Spanish NEA

Social

Evaluating Biophysical, Social and Economic and values domains in the Spanish NEA

Lessons

Biophysical

Economic

Spanish NEA

Social

Evaluating Biophysical, Social
and Economic and values domains
in the Spanish NEA

Lessons

Biophysical

Economic

Spanish NEA

Evalua

TIMELINE

FRAMEWORKS

MA, 2005

EME, 2011
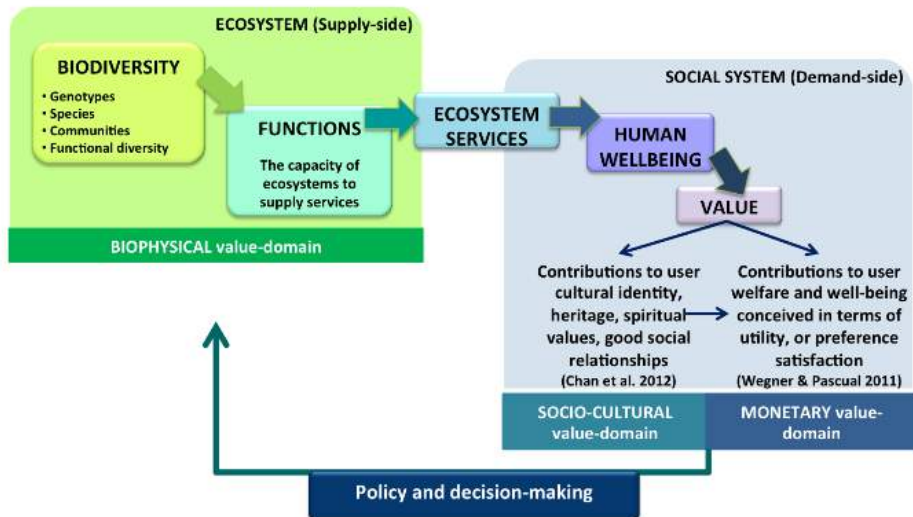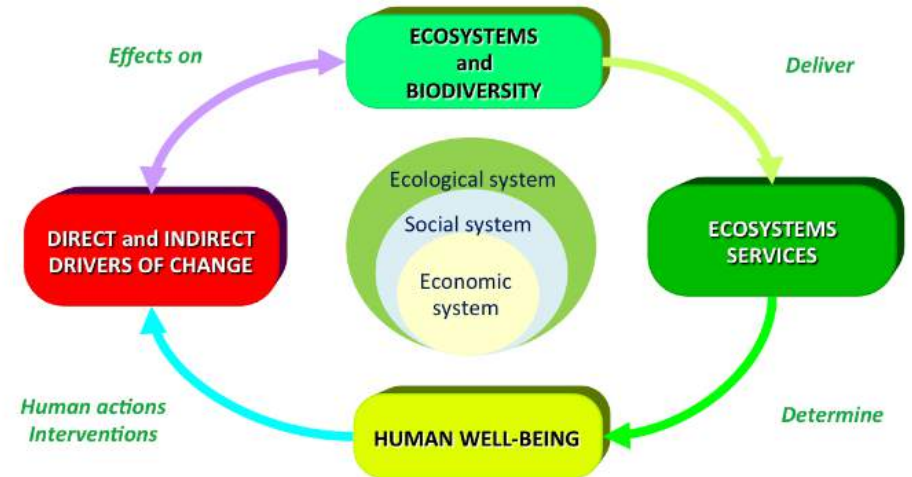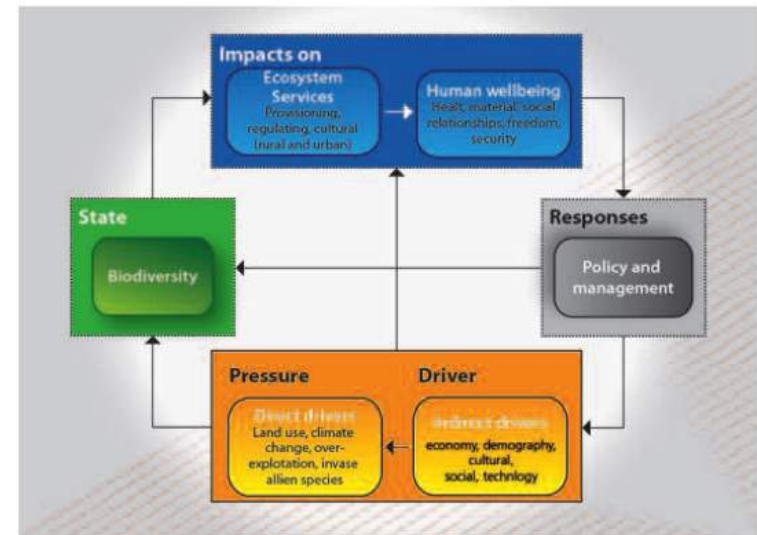

Martín-López et al, 2013

Santos-Martín et al, 2013

ES CLASSIFICATION

ES Type	Spanish NEA	MA	TEEB	CICES
Provisioning services	Crops and Livestock	Food (fodder)	Food	Terrestrial plants and animal foodstuffs
	Aquaculture product			Freshwater plants and animal foodstuffs
	Wild plants and animals			Marine algae and animal foodstuffs
	Domestic water use	Fresh water	Water	Water for human consumption
	Agricultural water use			Water for agricultural use
	Industrial water use			Water for industrial and energy use
	Biotic materials (i.e. timber, pulp, vegetal fibers)	Fibre, timber	Raw Materials	Biotic materials
	Gene pool (Native breeds and varieties, genetic information of biotechnological interest)	Genetic resources	Genetic resources	Biotic Materials (Genetic resources)
	Natural medicines (Active ingredients for traditional medicines and pharmaceutical industry)	Biochemicals	Medicinal resources	Biotic Materials (Medicinal and cosmetic resources)
		Ornamental resources	Ornamental resources	Biotic Materials (Ornamental resources)
	Renewable Energy (biomass based and hydropower)			Biomass based energy

ES SELECTION

We selected 22 ecosystem services from the provisioning (*N*=8), regulating (*N*=7) and cultural categories (*N*=7).

We assessed the influence of direct and indirect drivers of change.
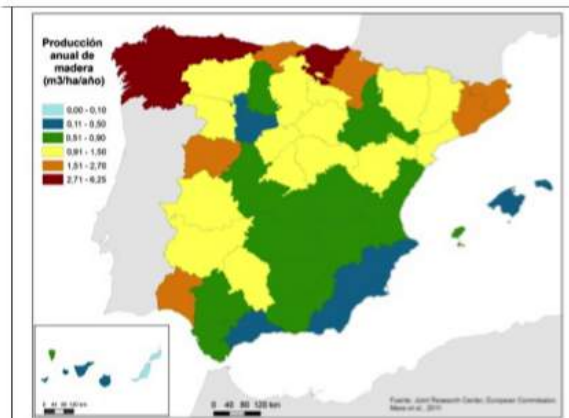
Direct drivers
✓Land use change
✓Climate change
✓Pollution
✓Invasive alien species
✓Overexploitation

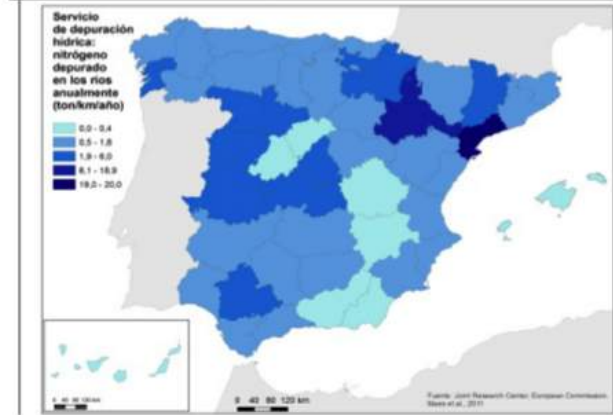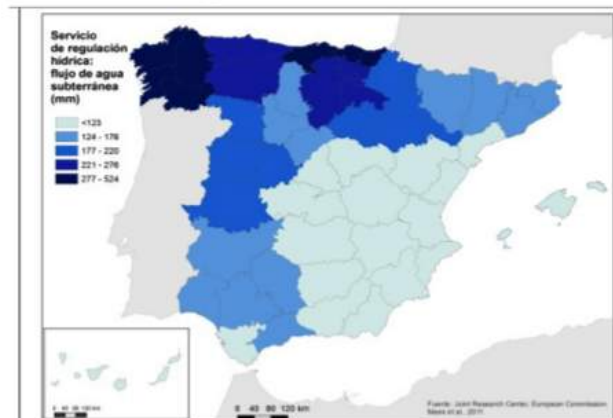| Indirect drivers |
| --- |
| ✓Demographic |
| ✓Socio-political |
| ✓Gender |
| ✓Cultural |
| ✓ Economic |
| ✓ Science & Technology |

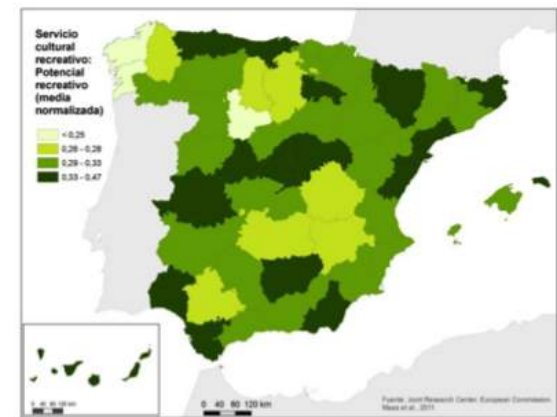# ES Mapping

7 Provisioning
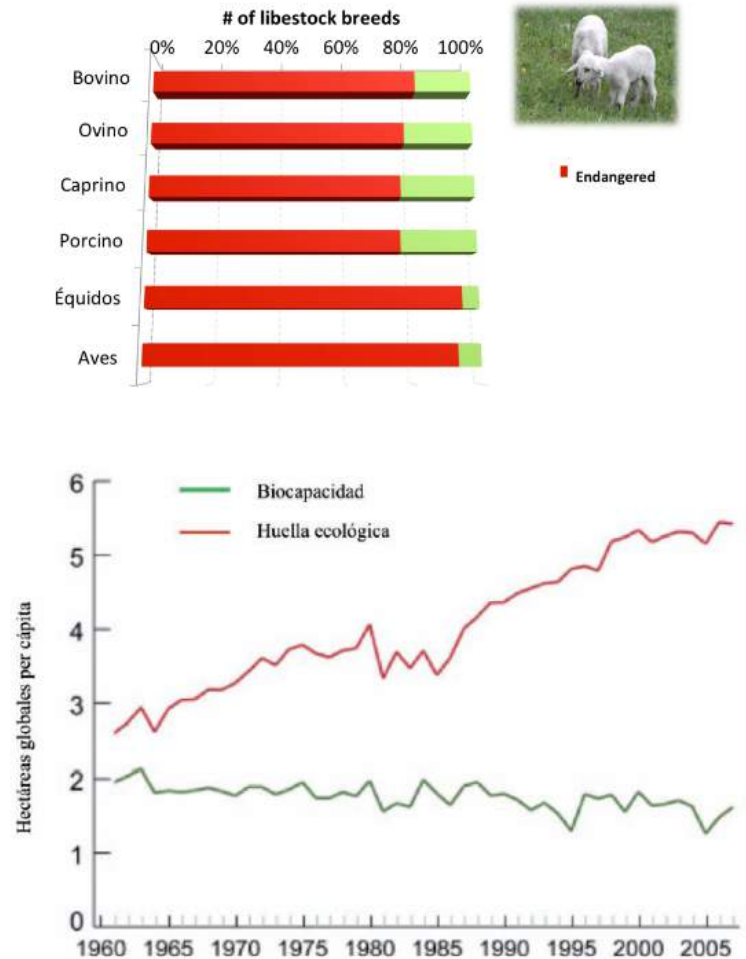

Producción, flujo
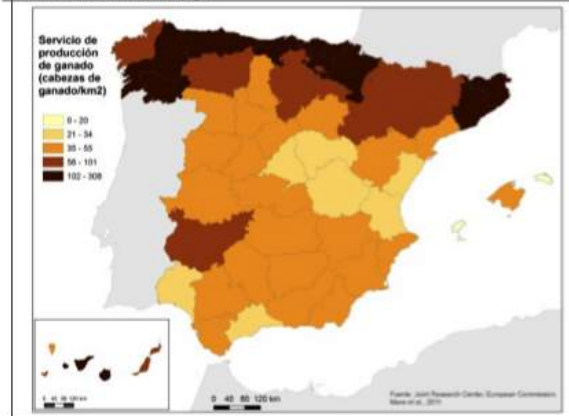
12 Regulation

1 Cultural

JRC (Joint Research Centre, 2011)

TYPE OF DATA
(measure, indicator, index....)

