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Les solutions fondées sur la nature: définition et enjeux pour la recherche

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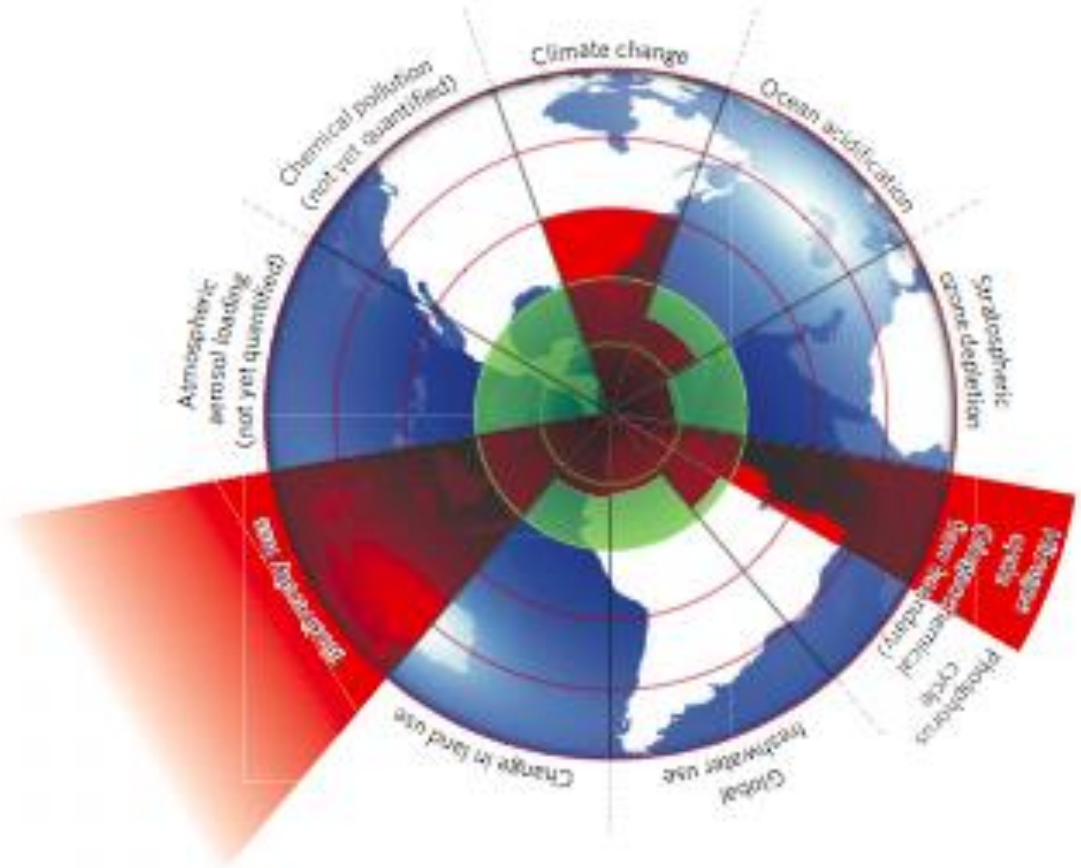
Content

Part 1: What are Nature-based solutions?
(incl. history of the emergence of a term)

Part 2: Challenges linked to NbS for the (French) research community

Background



Planetary boundaries
Rockstrom et al. (2009)

- Humans increasingly disconnected from Nature
- Planetary supply of natural resources and ecosystem services can no longer meet human demands

⇒ Challenges :
* Restore harmony in humans-Nature relationships
* bring and maintain the human demand for resources and services within the global supply constraints

Background

Rough timeline	Framing of conservation	Key ideas	Science underpinning
1960–1970	Nature for itself	Species Wilderness Protected areas	Species, habitats and wildlife ecology
1980–1990	Nature despite people	Extinction, threats and threatened species Habitat loss Pollution Overexploitation	Population biology, natural resource management
2000–2005	Nature for people	Ecosystems Ecosystem approach Ecosystem services Economic values	Ecosystem functions, environmental economics
2010	People and nature	Environmental change Resilience Adaptability Socioecological systems	Interdisciplinary, social and ecological sciences

(G. Mace)

