agriculture and the concepts for farmland biodiversity conservation described in Section 4. The region where HNV farming can be found (from Fig. 1) is shown in dashed lines. While there is a clear overlap of HNV farming with the land sharing approach, the other concepts are not specifically targeted at HNV farming, or, in the case of rewilding, are potentially exclusive.



Advances in HNVf assessment in EU countryside

Ecology and Evolution

Open Access

Reconciling nature conservation and traditional farming practices: a spatially explicit framework to assess the extent of High Nature Value farmlands in the European countryside

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³Hill & Mountain Research Centre, Scotland's Rural College, Auchincruive, Ayr KA6 5HW, UK

European



National (NUT I)



Regional (NUT II)



Local (LAU)

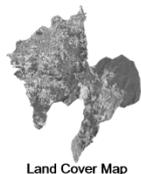


Spatially-explicit framework to target farmlands with High Nature Value (HNVf)

Steps

1

UAA_p establishment



Land Cover Map

HNVf minimum and maximum definition

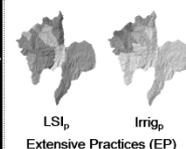


pHNV_{f_{min}}

2

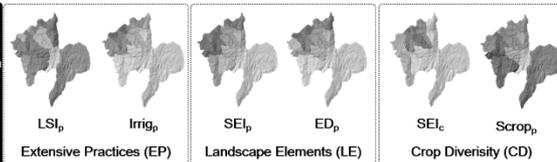
Sets of indicators and HNV₁ and HNV₂ farmlands assessment

HNV₁



LSI_p Irrig_p
Extensive Practices (EP)

HNV₂



LSI_p Irrig_p SEI_p ED_p SEI_c Scrop_p
Extensive Practices (EP) Landscape Elements (LE) Crop Diversity (CD)

3

HNV₃ farmlands



IPs



IBAS
Indicator Species (Isp)