Terrestrial vertebrate species richness

- 0 - 50
- 51 - 80
- 81 - 110
- 111 - 140
- 141 - 202

0 50 100 150 km

0 40 80 120 km

Data source: Inventario Español de Especies Terrestres
Ministerio de Agricultura, Alimentación y Medio Ambiente

# of libestock breeds

Bovino
Ovino
Caprino
Porcino
Équidos
Aves

0% 20% 40% 60% 80% 100%

Endangered

Biocapacidad
Huella ecológica

Hectáreas globales per cápita

SOURCES OF DATA

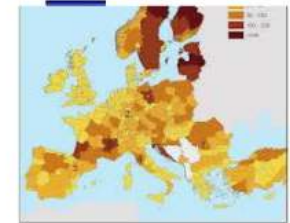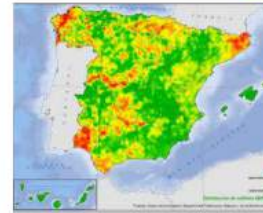National Statistic

Spatial information

In-situ Observations
 (case studies)

Simulation Models

STATE OF ES DATA

Provisioning services ⬤ (light green)
Regulating services ⬤ (yellow)
Cultural services ⬤ (red)

Supply metrics ⬤ (dark green)
Service metrics ⬤ (yellow)
Benefit metrics ⬤ (red)

STAKEHOLDERS
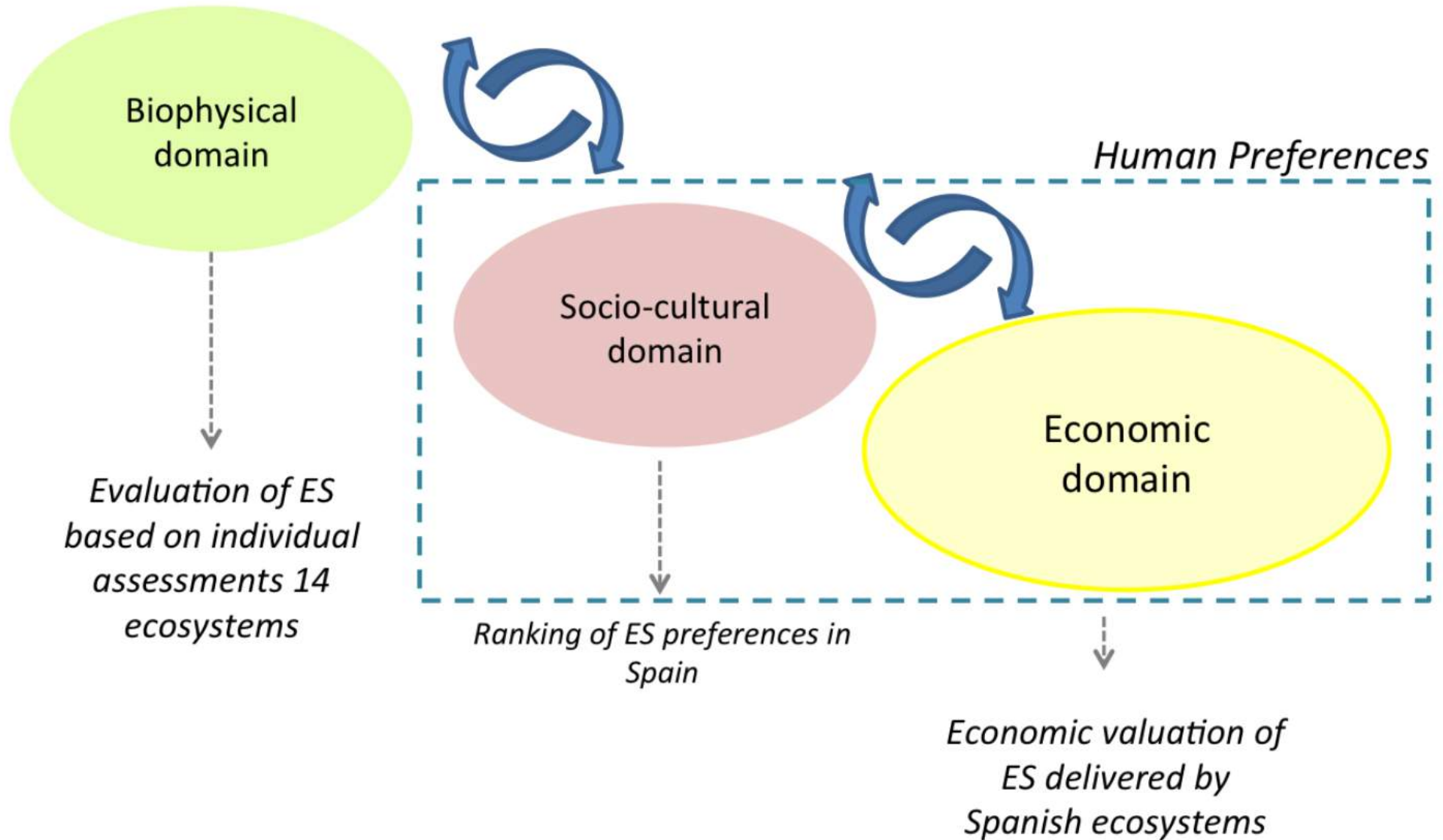
✓Network of researchers (National Research Council –CSIC- and Universities)- More than 60 researchers from 20 institutions
✓Ministries
✓Regional Governments
✓Spanish Observatory of Sustainability (OSE)
✓Network of complementary projects
✓Communication Unit
✓International advisory board
✓Stakeholders involved: NGOs, enterprises, general population

✓Data bases
✓Cartographic information
✓Literature review
✓Expert panels
✓Focus groups
✓Workshops
✓Interviews
✓Questionnaires

Biophysical, Social and Economic results
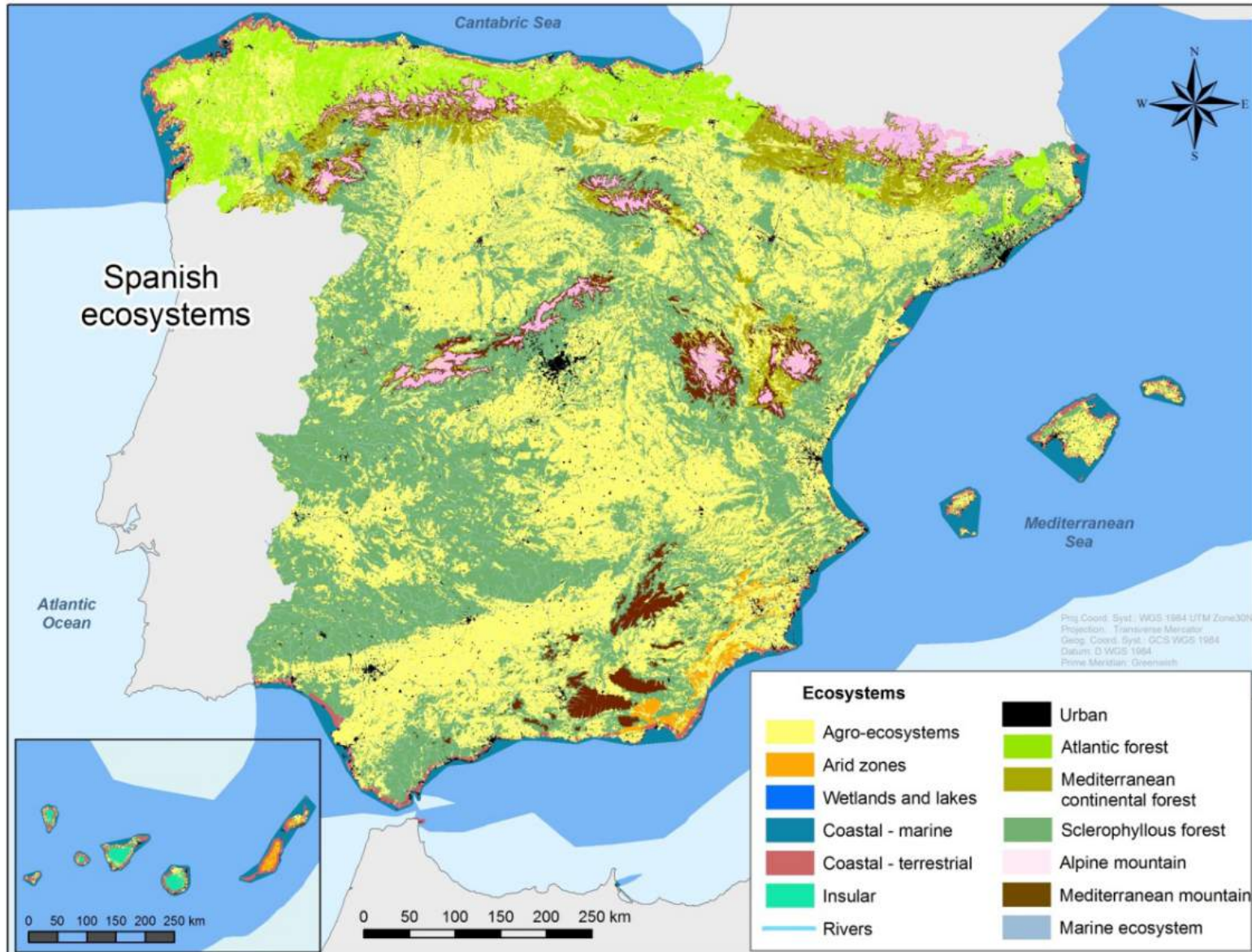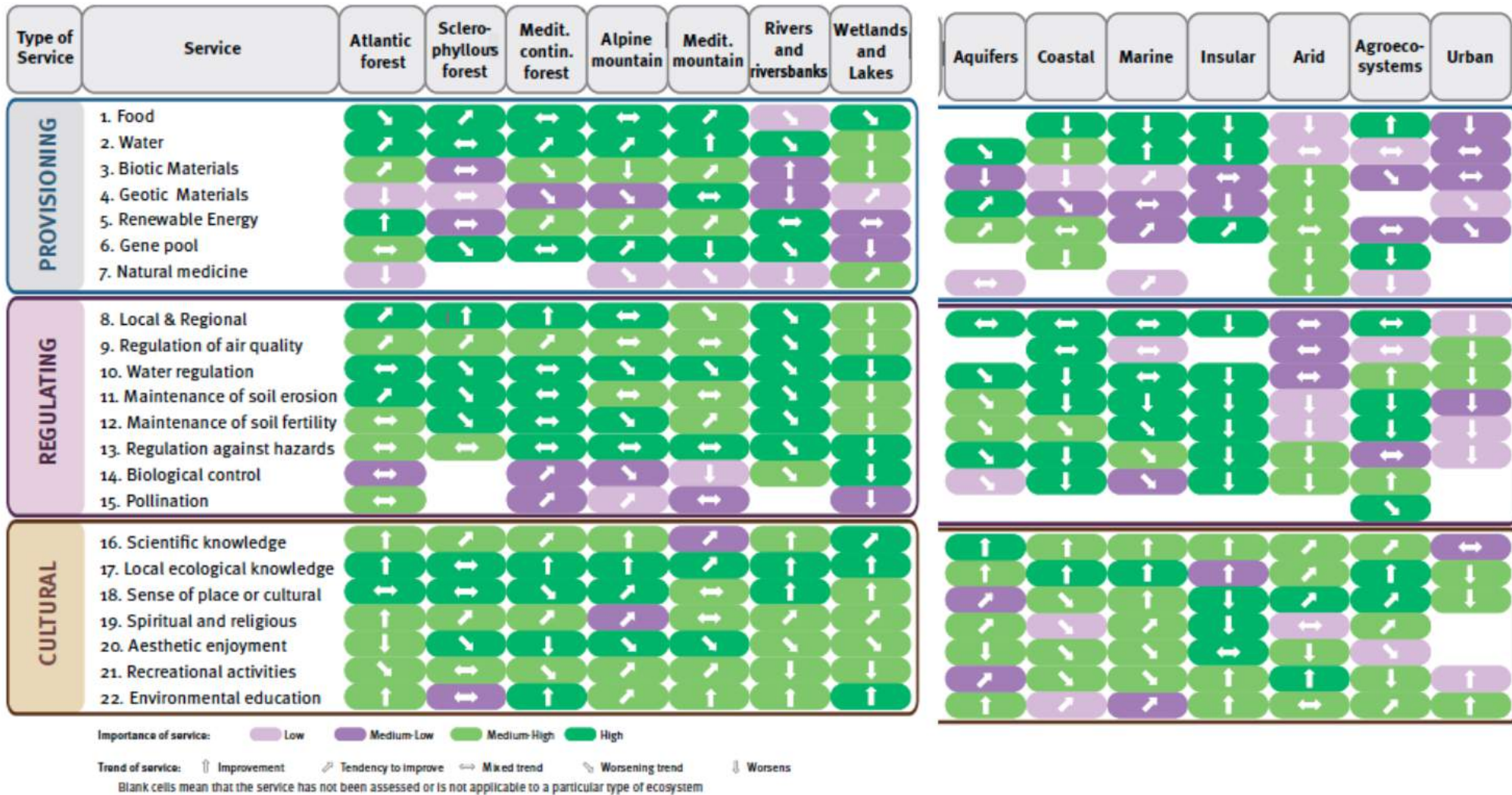
Biophysical