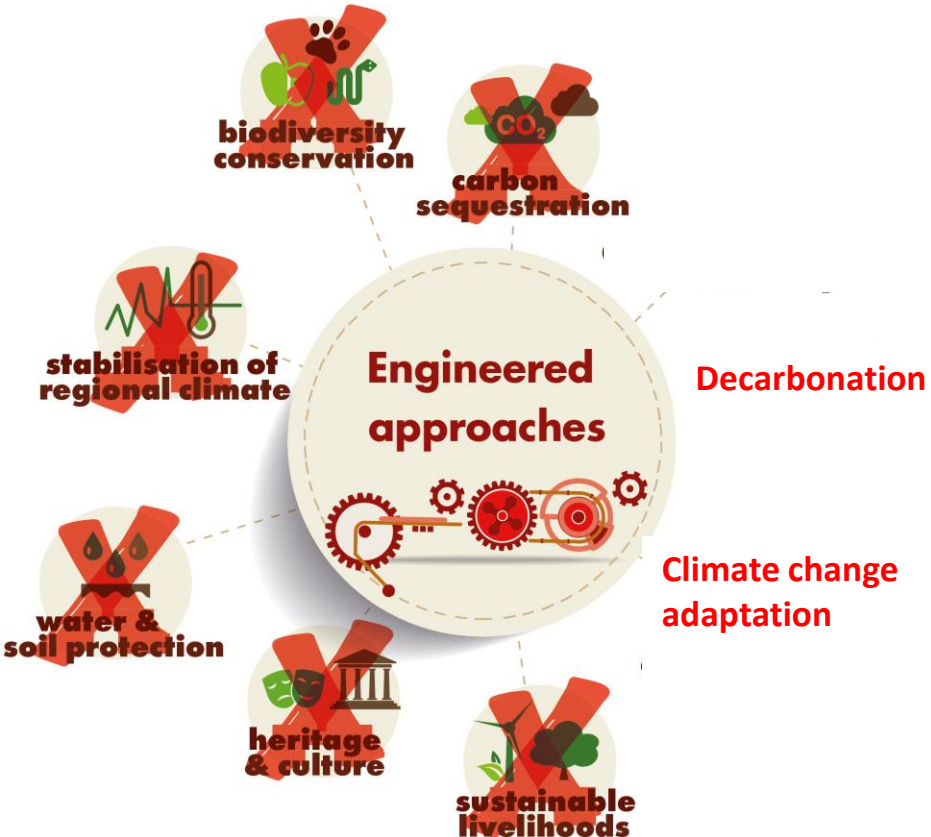
Solutions to protect nature

Solutions to restore biodiversity/habitats

Solutions to manage natural assets (ESS)

Background

• **Technological Solutions** (simple, replicable, predictable) - e.g. physico-chemical filtration to purify water and air



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2010	People and nature	Environmental change Resilience Adaptability Socioecological systems	Interdisciplinary, social and ecological sciences	**Solutions for people AND nature**

(G. Mace)

Background

• **Nature-Based Solutions (NbS)** – refer to the sustainable use and management of nature to tackle societal challenges, simultaneously providing benefits for society, economy and the environment (with benefits to biodiversity)

Background

- **Late 2000s:** Term “nature-based solutions” first used in the context of finding new solutions to mitigate and adapt to climate change effects whilst simultaneously protecting biodiversity and improving sustainable livelihoods.

- **2009:** IUCN referred to NbS in a position paper for UN

- **then:**
  - quickly taken up by European policy-makers, in particular by the European Commission stressing that NbS can offer an innovative mean to create jobs and growth part of a green economy (2012-).
  - BiodivERsA: framing of the term ; NbS axis in the BiodivERsA research agenda (2013-)
  - strongly embedded in Global Programme of IUCN (2016)
  - since 2015: gaining acceptance outside the conservation community and now well on its way to be mainstreamed in policies and programmes (climate-change policy, CBD, IPBES-IPCC, infrastructure investment and financing mechanisms…)

What are NbS?

Nature-based Solutions to societal challenges are **solutions** that are inspired and **supported by nature**, which are cost-effective, **simultaneously provide environmental, social and economic benefits** and help build **resilience**. Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes and seascapes, through locally adapted, resource-efficient and systemic interventions. Nature-based Solutions must **benefit biodiversity** and support the delivery of a range of ecosystem services (*European Commission*)

What are NbS?