4

Total HNV farmlands



Landscapes dominated by farmed areas

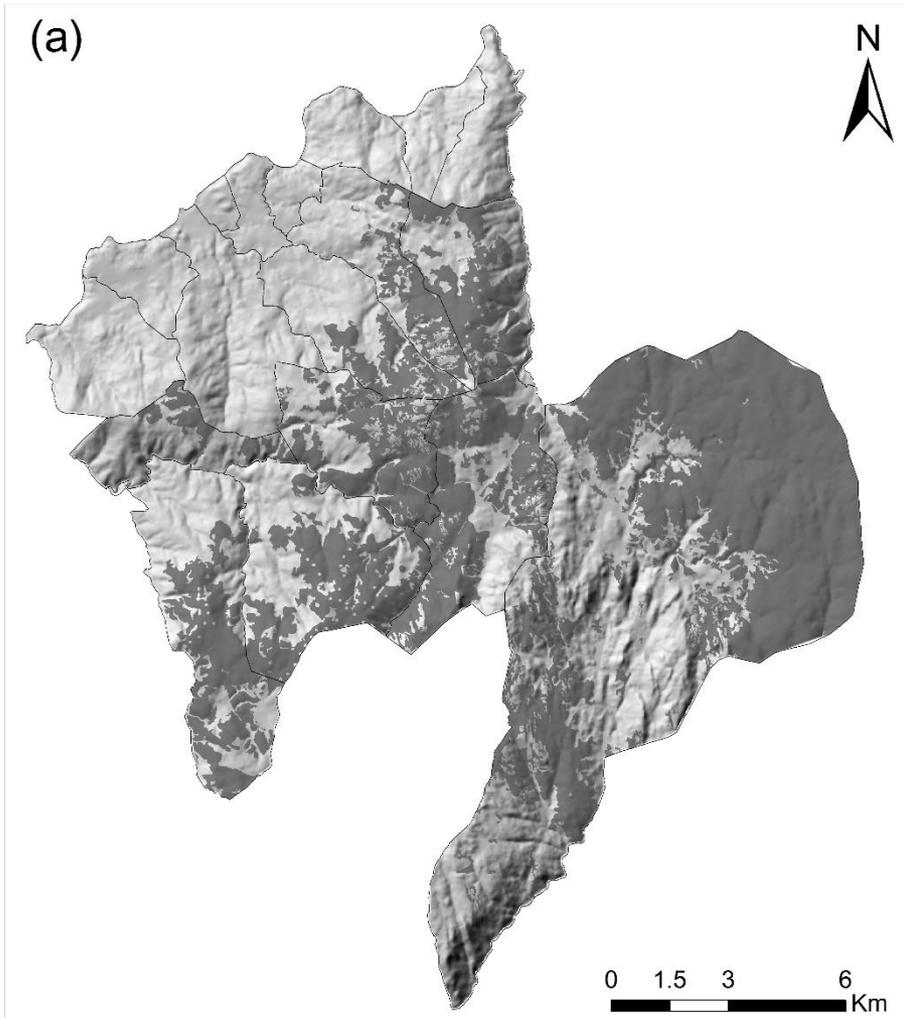
LE

LE

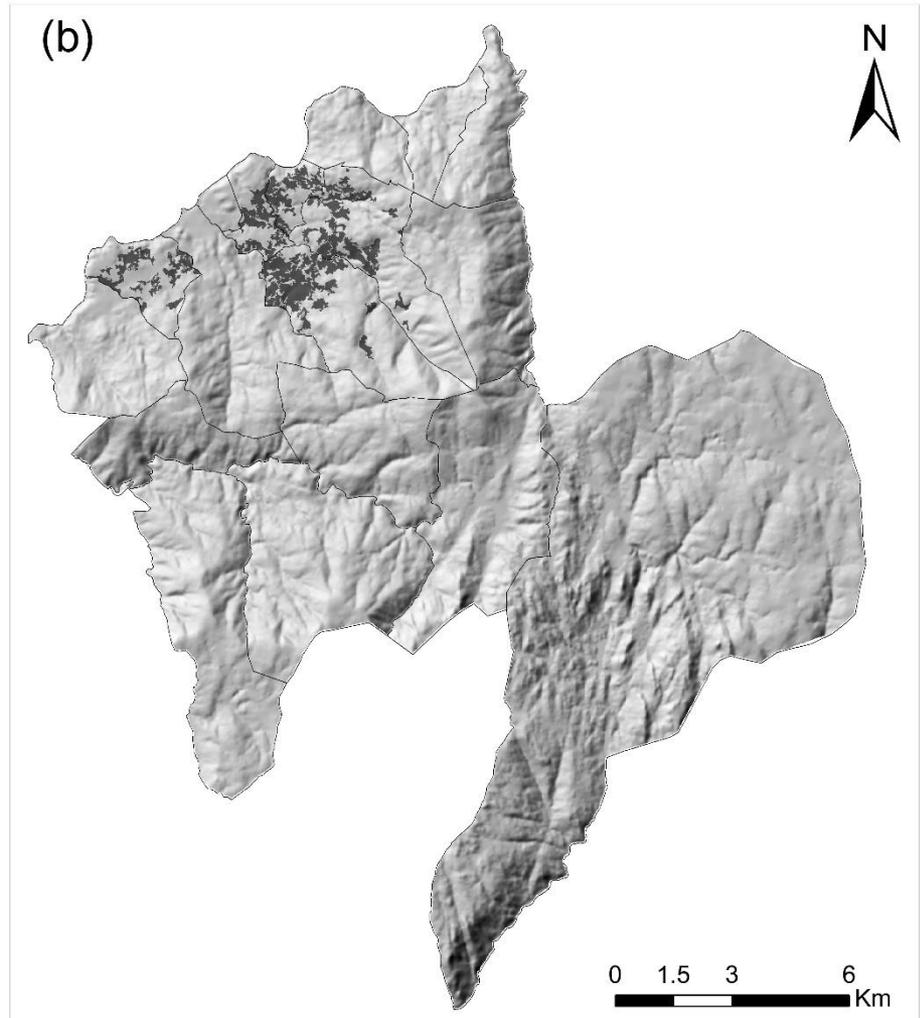
pHNV_{f_{max}}

Targeting farmlands with High Nature Value

HNVf Type 1

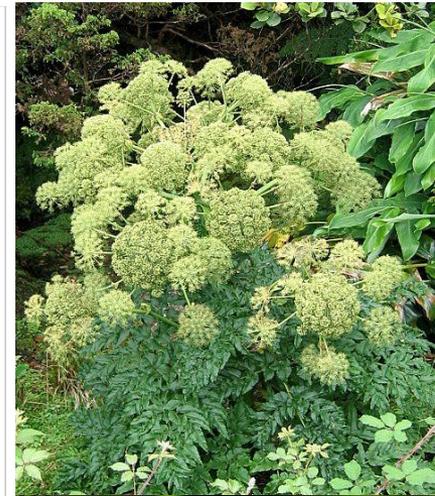
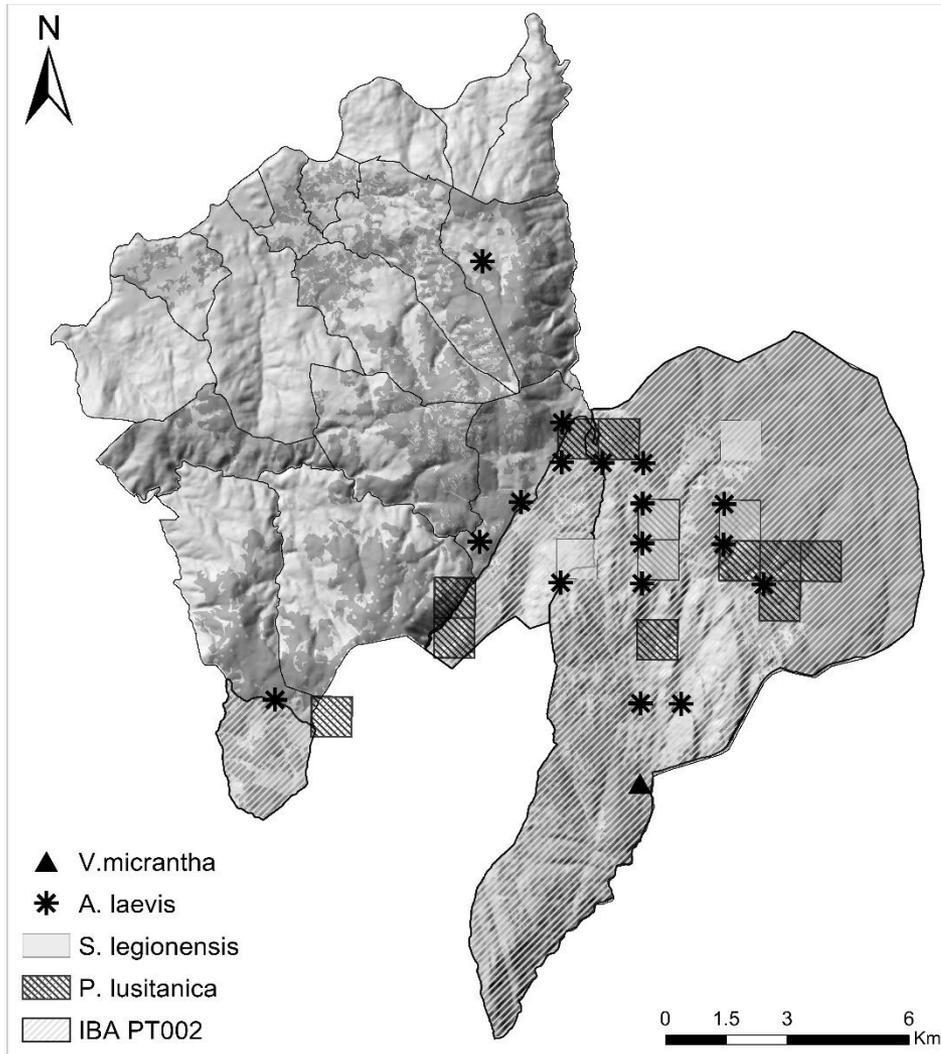