14 ECOSYSTEMS

Spanish ecosystems

Cantabric Sea

Atlantic Ocean

Mediterranean Sea

Ecosystems

- Agro-ecosystems
- Arid zones
- Wetlands and lakes
- Coastal - marine
- Coastal - terrestrial
- Insular
- Rivers
- Urban
- Atlantic forest
- Mediterranean continental forest
- Sclerophyllous forest
- Alpine mountain
- Mediterranean mountain
- Marine ecosystem
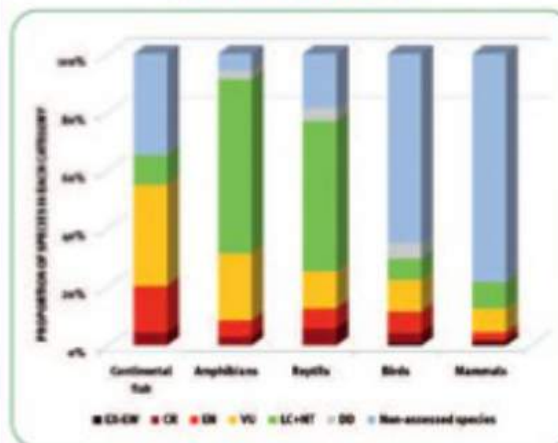
ES Biophysical Assessment
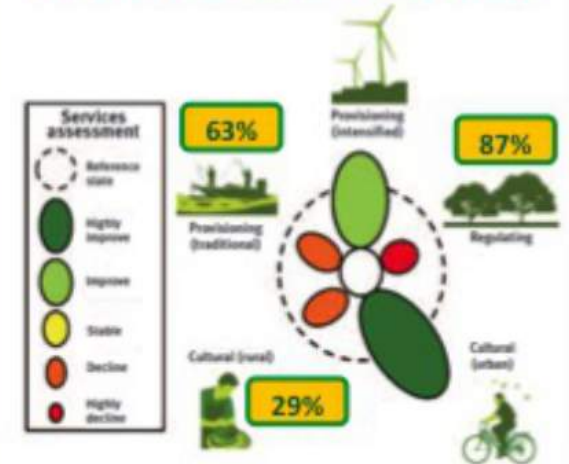
Biophysical Key findings

Freshwater and marine ecosystems are under the most critical pressure

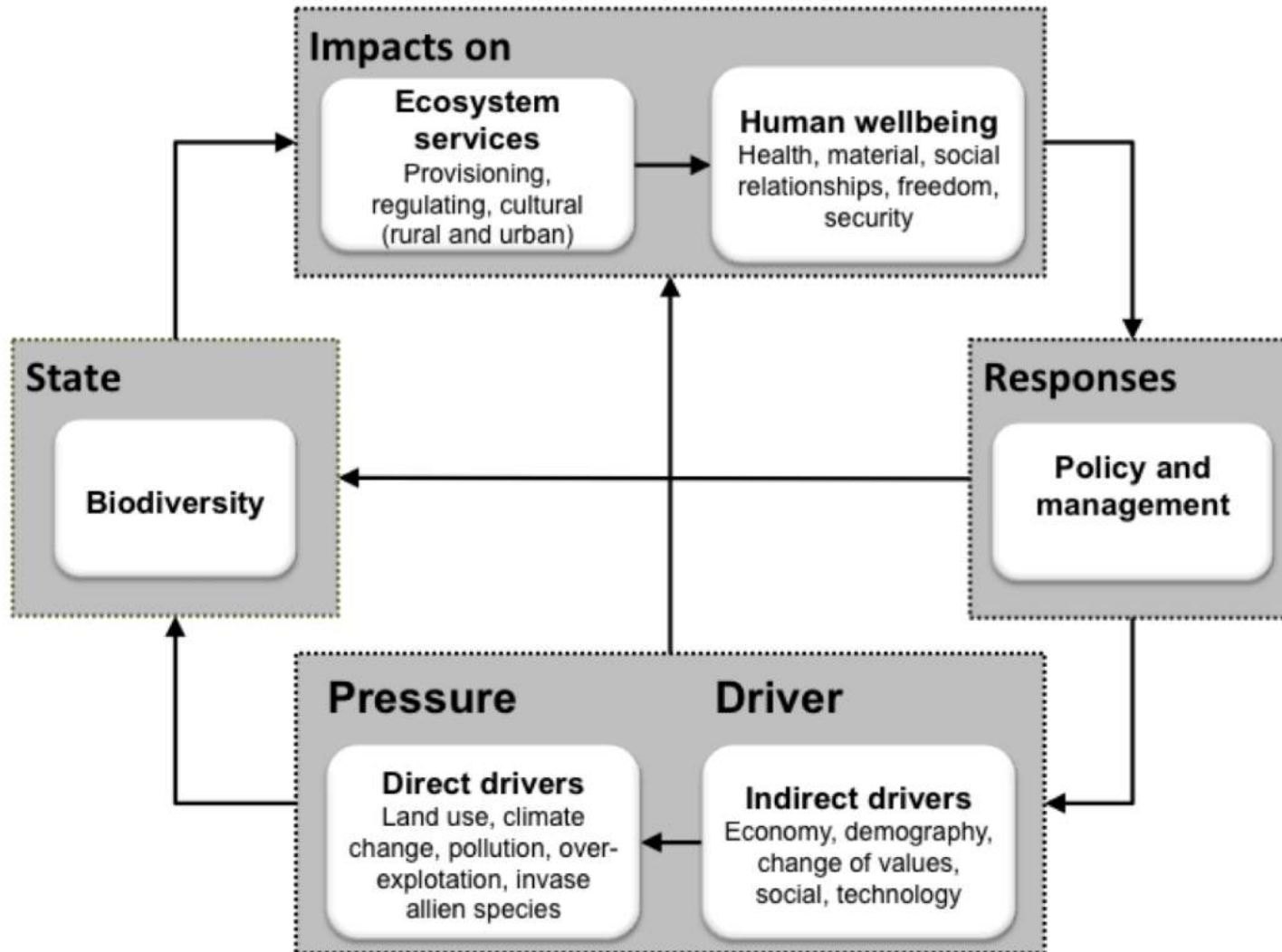**Between 40% and 68% of species assessed are threatened**