IUCN definition	European Commission definition
Actions	**Living solutions**
to **protect**, **sustainably manage** and **restore**	**inspired by**, continuously supported by and **using**
natural or **modified ecosystems**	**Nature**
that address societal challenges	Designed to address various societal challenges
effectively and **adaptively**	In a **resource efficien**t and adaptable manner
simultaneously providing human well-being and biodiversity benefits	And to provide simultaneously economic, social and environmental benefits

Common ground: Promoting sustainability and increasing the role of natural, self-sustained processes relying on biodiversity + allowing multiple benefits

… **innovate with and for nature!**

What NbS are … and are not

Biomimicry: not NbS

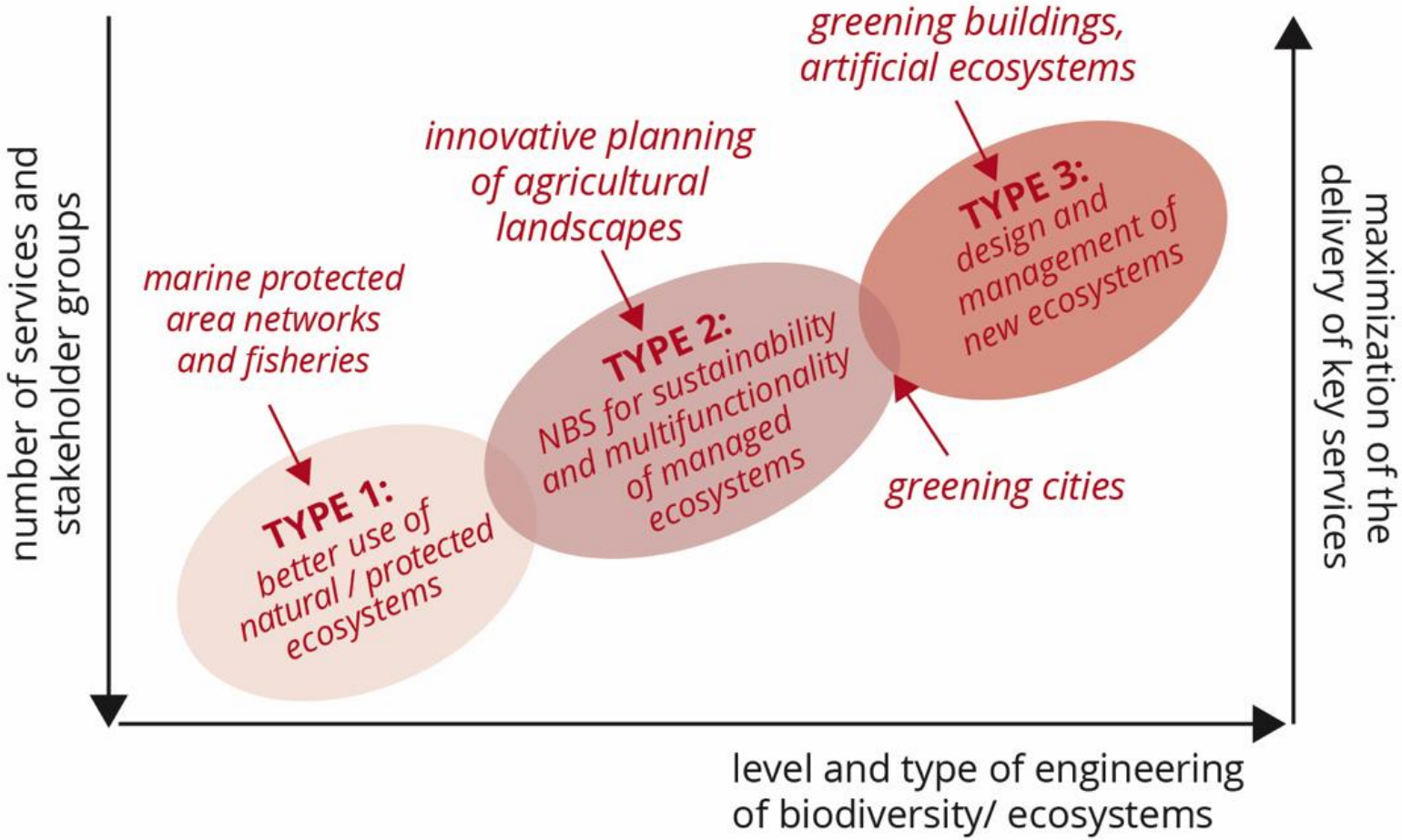
How a ‘green roof’ can be a NbS … or not!