HNVf Type 2



Targeting farmlands with High Nature Value

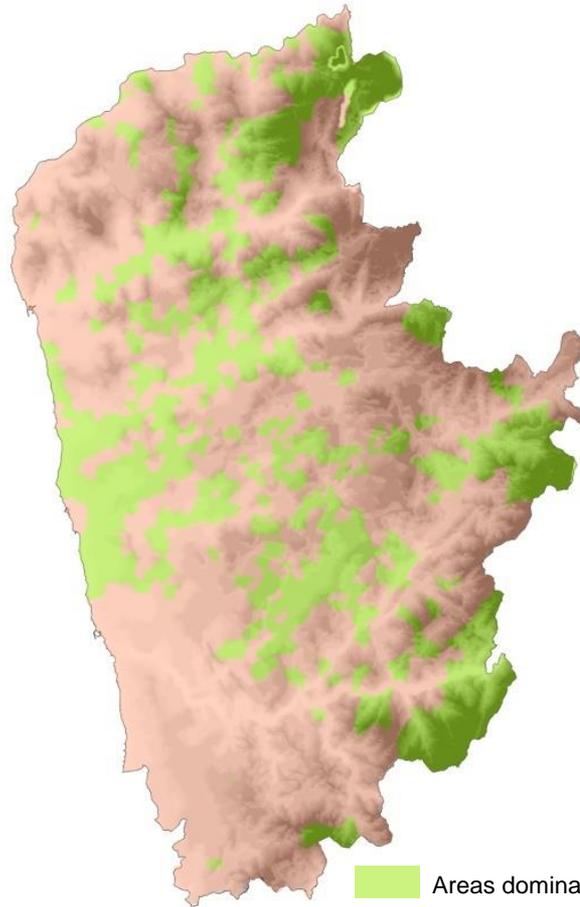
HNVf Type 3



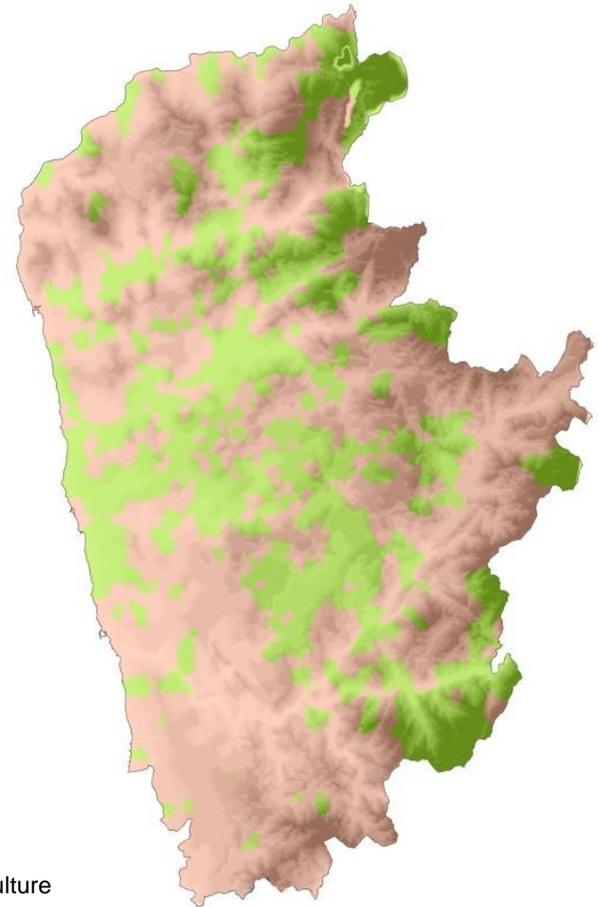
Assessing High Nature Value farmlands in time



1990



2007



Areas dominated by agriculture
Areas dominated by forest/urban surface

Using the most detailed datasets...