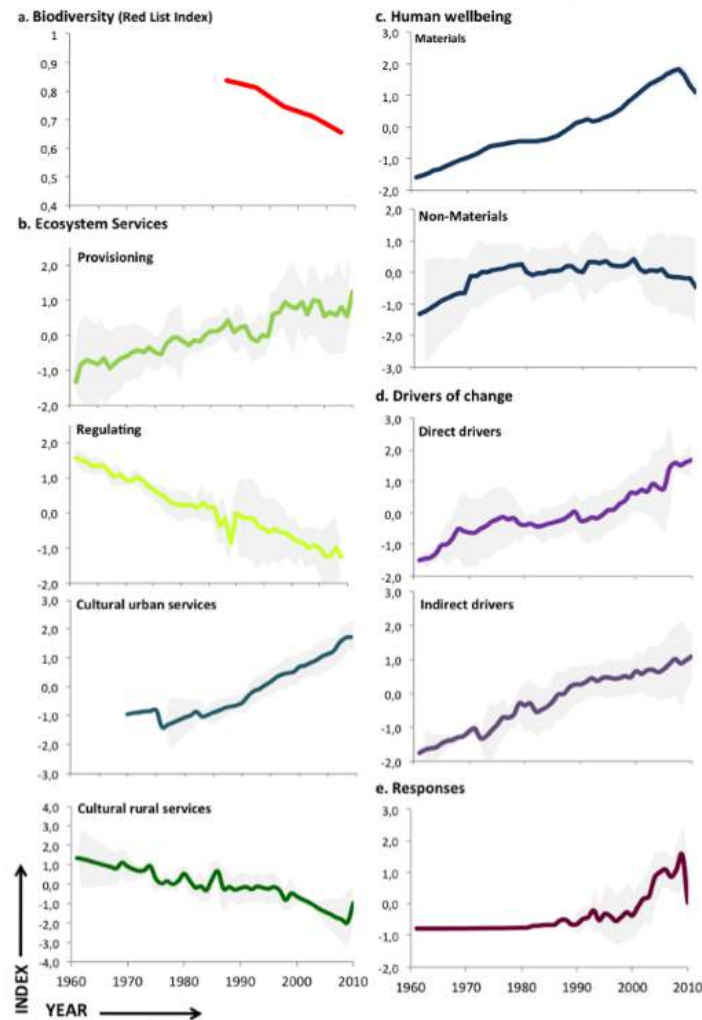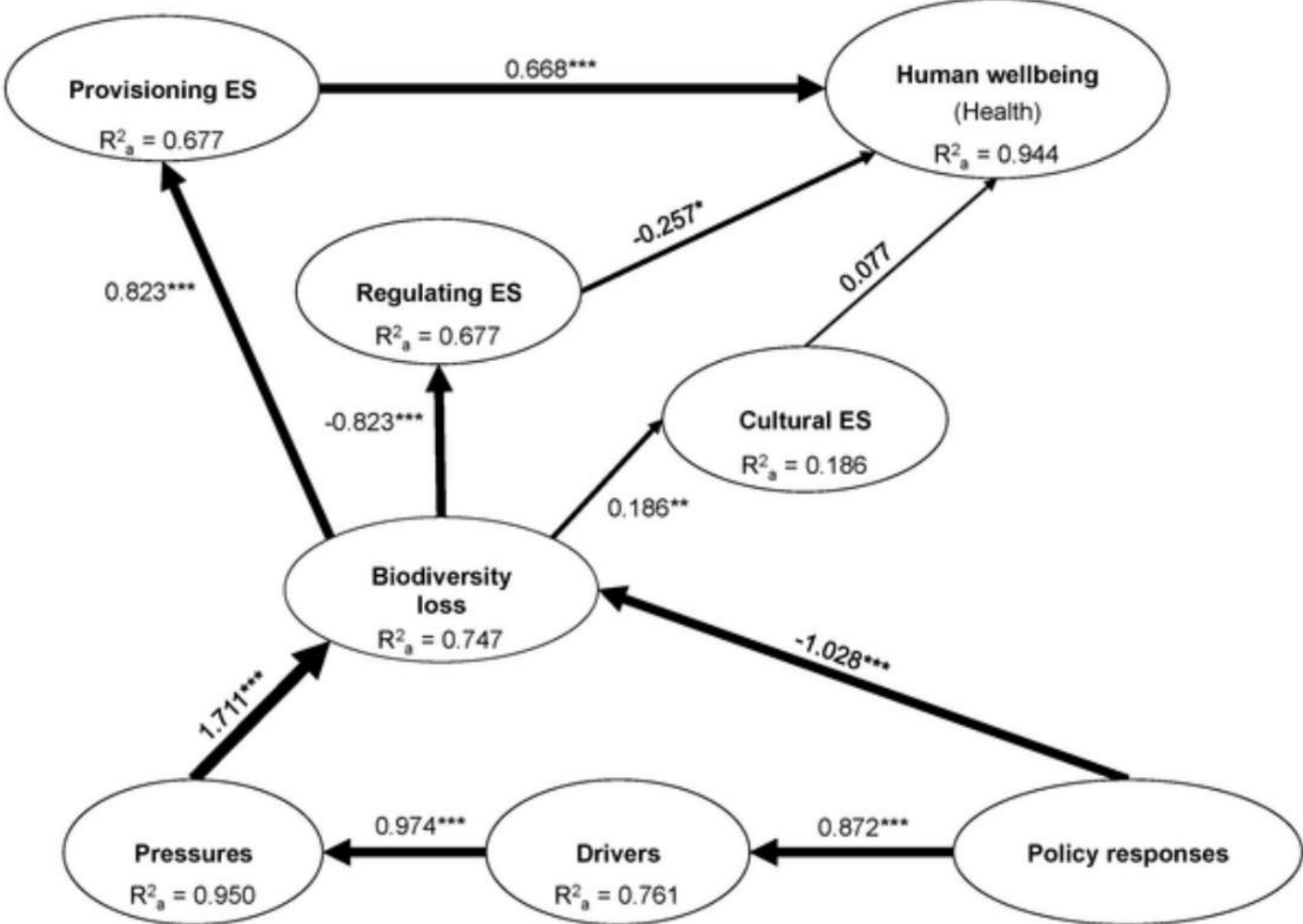**Degradation or unsustainable use of 45% of the evaluated services**

DPSIR FRAMEWORK

Santos-Martin F. et al. PlosOne. 2013

Trends of DPSRI components

Santos-Martin et al, 2013

Relationships among DPSRI components

Santos-Martin et al, 2013

Understanding relationships at ecosystems level

Contents lists available at ScienceDirect

Ecological Complexity

Original Research Article

Understanding complex links between fluvial ecosystems and social indicators in Spain: An ecosystem services approach

CrossMark

M.R. Vidal-Abarca [a,*], M.L. Suárez-Alonso [a], F. Santos-Martín [b], B. Martín-López [b], J. Benayas [b], C. Montes [b]

[a] Department of Ecology and Hydrology, Regional Campus of International Excellence "Campus Mare Nostrum" – University of Murcia, Campus de Espinardo, 30100 Murcia, Spain
[b] Social-Ecological Systems Laboratory, Department of Ecology, c. Darwin, 2, Edificio de Biología, Universidad Autónoma de Madrid, 28049 Madrid, Spain
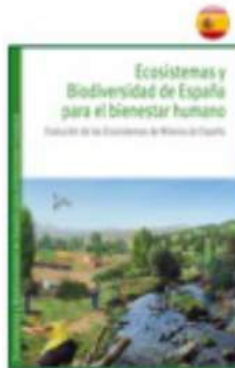
Available information

Final Report
+2000 Pgs.
33 Chapters

Synthesis Report
303 Pgs.
11 Chapters

Synthesis of key findings
90 Pgs.
9 Chapters

Educational materials
34 Pgs.
1 slide presentation

Cartographic information
86 Maps

Political implications

SNEA provides evidence on the status and trends of ecosystems condition with **potential policy implication at different levels**. But more structural changes are required in the Spanish institutional framework to reach 2020 Biodiversity International targets.

Spanish Biodiversity Strategy (2011-2017)
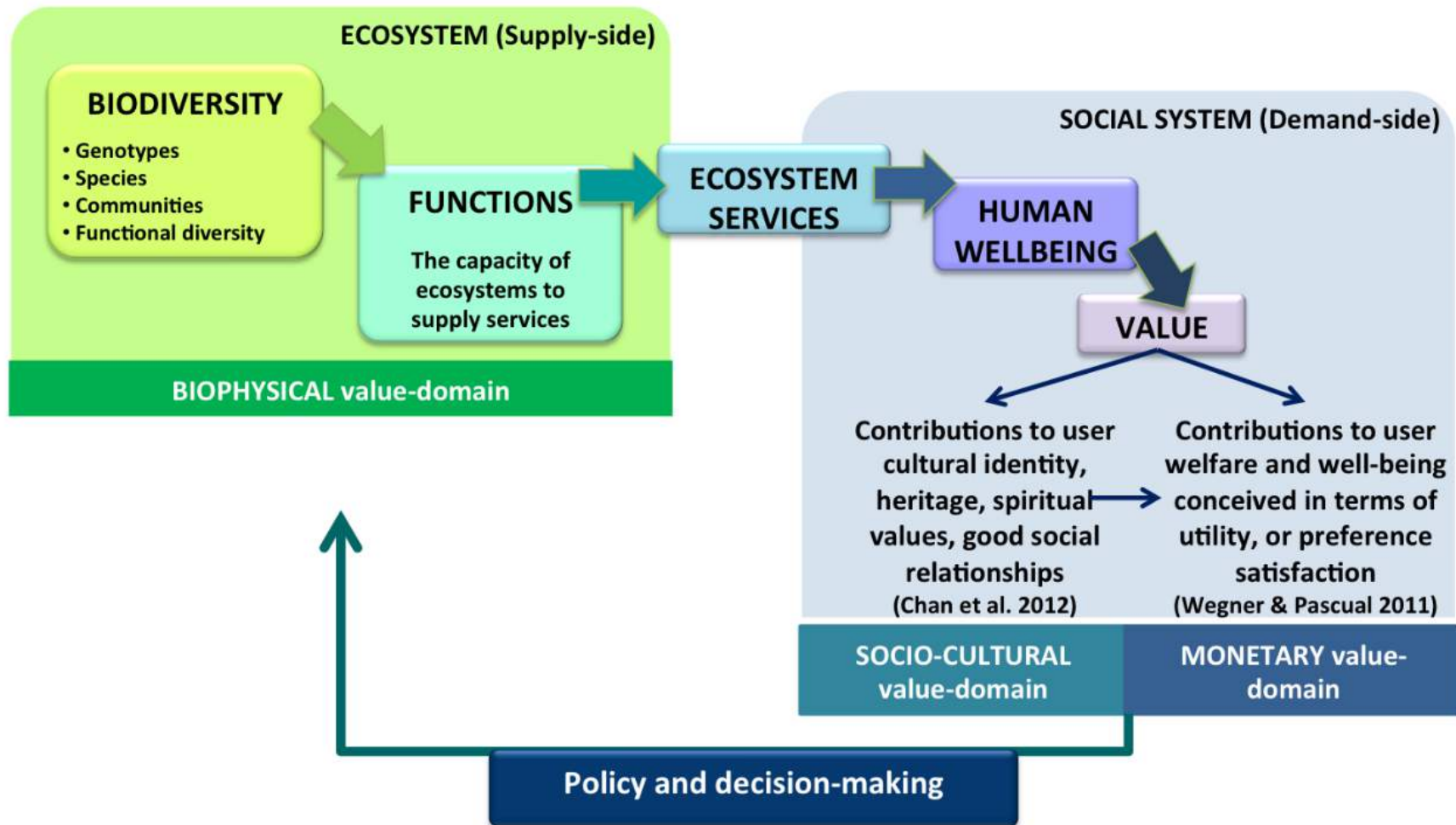

EU Biodiversity Strategy (2010-2020)

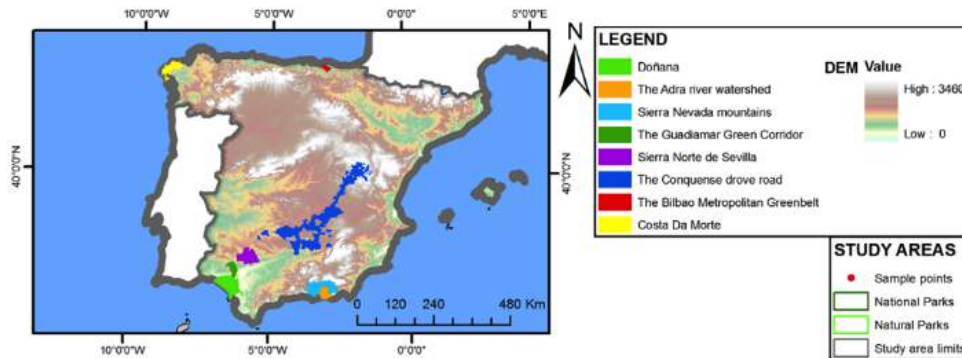**Intergovernmental Platform on Biodiversity & Ecosystem Services**