Link to other terms

Link to ecosystem services (ESS)
⇒ESS used within the concept of NbS
⇒But ESS often valued in terms of short-term benefits to people and economy; NbS refer to systemic approaches that integrate societal factors and the benefits for the environment, including long-term resilience

Link to concepts such as ecological engineering, agroecology, …
=> but NbS bring in a more systemic agenda / require more systemic approaches

Typology of NbS



Eggermont E. (…) & Le Roux X. (2015) Nature-Based Solutions: New influence for Environmental Management Research in Europe. GAIA, 24/4: 243–248

Typology of NbS

Type 1 NBS : Pas/peu d'intervention sur les écosystèmes. Objectifs = préserver/renforcer une gamme de services écosystémiques dans et hors ces écosystèmes préservés

Ex: protection des mangroves; établissement/ renforcement des AMPs

Type 1 NBS connecté au concept de réserves de biosphère (zones coeur pour la protection de la nature + zones tampons et de transition)

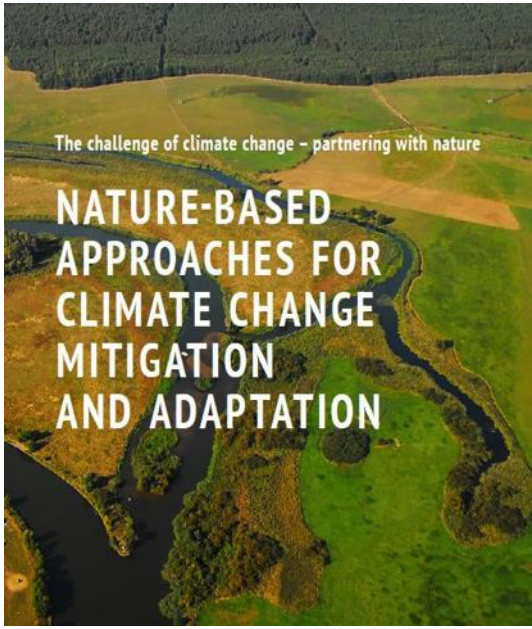
Eggermont E. (…) & Le Roux X. (2015) Nature-Based Solutions: New influence for Environmental Management Research in Europe. GAIA 24/4: 243–248

Typology of NbS

Type 2 NBS : Approches pour accroitre la durabilité & multifonctionalité des écosystèmes, et la fourniture de services

Ex: développement de paysages agricoles multifunctionnels; management de la diversité spécifique et génétique des arbres pour accroitre la résilience des forêts aux évèvements extrêmes

Type 2 NBS connecté aux concepts Natural Systems Agriculture, agro-ecology, evolutionary-orientated forestry…



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Typology of NbS

Type 3 NBS : Management d'écosystèmes de façon intrusive, voire en créant de nouveaux écosystèmes

Ex: Création d'écosystèmes artificiels (nouveaux assemblages d'espèces/génotypes) en ville

Type 3 (et 2) NBS lié aux approches de TVB, ingénierie écologique, restauration de terrains fortement pollués

Eggermont E. (…) & Le Roux X. (2015) Nature-Based Solutions: New influence for Environmental Management Research in Europe. GAIA 24/4: 243–248

To summarize

<u>Interest of this new term:</u>

Promoting SOLUTION-oriented researches to tackle societal challenges ➔ explicit the different challenges tackled and the environmental, social and economic outcomes

Using a term PALATABLE TO STAKEHOLDERS, incl. policy-makers ➔ solutions co-constructed and implemented for and with different social groups

Reinforcing cross-sectoral researches to tackle wicked problems
➔ Promoting a knowledge basis BEYOND THE TRADITIONAL SILOS
➔ Systemic approaches recognizing the COMPLEXITY of the systems studied, and UNCERTAINTY associated to their possible trajectories