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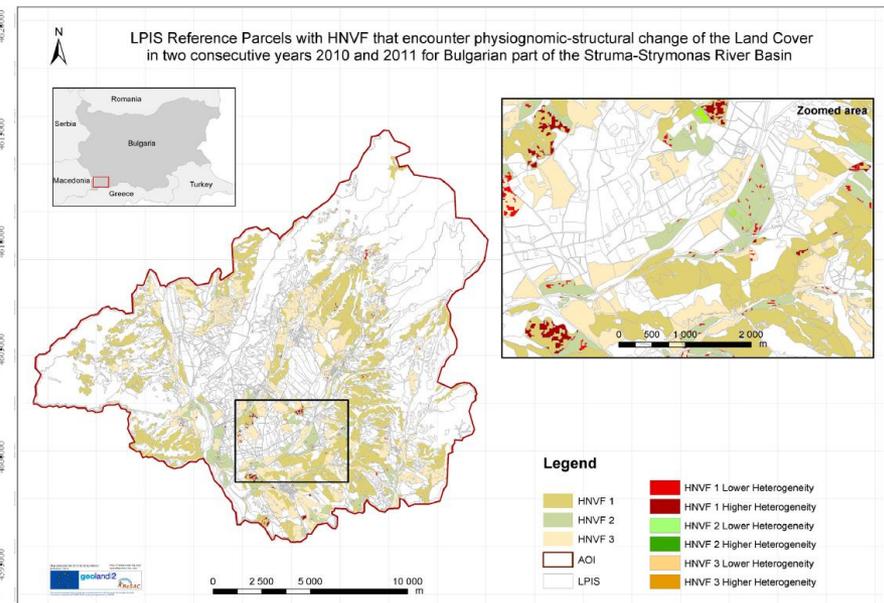
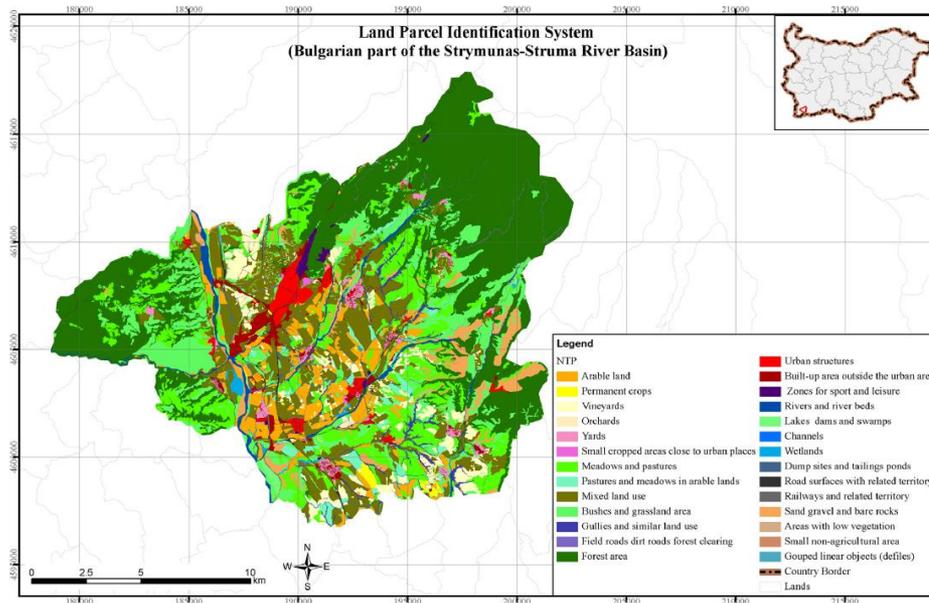
High Nature Value farmland identification from satellite imagery, a comparison of two methodological approaches



Gerard Hazeu^a, Pavel Milenov^b, Bas Pedroli^{a,*}, Vessela Samoungi^b, Michiel Van Eupen^a, Vassil Vassilev^b