Social

Integrating the Demand-Side in assessments

Martín-López et at., 2013
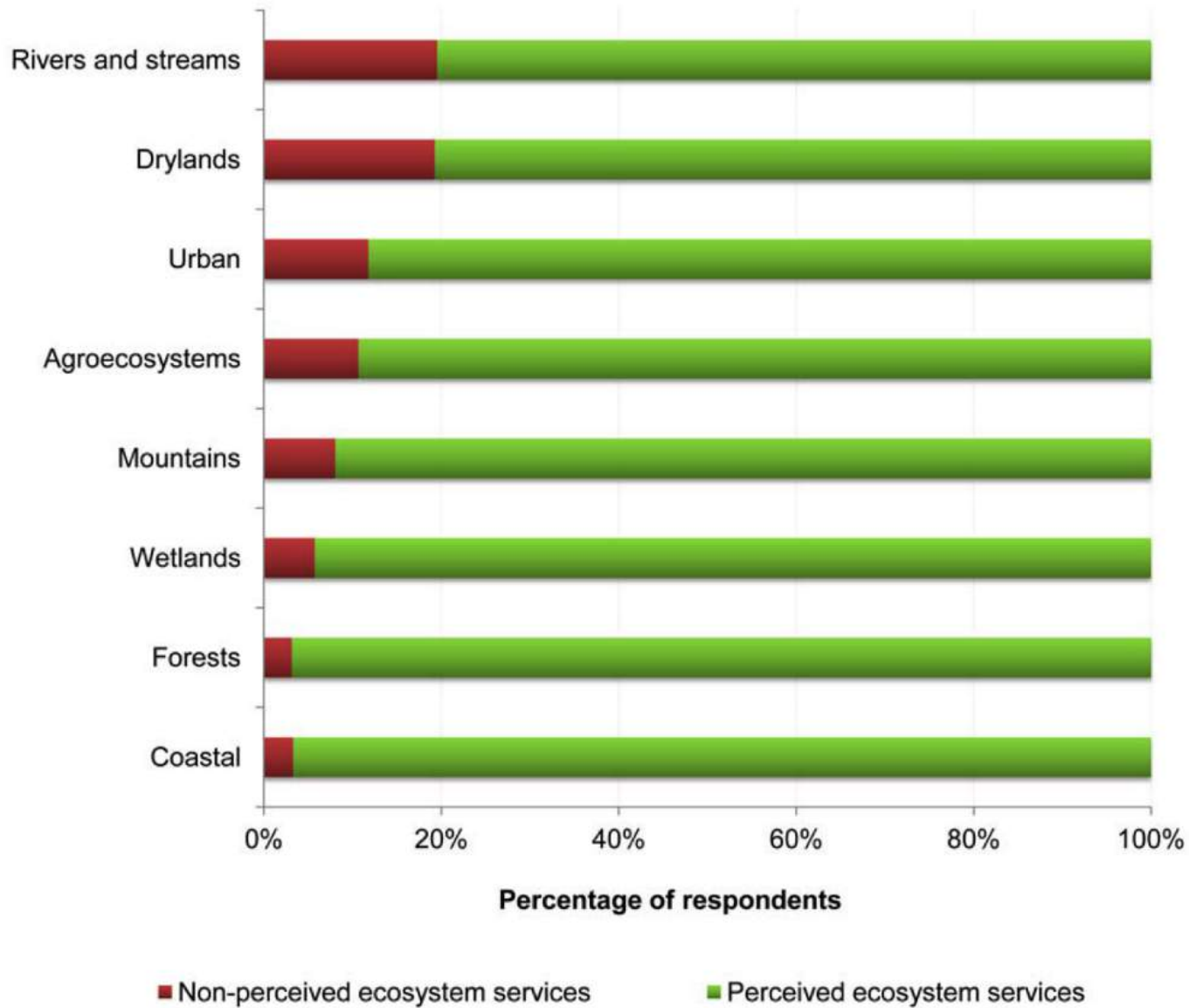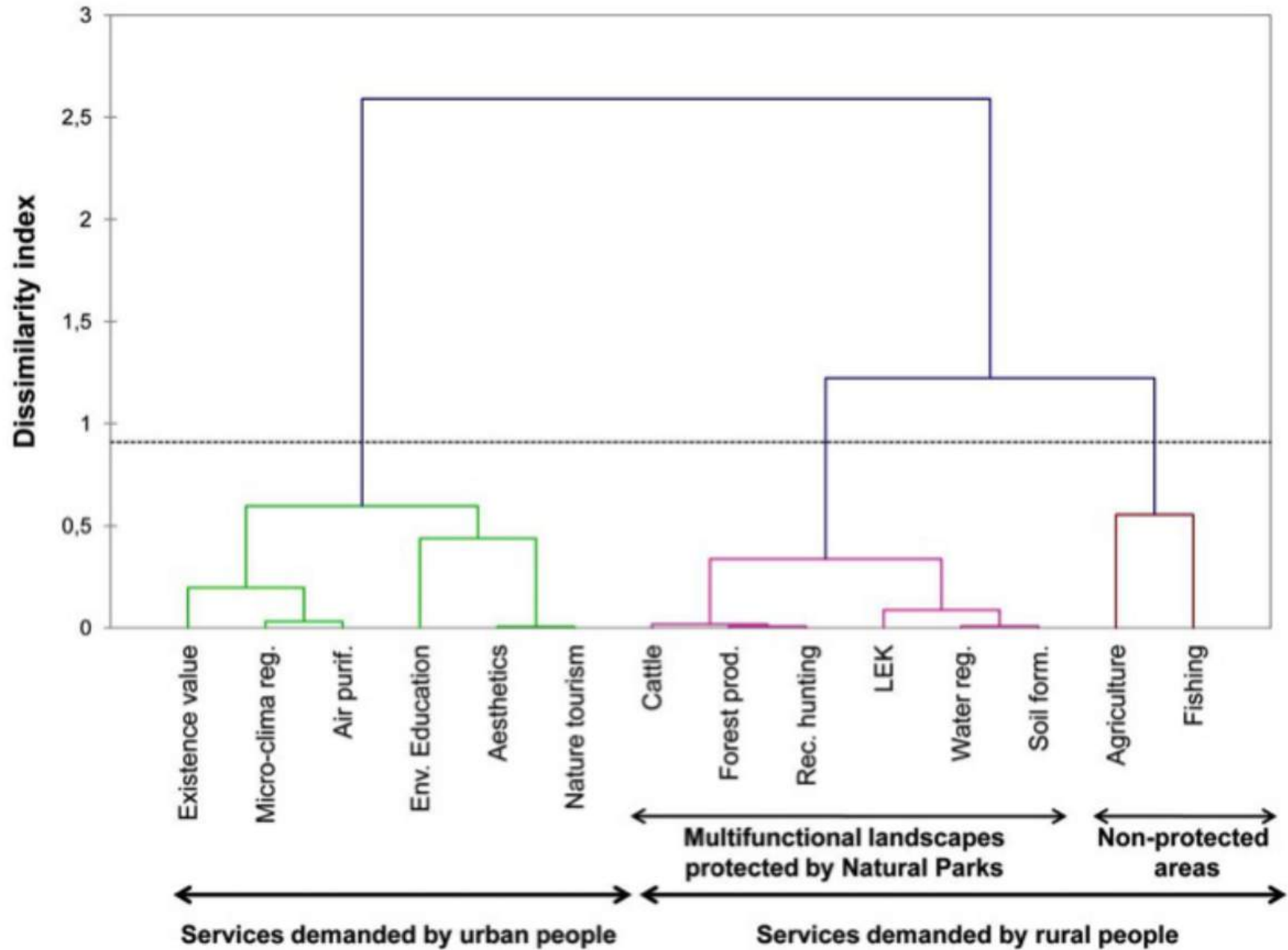
ES Social assessment

Conducted 3,379 direct face-to-face questionnaires in eight different case study sites

Martín-López et at., 2013
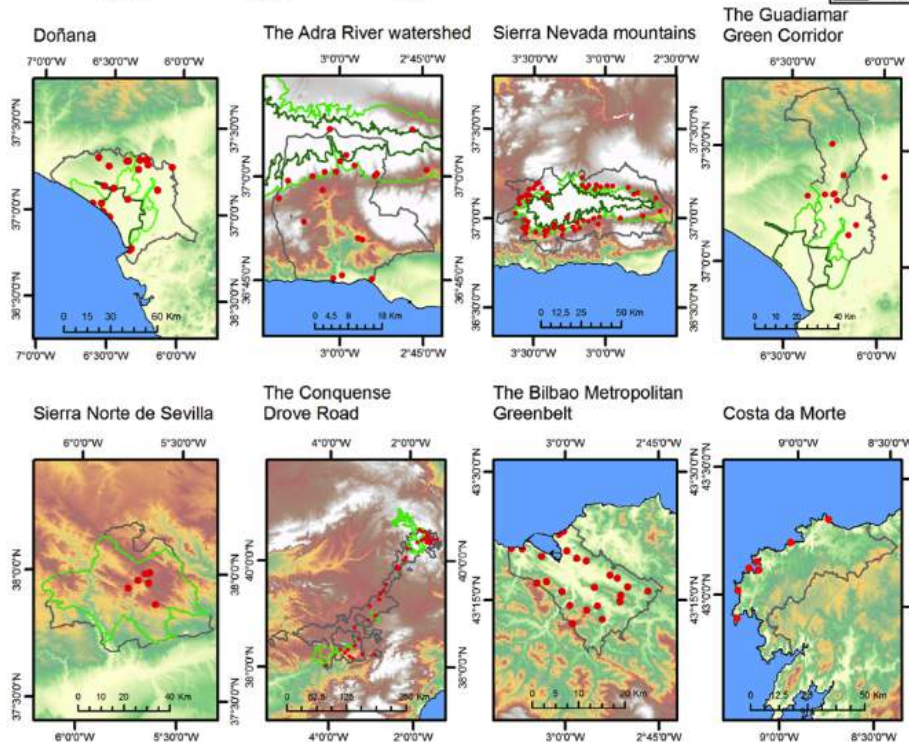
ES Social Preferences