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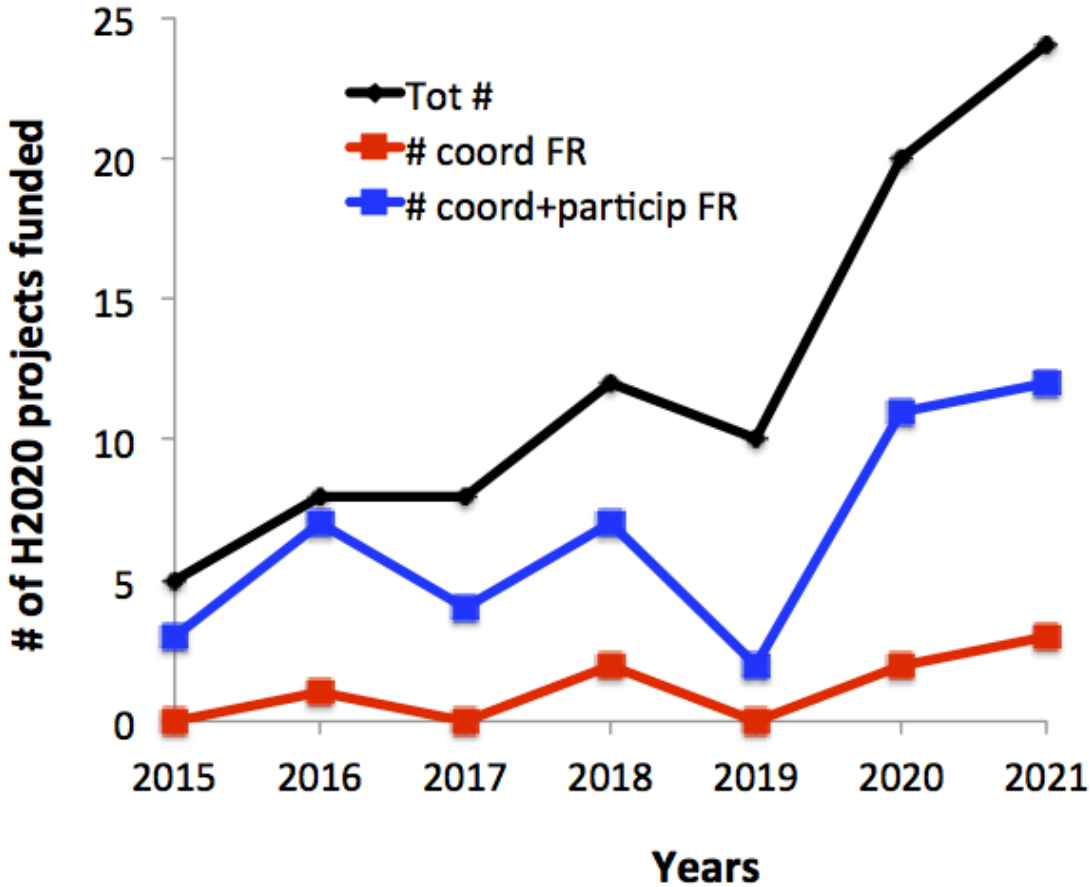
An insufficient mobilization/leadership of the French community



Temporal variation in the number of H2020-funded projects on NbS: total (black); coordinated by France (red); including at least a participation of France (blue). *Unpublished analysis made by BiodivERsA*