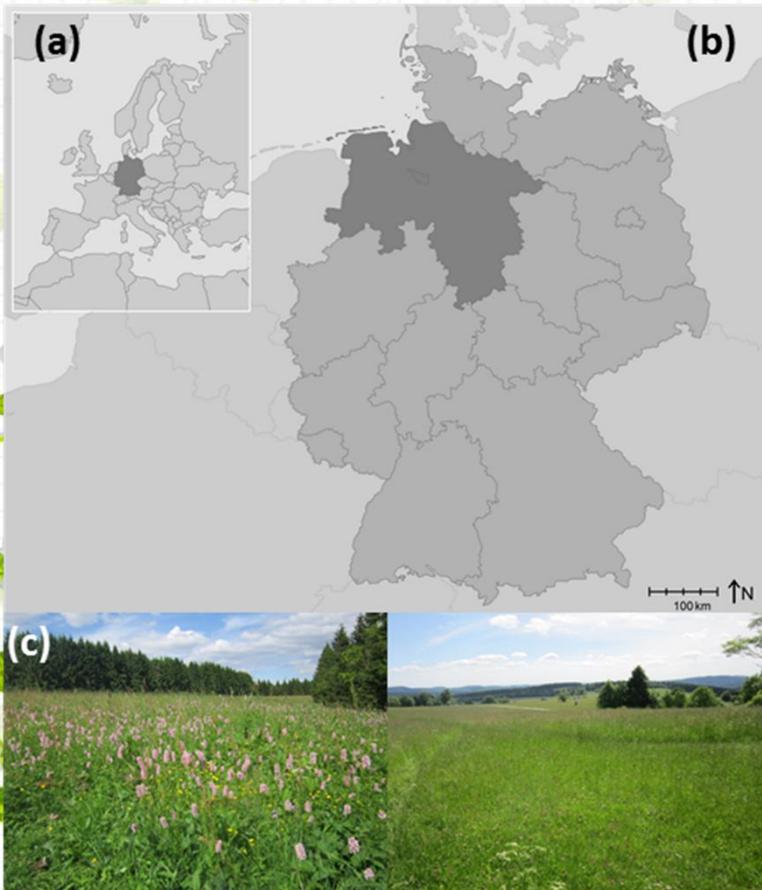
^a Alterra Wageningen UR, P.O. Box 47, 6700 AA Wageningen, The Netherlands

^b Remote Sensing Application Centre ReSAC, Tzar Assen Str. 61, Sofia, Bulgaria



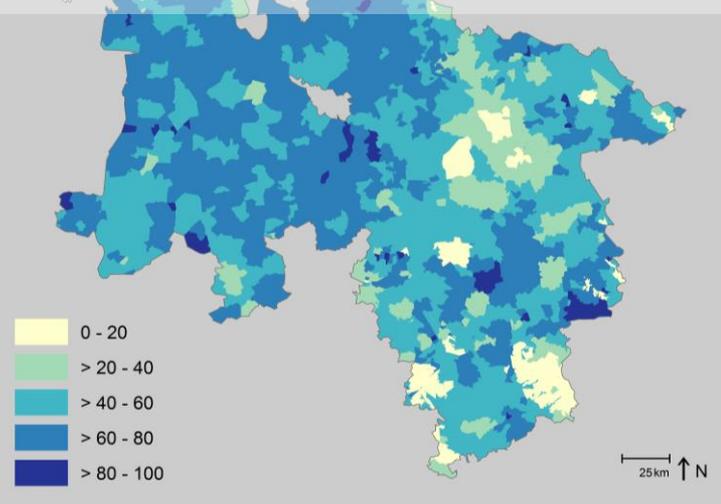
Using Integrated Administration and Control System (IACS) to assess HNVf in space and time

Lower Saxony

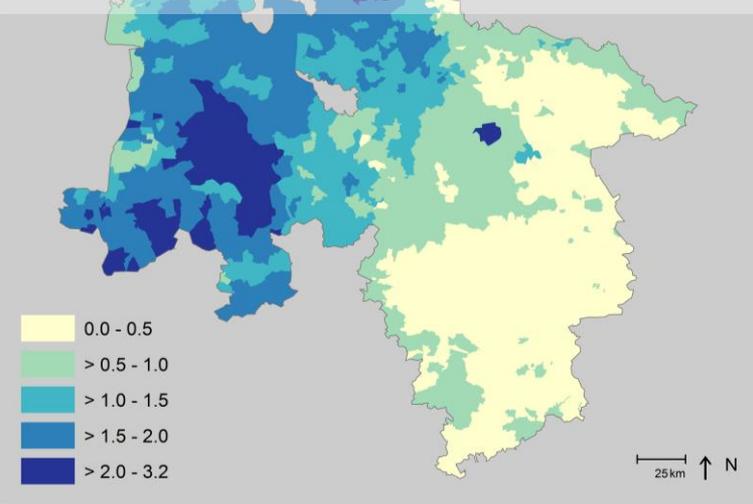


Using Integrated Administration and Control System (IACS) to assess HNVf in space and time