ES bundles through social preferences

Understanding social-ecological transformations in Spain

GRAPHICAL ABSTRAC

F2 (13.79 %): SOCIO-CULTURAL TRANFORMATION

2. From rural to urban (1980-1988):

3. The consolidation of urban society (1989-1996)

4. The great acceleration process(1997-2005):

1. The end of the traditional agricultural society (1960-1979)

5. The fall of the development model (2005-2010)

F1 (81.08%): SOCIO-ECONOMIC DEVELOPMENT
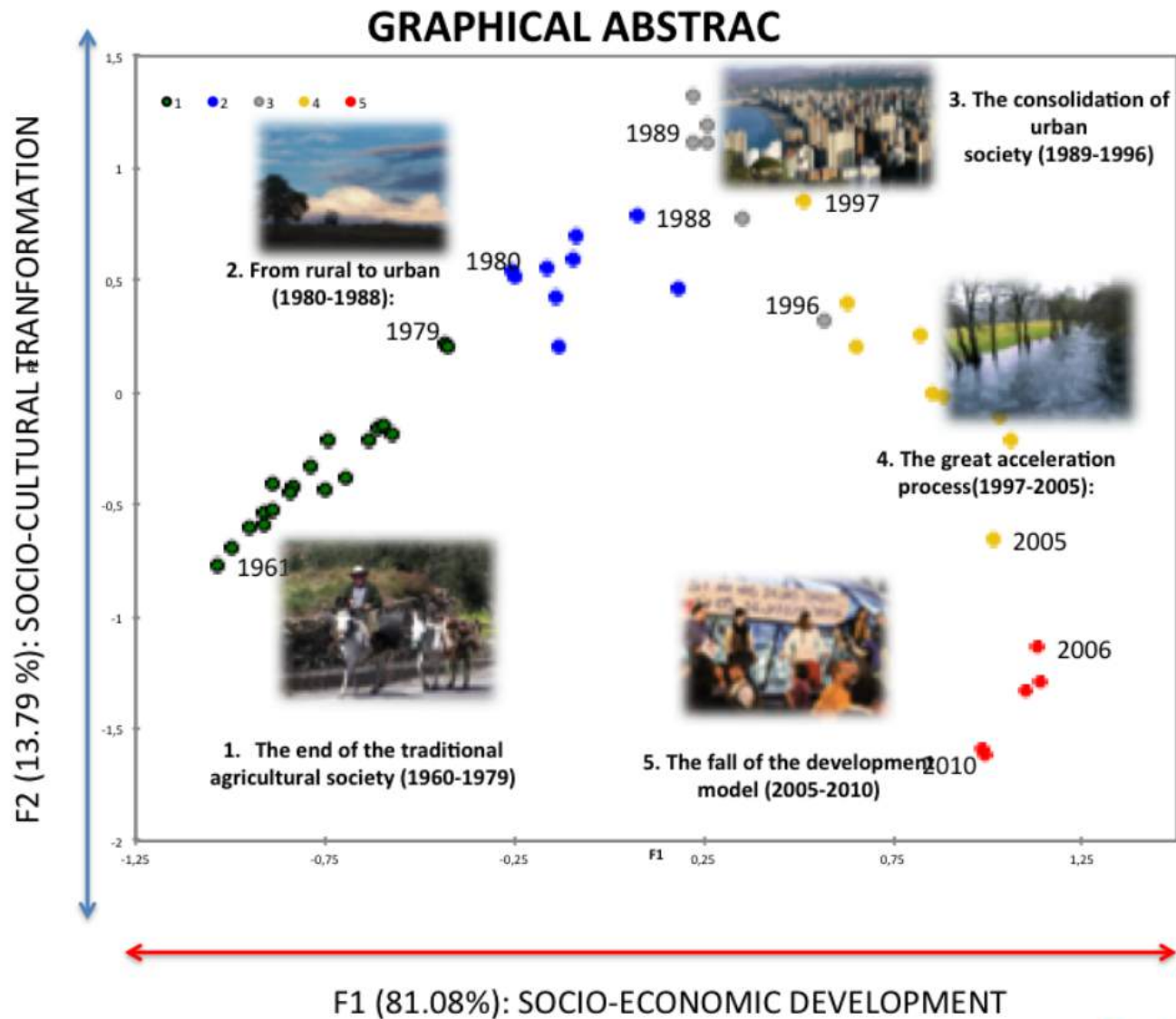
Identifying thresholds of change
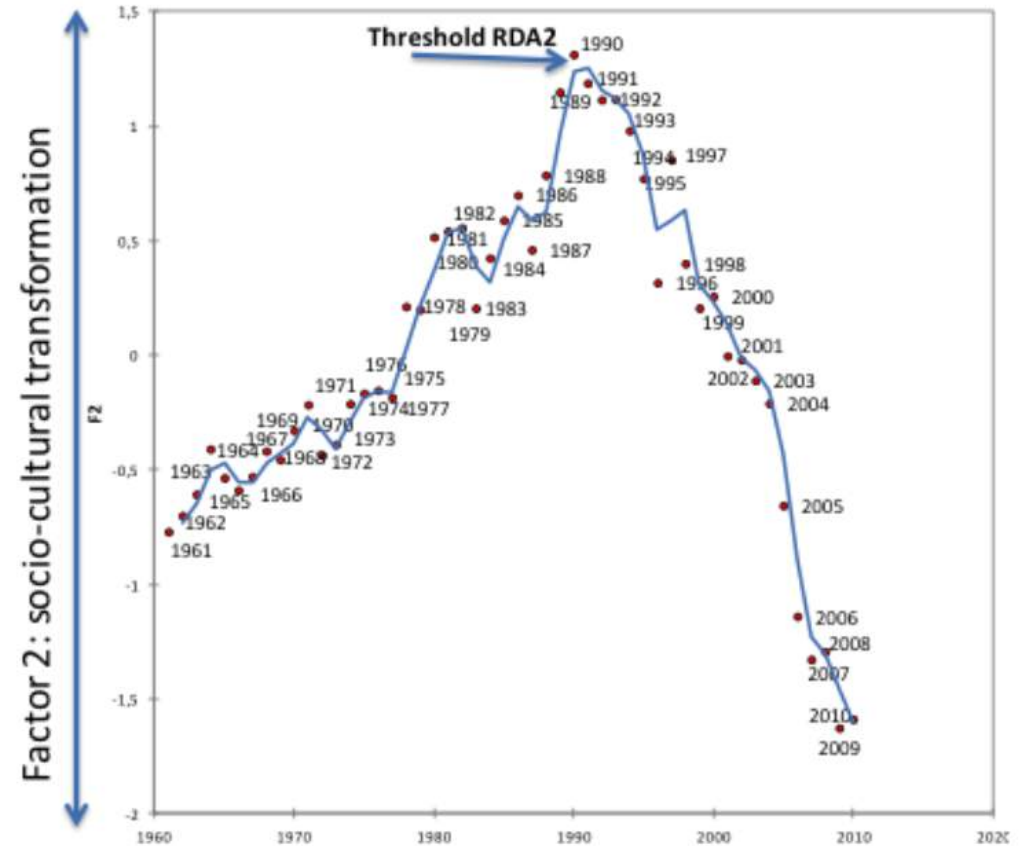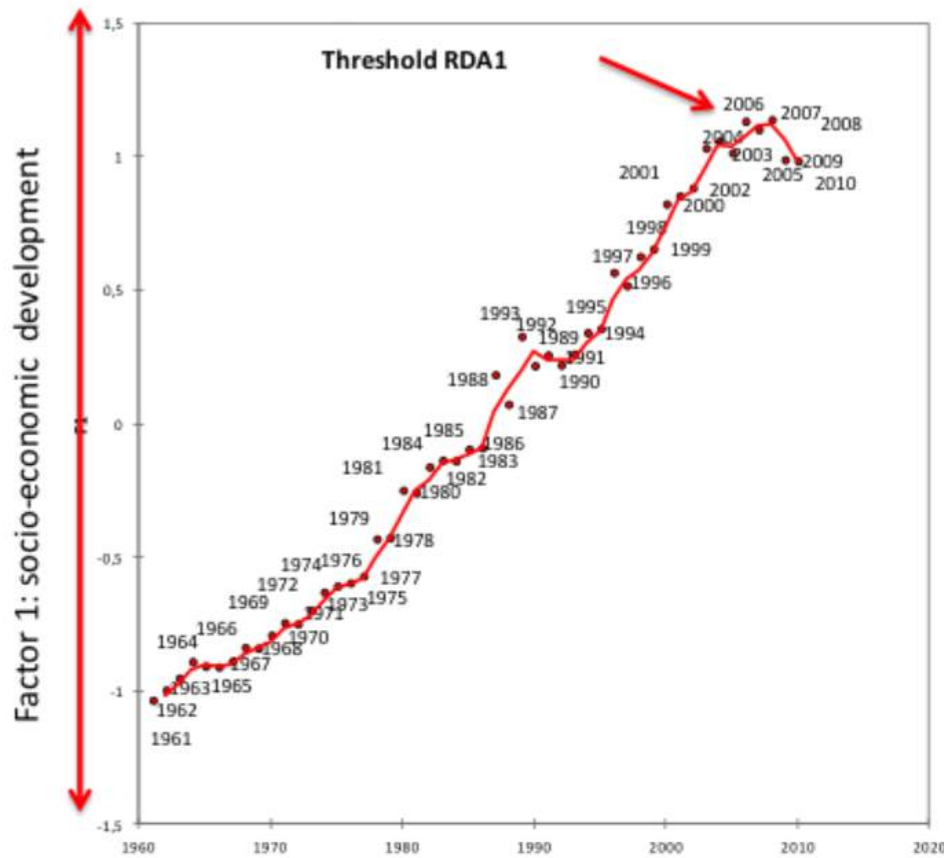
Economic

ES Economic Assessment

1. Meta-analysis (9 services)

- Food
- Natural disasteres
- Climatic regulation
- Water quality
- Erosion control
- Biological control
- Recreation
- Aesthetic
- Biodiversity conservation

2. Market based methods (5 services)

- Agriculture
- Water
- Forest fires
- Water quality
- Recreation

3. Stated methods and preferences (5 services)

- Water quality
- Erosion control
- Gene pool
- LEK
- Biodiversity conservation

Database generation in ES values
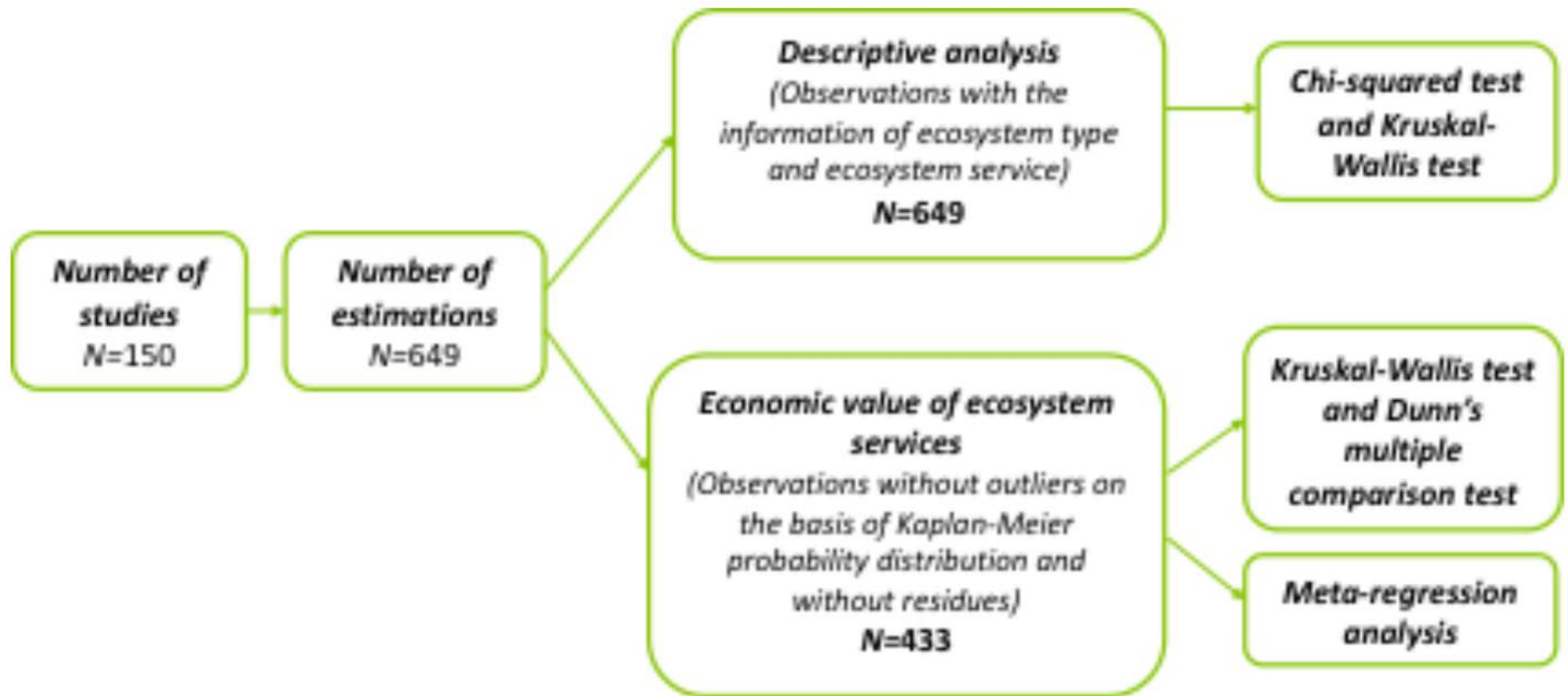
Meta-analysis: State of the art of ES economic valuation