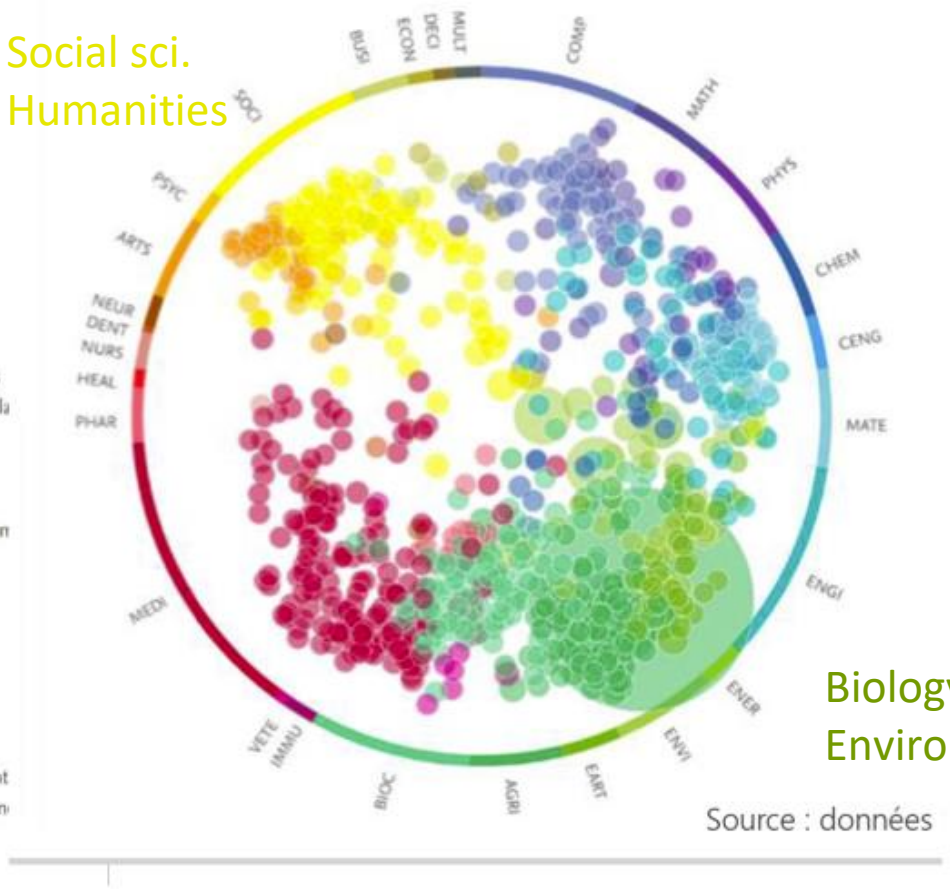
Explanation #1: mobilization of social sciences/humanities

Mapping

An interdisciplinary field still dominated by life sciences

COMP	Computer Science
MATH	Mathematics
PHYS	Physics and Astronomy
CHEM	Chemistry
CENG	Chemical Engineering
MATE	Materials Science
ENGI	Engineering
ENER	Energy
ENVI	Environmental Science
EART	Earth and Planetary Sciences
AGRI	Agricultural and Biological Sciences
BIOC	Biochemistry, Genetics and Molecula
IMMU	Immunology and Microbiology
VETE	Veterinary
MEDI	Medicine
PHAR	Pharmacology, Toxicology and Pharm
HEAL	Health Professions
NURS	Nursing
DENT	Dentistry
NEUR	Neuroscience
ARTS	Arts and Humanities
PSYC	Psychology
SOCI	Social Sciences
BUSI	Business, Management and Account
ECON	Economics, Econometrics and Finan
DECI	Decision Sciences
MULT	Multidisciplinary

Social sci.
Humanities



Biology/
Environ.