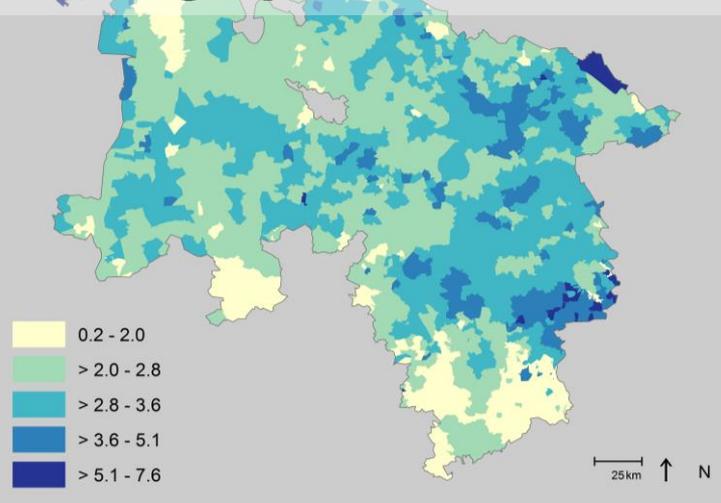
Utilized Agricultural Area



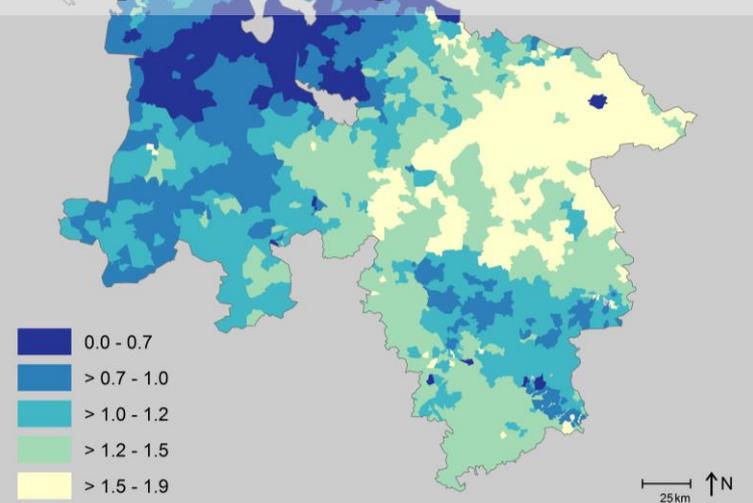
Livestock density index



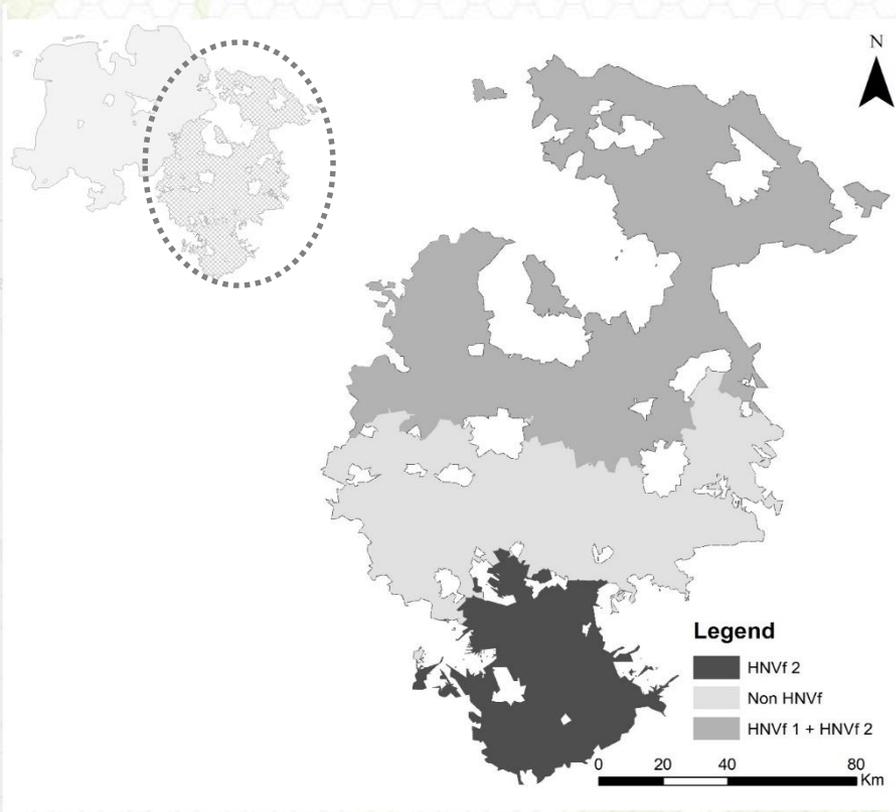
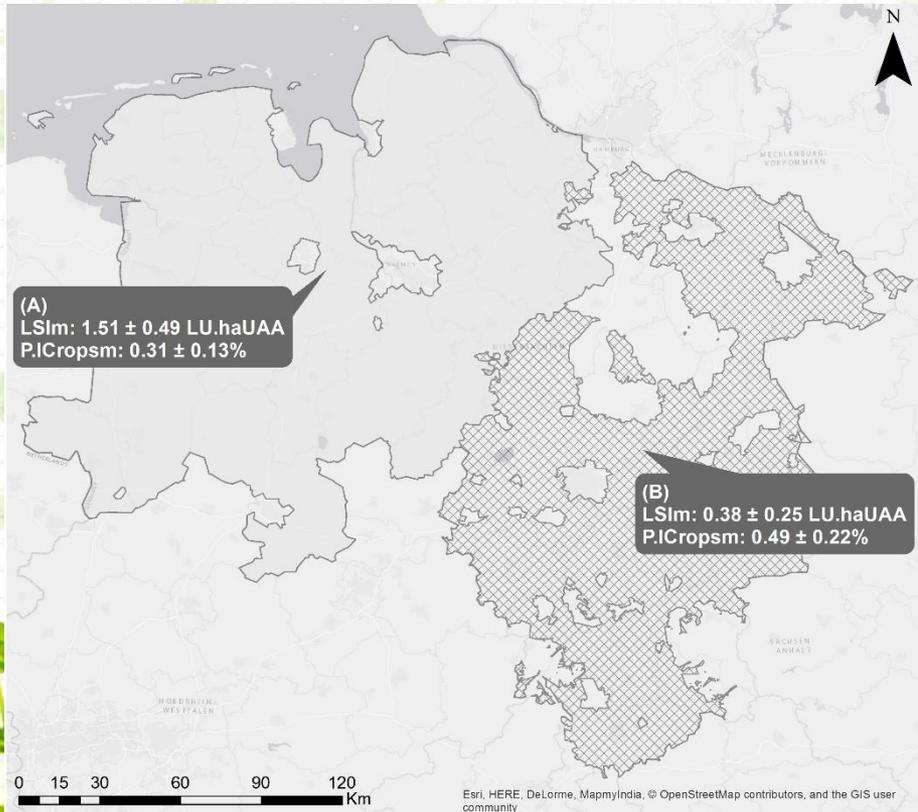
Average parcel size