Number of ES studies
- 2 - 4
- 4 - 7
- 7 - 20
- 20 - 35
- 35 - 42

Category of ES
- Provisioning
- Regulating
- Cultural
- Mixed
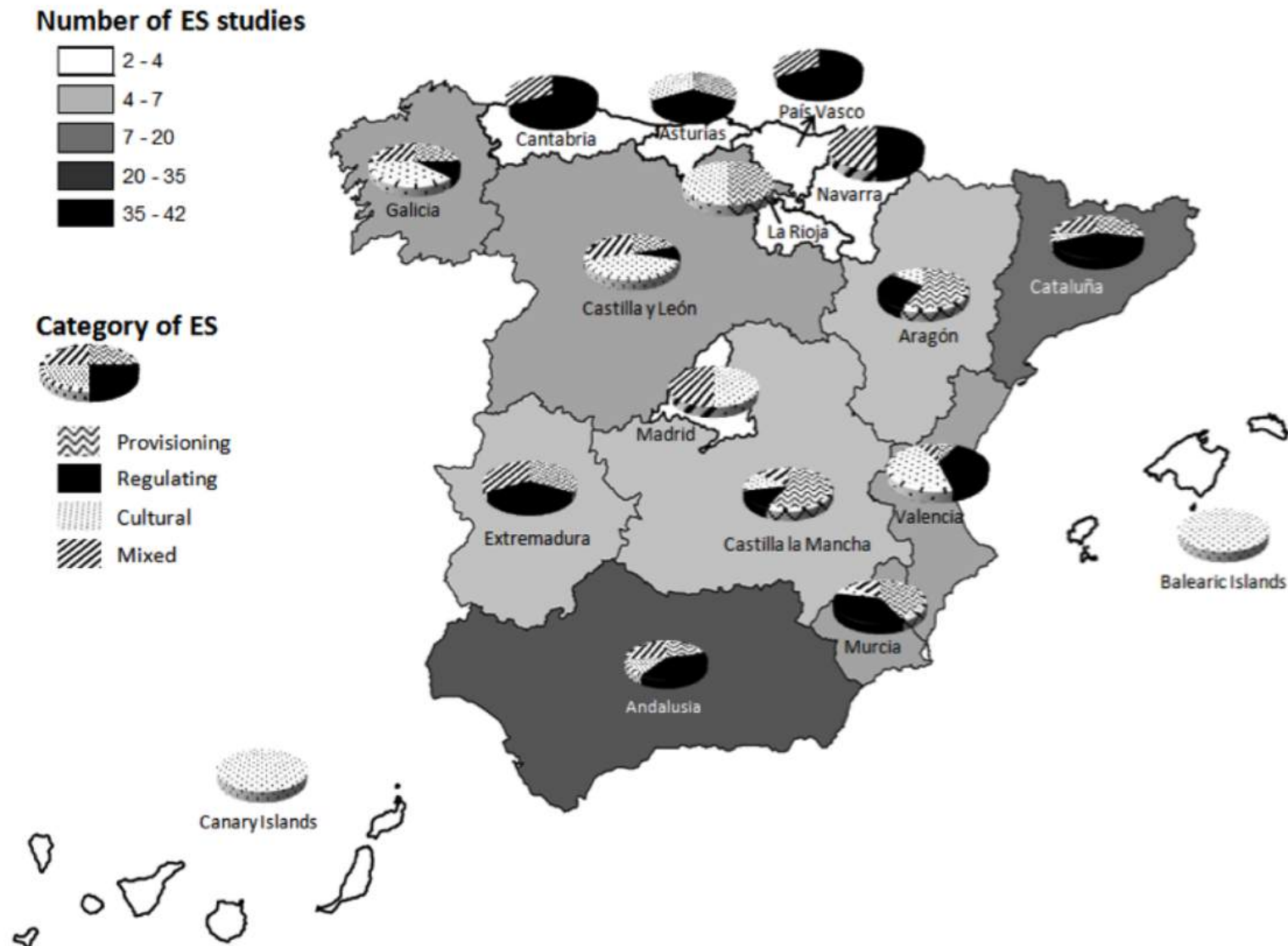
Stated preference methods: Choice experiment

On-line survey with 800 valid questionnaires

Representative of the Spanish population

Sampling error <5%

García-Llorente et al., (in prep)

Economic values for ES: willingness to pay (WTP)

ES	WTP (euros/home/year)	IC min	IC max
Water quality	32.58	27.05	38.11
Biodiversity conservation	22.50	19.38	25.62
Geen pool	16.35	12.41	20.28
LEK	14.50	9.54	19.46
Erosion control	14.05	9.85	18.24

Media problemas ambientales

Pérdida de los conocimientos locales

Pérdida de biodiversidad

Escasez de agua

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

■ Muy o bastante importante   ■ Poco o nada importante

Market based Methods

Santos-Martín et al. (in prep)

Econmic vs. Ecological value

Santos-Matín et. al, (in prep)
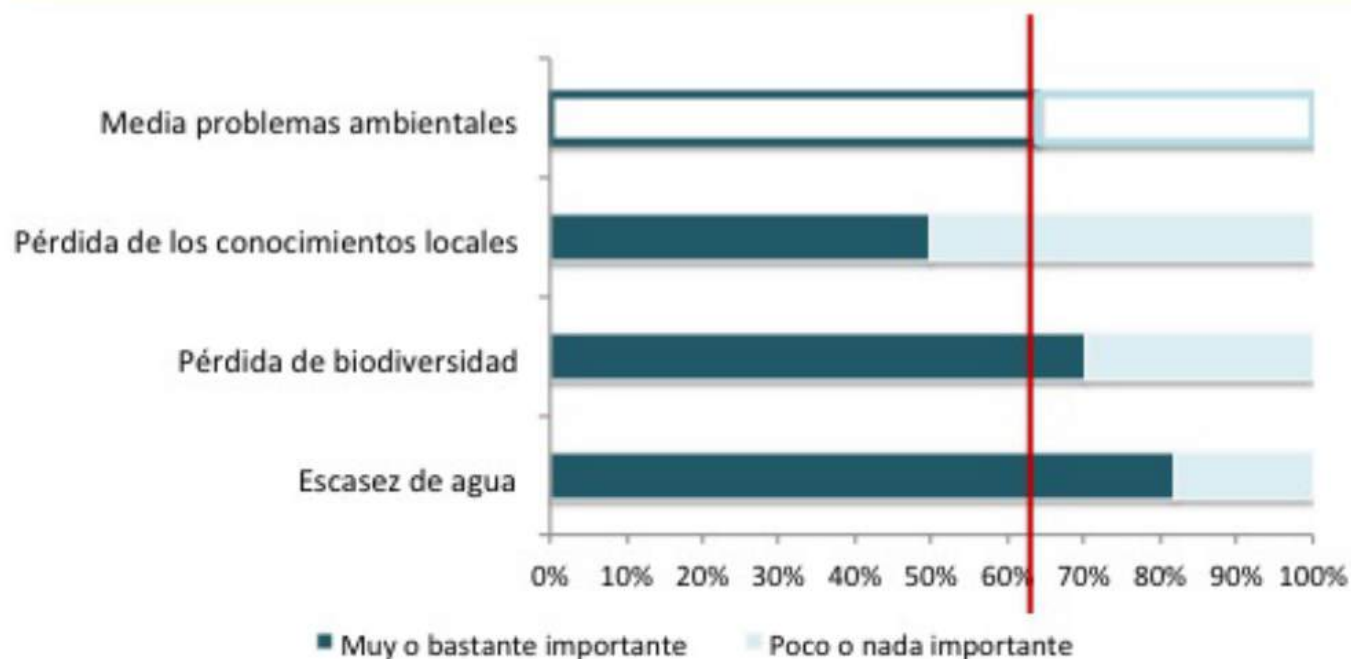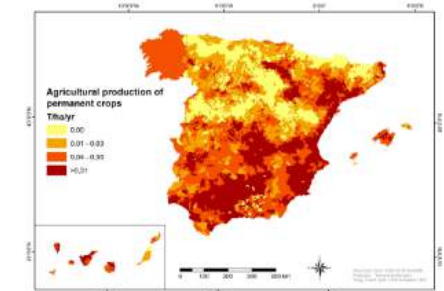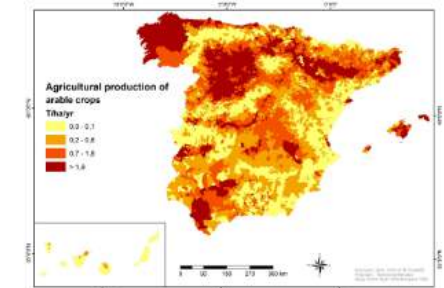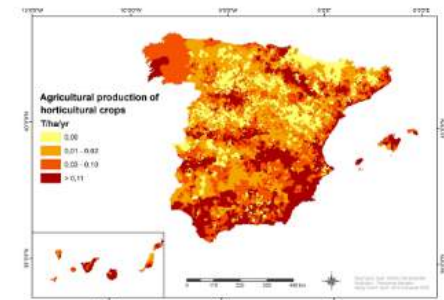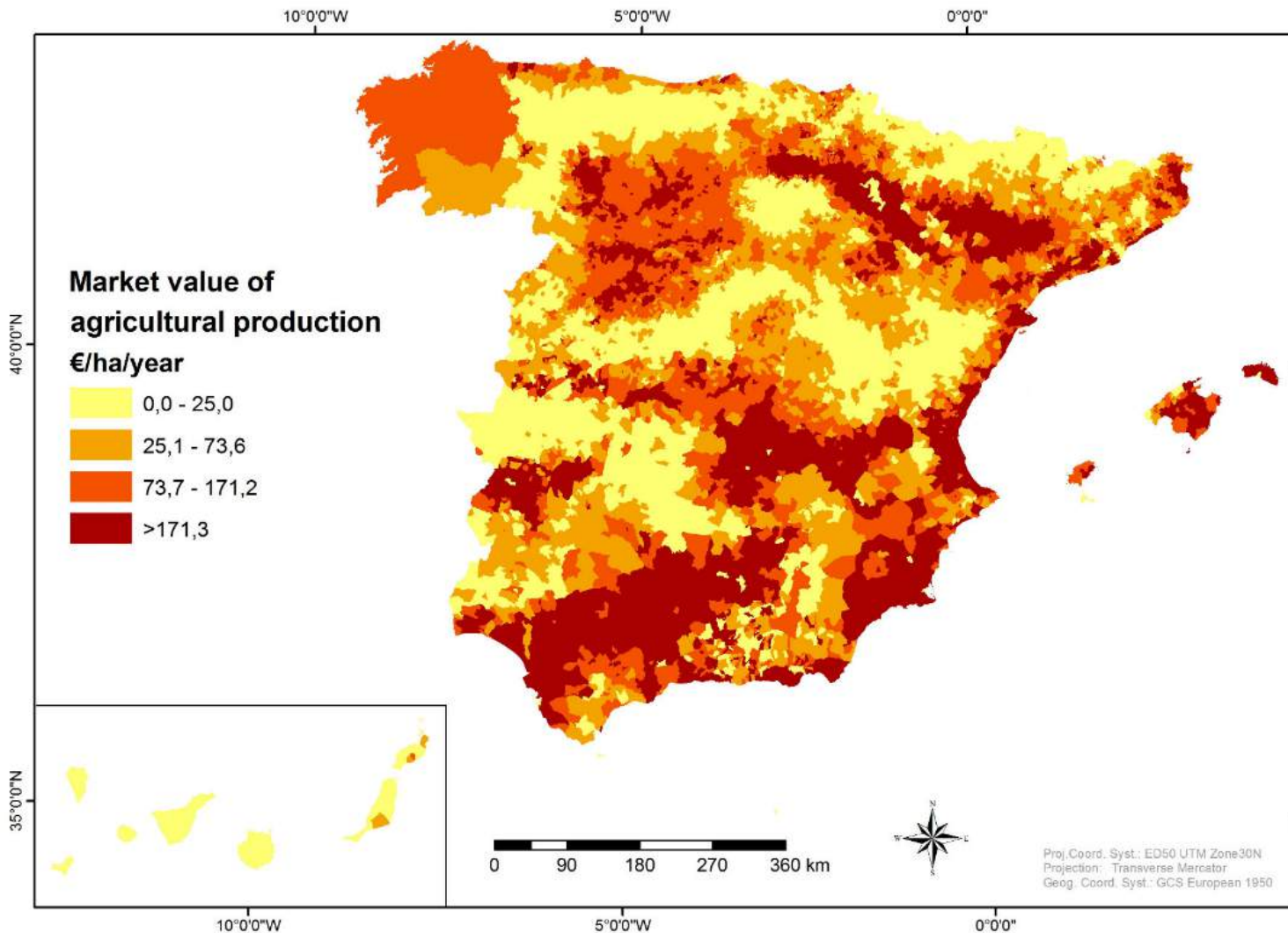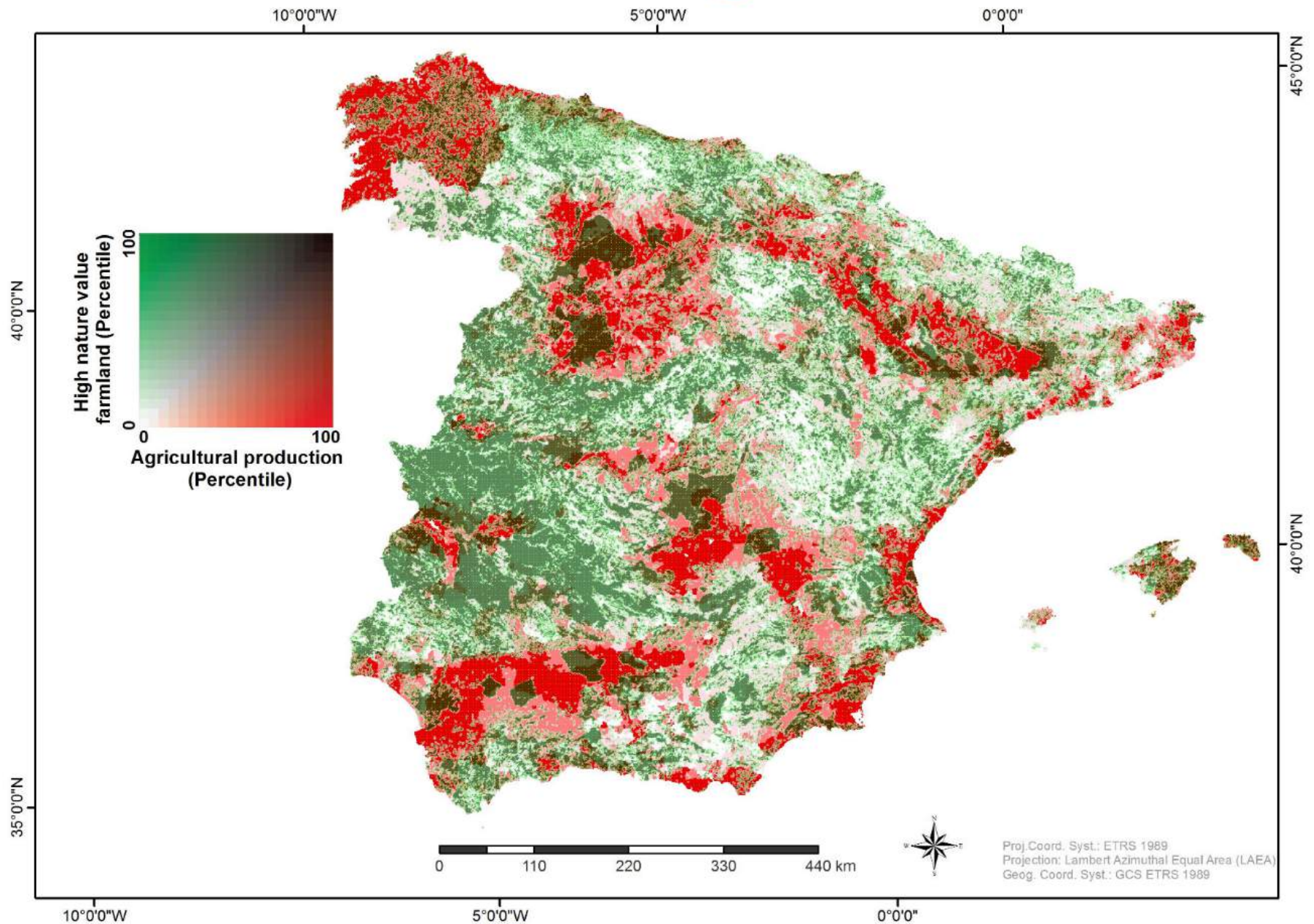
ES Economic Values

