



Ecosystem services related to small forests in temperate rural landscapes

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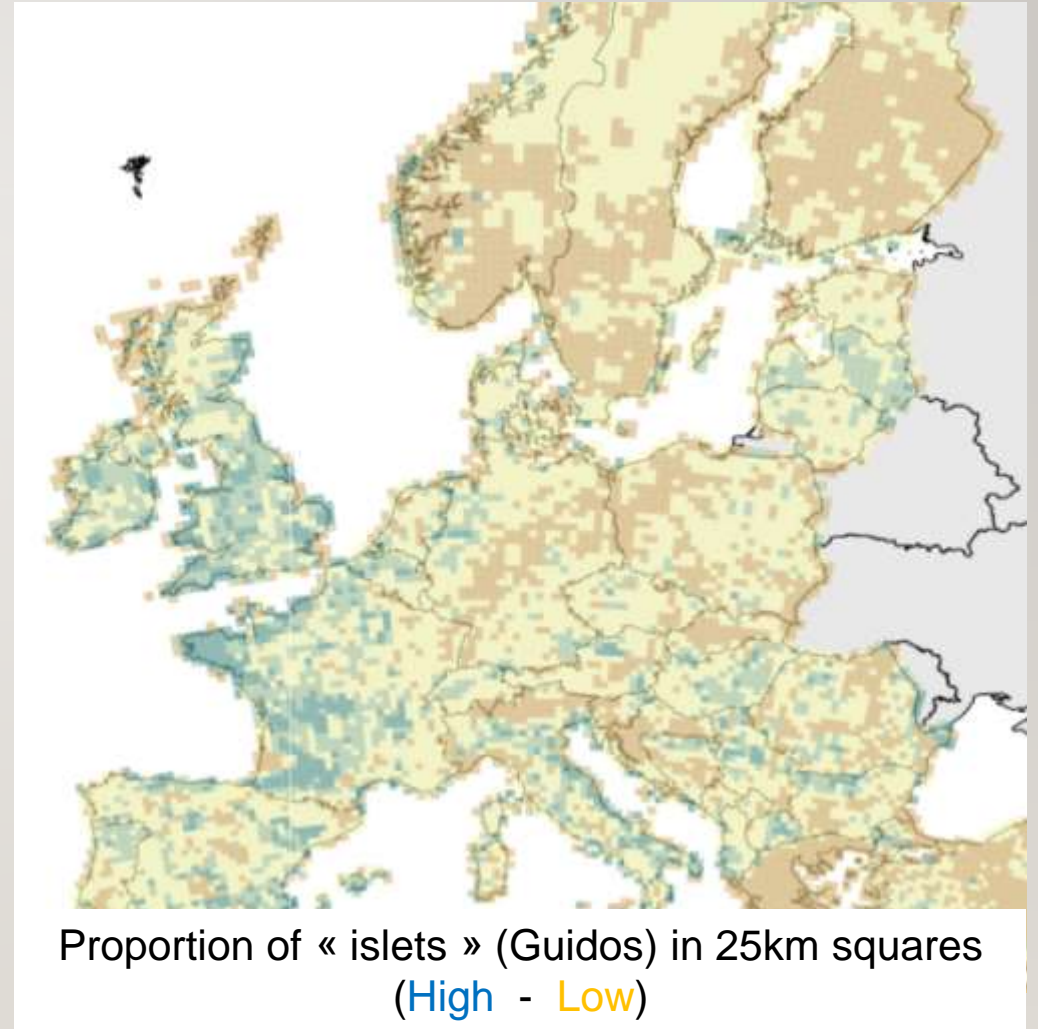
Ecosystem services related to small forests in temperate rural landscapes

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ESP10- Hanovre- 21-25/10/2019