Crop diversity



Using Integrated Administration and Control System (IACS) to assess HNVf in space and time



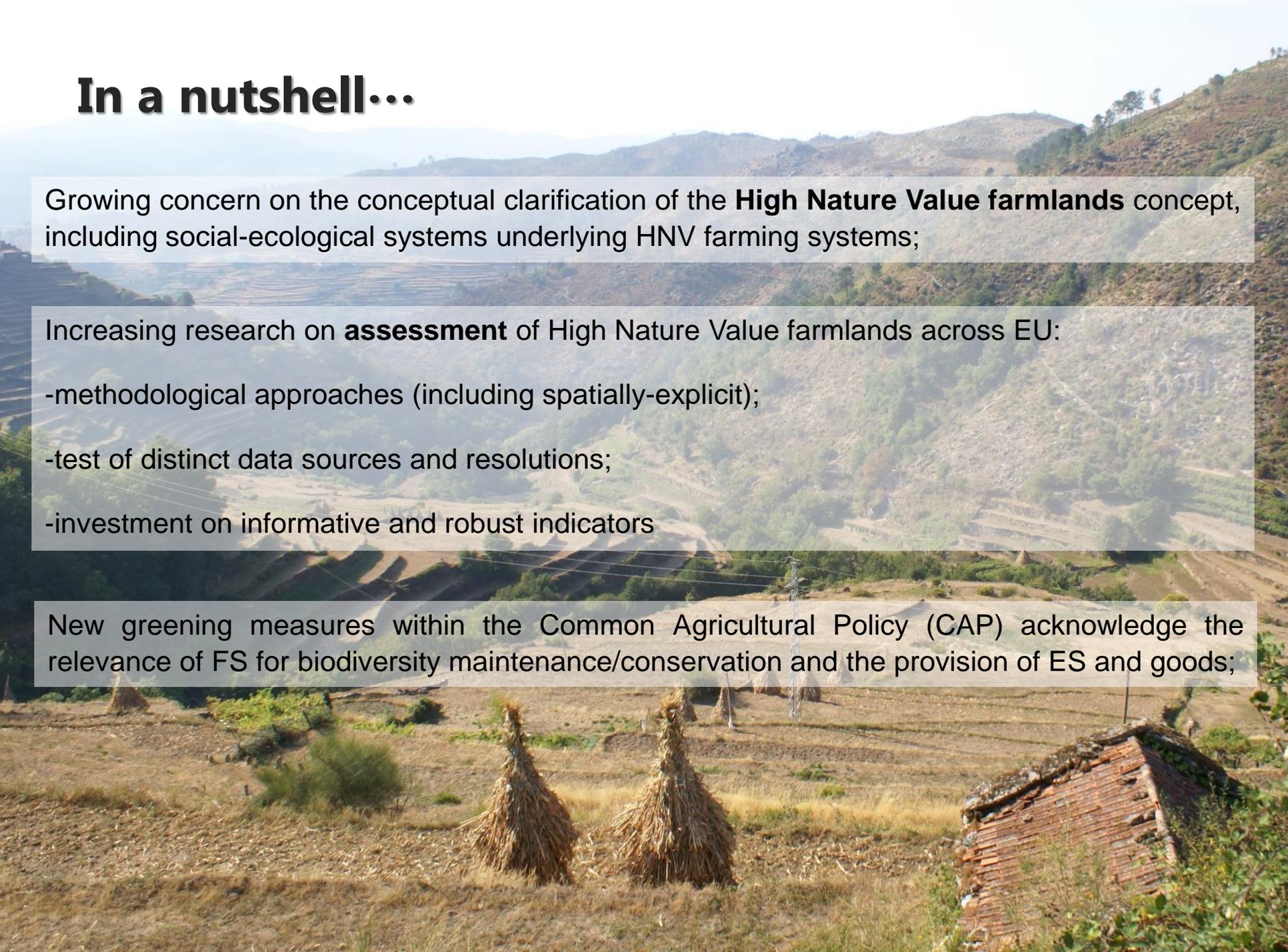
In a nutshell...