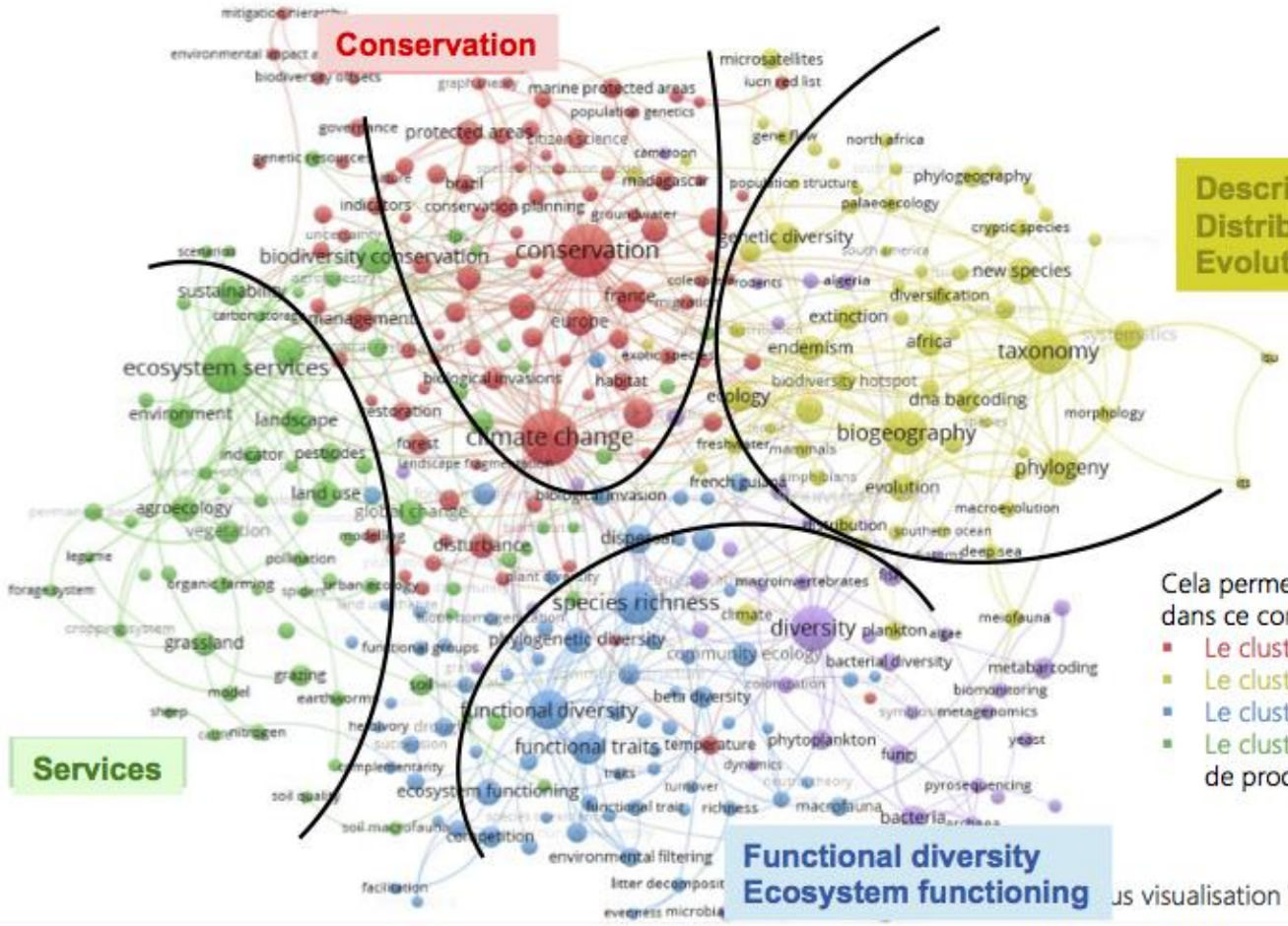
Source : données

cnrs INRAE

Explanation #2: mobilization of different domains

Mapping

4 main domains still not well connected



Les corpus
françaises s
ont été ca
cooccurren

Cela permet de distingu
dans ce corpus :

- Le cluster rouge : la
- Le cluster jaune : la
- Le cluster bleu : la d
- Le cluster vert : les a
de production et la l

us visualisation VosViewer, fé

Remaining challenges for research (exemples)

NbS design and implementation to effectively contribute to the protection/restoration of biodiversity while delivering other benefits (climate change mitigation and adaptation, human health and well being, social cohesion/justice, economic outcomes, risk disaster, …)?

Biodiversity facets important for different NbS and for their adaptative capacity and resilience?

Trade-offs induced by different NbS, e.g. between biodiversity and other environmental, social and economic outcomes? Costs and multiple benefits generated by different types and scales of NbS –and hybrid solutions– for different social groups?

Remaining challenges for research (exemples)

Approaches and indicators for measuring NbS performance? Prioritization of areas for NbS? Modelling NbS performance and outcomes under global change scenarios?

Processes favoring/impairing the performance and scaling up and out of NbS? (ecological interactions, financial frameworks and tools, rules & norms, perception & behaviours, …)

Conclusions
Take-home messages

<u>The NbS agenda: a change of mindset needed !</u>

Disciplinarity ➔ Inter/Trans-disciplinarity
Work in silos ➔ Desiloing (tradeoffs and underlying conflicts); adequate governance systems
Simplicity ➔ Complexity
Predictibility ➔ Uncertainty
Short term benefits ➔ Long term sustainability, resilience

More <u>systemic</u> approaches in research on socio-ecosystems

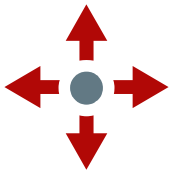
Work on transformative changes …
…and transformation of research practices

Conclusions
Take-home messages

Factors of success of **N**ature-**B**ased **S**olutions

N – NETWORKS
of communities

B – BENEFITS
of NbS



S – SCALING
for impact

Conclusions

Important to boost the French research community on this subject

➔ PEPR SOLU-BIOD