		VALOR ECONÓMICO MEDIO (Min - Max)		
		MERCADOS (€/ha/año)	METAANALISIS (€/ha/año)	MODELOS DE ELECCIÓN (€/hogar/año)
Abastecimiento	1. Alimentos	166.4 (0.1 – 8.100)	371.04 (0.91 -1972.65)	
Abastecimiento	2. Agua	3.717 875 – 23.000		
Abastecimiento	3. Acervo genético			16.35 (12.41- 20.28)
Regulación	4. Regulación climática		181.35 (0.01 -528.44)	
Regulación	5. Depuración hídrica	3.717 (875 – 23.000)	135.31 (0.01- 1970.31)	32.58 (27.05-38.11)
Regulación	6. Control de la erosión		31.99 (0.87- 234.72)	14.05 (9.85-18.24)
Regulación	7. Perturbaciones naturales	1.75 (0.1- 2.700)	262.83 (1.99-1364.45)	
Regulación	8. Control biológico		15.43 (0.15 - 56.30)	
Cultural	9. Recreativo o turismo	41 (1- 700)	186.36 (0.44 -1836.90)	
Cultural	10. Conocimiento local			14.50 (9.54-19.46)
Cultural	11. Sentimiento espiritual		6.26 (0.12-100.03)	22.50 (9.38-25.62)
Cultural	12. Disfrute estético		84.84 (0.41- 1871.99)	

Tradeoffs among value domains

(A) DIMENSION BIOFÍSICA

Mejora
Estable
Disminuye

(B) DIMENSION ECONÓMICA

Alto valor
Sin tendencia
Bajo valor

(C) DIMENSION CULTURAL

Muy valorado
Sin tendencia
Poco valorado
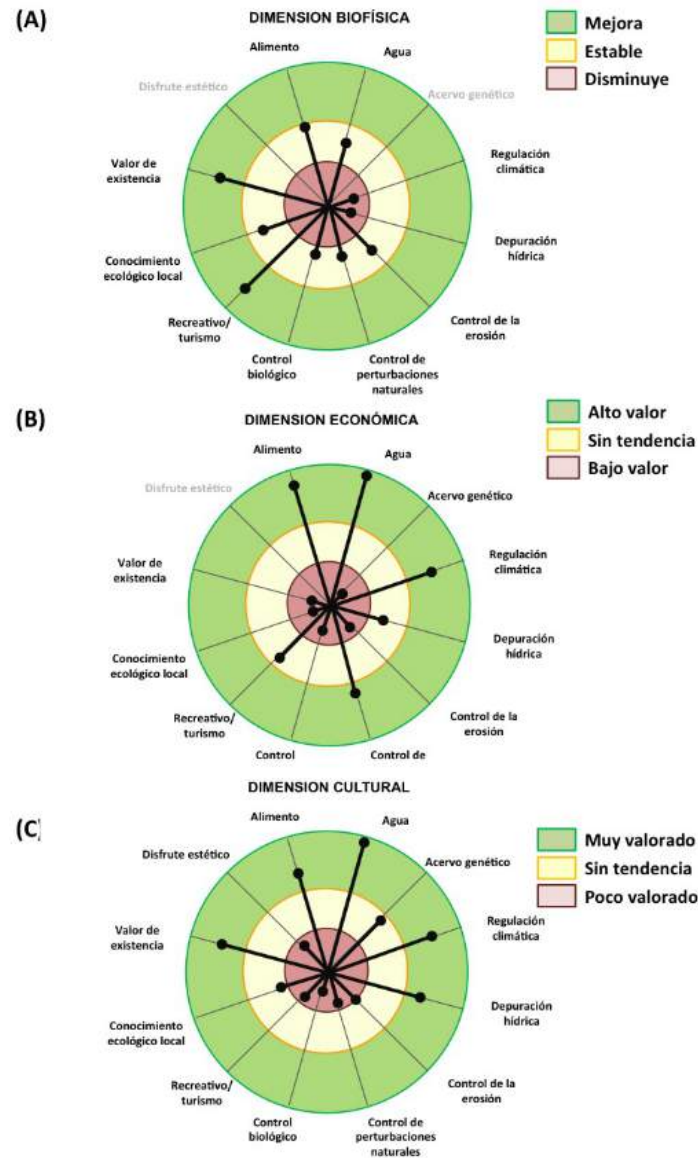
LeSSonS

National Ecosystem assessments should combine the three value-domains (biophysical, socio-cultural, and economic) to properly inform the environmental decision-making process.

Developing a comprehensive methodology, in which biophysical, social-cultural, and economic value domains can be properly integrated remains a challenging scientific frontier.

The use of different assessment methods uncovers the fact that each method actually shape and define the results being elicited.

The ecosystem's capacity to supply services determines the range of potential uses by society, having an influence on socio-cultural and economic values.

Sociocultural values have an influence on monetary values, because preferences and stakeholders motivations determine the 'utility' that a person obtains from a particular service.

Recognizing the role of ecosystem service assessment methods, we call for a integrative methodological framework able to contemplate the multidimensional nature of ecosystem services.

National Ecosystem assessments should combine the three value-domains (biophysical, socio-cultural, and economic) to properly inform the environmental decision-making process.

Developing a comprehensive methodology, in which biophysical, social-cultural, and economic value domains can be properly integrated remains a challenging scientific frontier.

The use of different assessment methods uncovers the fact that each method actually shape and define the results being elicited.

The ecosystem's capacity to supply services determines the range of potential uses by society, having an influence on socio-cultural and economic values.

Sociocultural values have an influence on monetary values, because preferences and stakeholders motivations determine the 'utility' that a person obtains from a particular service.

Recognizing the role of ecosystem service assessment methods, we call for a integrative methodological framework able to contemplate the multidimensional nature of ecosystem services.

thank you!

Dr. Fernando Santos Martín

Social-Ecological Systems Lab. Dpt. Ecology,
Universidad Autónoma de Madrid, Spain

fernando.santos.martin@uam.es

www.ecomilenio.es
www.uam.es/sociecosistemas

Spanish NEA

Social

Evaluating Biophysical, Social
and Economic and values domains
in the Spanish NEA

Lessons

Biophysical

Economic

14 ECOSYSTEMS

ES Economic Assessment