Growing concern on the conceptual clarification of the **High Nature Value farmlands** concept, including social-ecological systems underlying HNV farming systems;

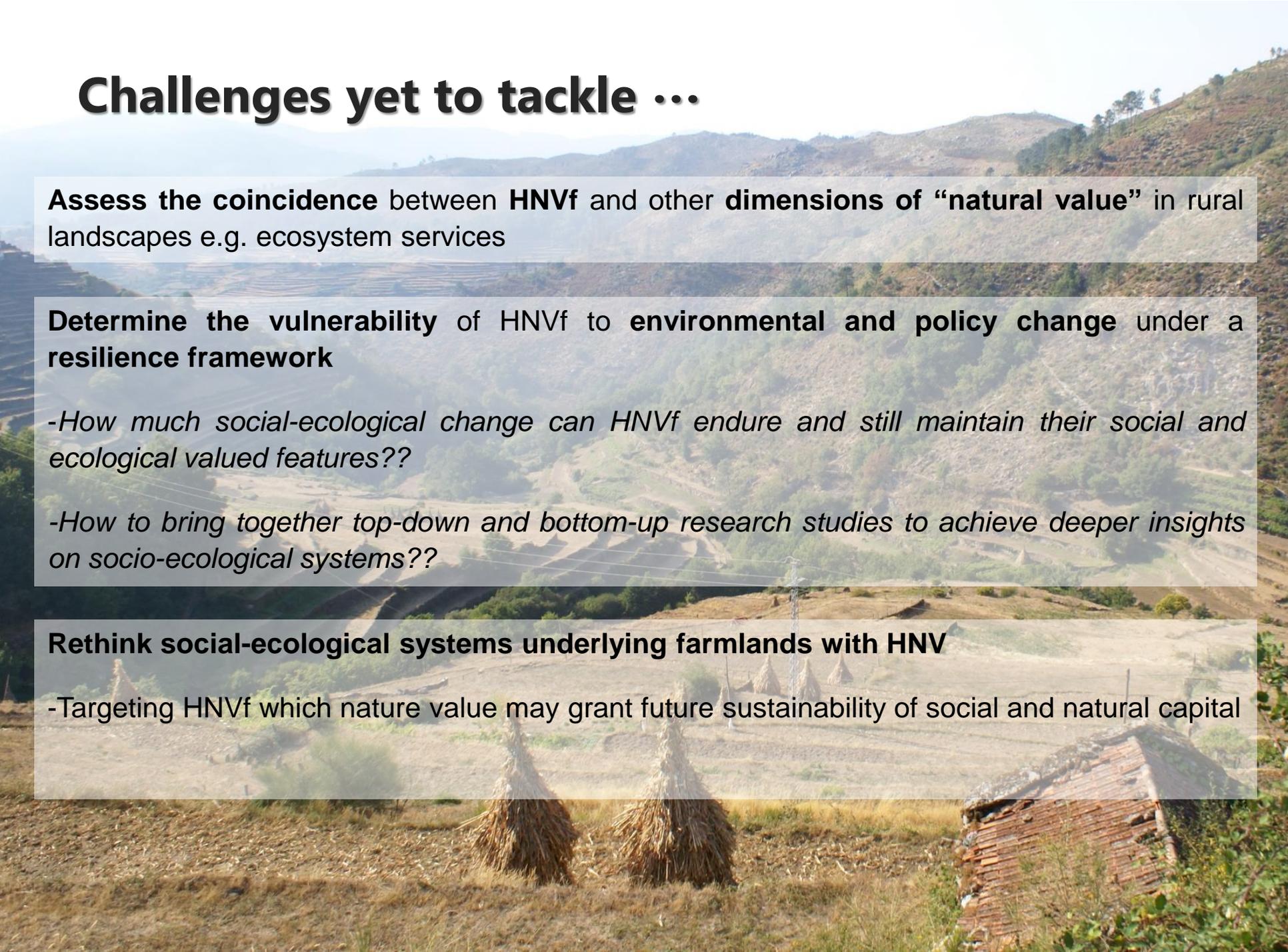
Increasing research on **assessment** of High Nature Value farmlands across EU:

- methodological approaches (including spatially-explicit);
- test of distinct data sources and resolutions;
- investment on informative and robust indicators

New greening measures within the Common Agricultural Policy (CAP) acknowledge the relevance of FS for biodiversity maintenance/conservation and the provision of ES and goods;



Challenges yet to tackle ...

The background image shows a vast rural landscape. In the foreground, there are several tall, conical haystacks made of dried straw. To the right, a small, rustic wooden building with a thatched roof is partially visible. The middle ground features terraced agricultural fields and a small cluster of buildings. The background consists of rolling hills and mountains under a clear sky.

Assess the coincidence between **HNVf** and other **dimensions of “natural value”** in rural landscapes e.g. ecosystem services

Determine the vulnerability of HNVf to **environmental and policy change** under a **resilience framework**

-How much social-ecological change can HNVf endure and still maintain their social and ecological valued features??

-How to bring together top-down and bottom-up research studies to achieve deeper insights on socio-ecological systems??

Rethink social-ecological systems underlying farmlands with HNV

-Targeting HNVf which nature value may grant future sustainability of social and natural capital



😊 Thank you!

A. Lomba is supported by the Portuguese Science and Technology Foundation (FCT) through Post-Doc Grant SFRH/BPD/ 80747/2011.