So many small forest fragments in rural landscapes



Lots of interactions with surrounding agriculture and other human activities

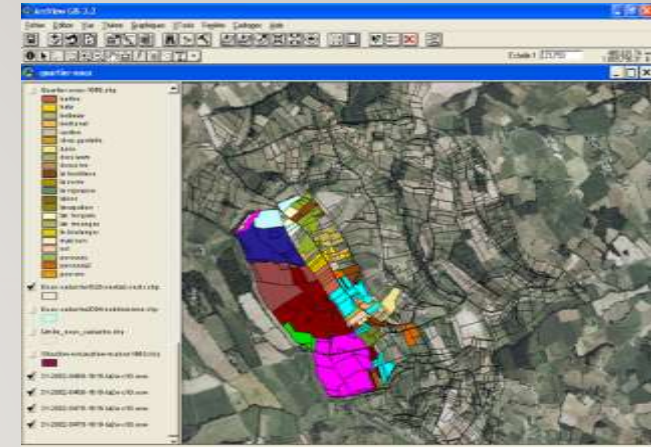


Study sites and methods



ZA-LTSEr Pygar

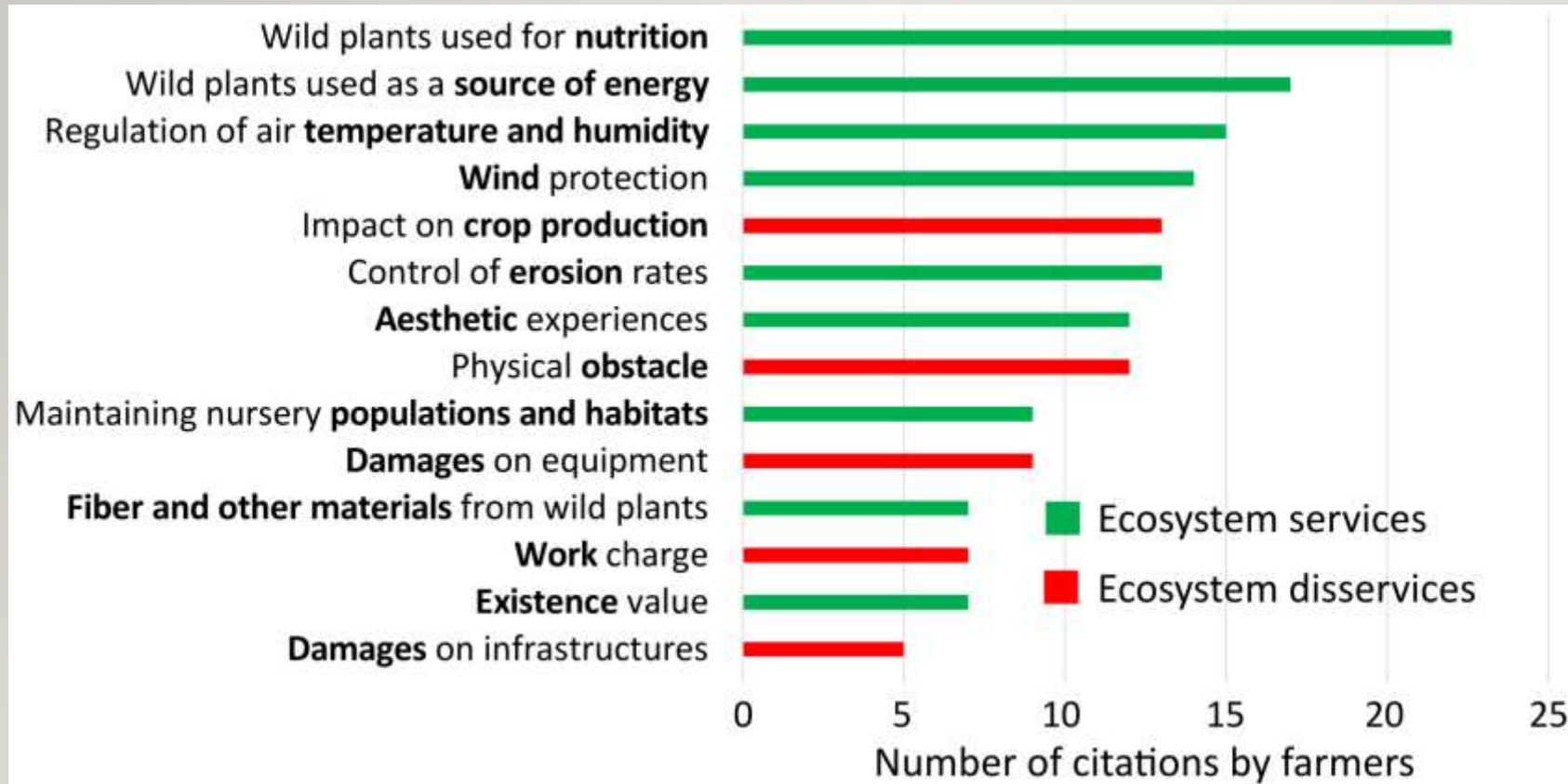
<https://pygar.omp.eu/>



Social drivers of rural forest dynamics: A multi-scale approach combining ethnography, geomatic and mental model analysis

Julien Blanco^{a,*}, Anne Sourdil^b, Marc Deconchat^c, Sylvie Ladet^d, Emilie Andrieu^e

Which ecosystem (dis)services are listed by farmers?



Blanco, J., Sourdril, A., Deconchat, M., Barnaud, C., San Cristobal, M., & Andrieu, E. (2019). *Farmers compose with ecosystem services and disservices for managing on-farm trees: insights from a French case study*. Paper presented at the 4. World Congress of Agroforestry

Which ecosystem (dis)services from a location point of view ?

In situ services

= services delivered within the forest patch

- Biodiversity
- Wood production
- Wild food production
- Biological invasion risk (*disservice*)

Local-proximal services

= services depending on the spatial proximity of the forest patch

- Disturbance regulation
- Habitat & refuge
- Biological pest control
- Pollination
- Infectious diseases (*disservice*)

Directional flow-related services

= services extending from the forest patch to the point of use

- Water regulation
- Water supply
- Erosion control
- Carbon storage & climate regulation

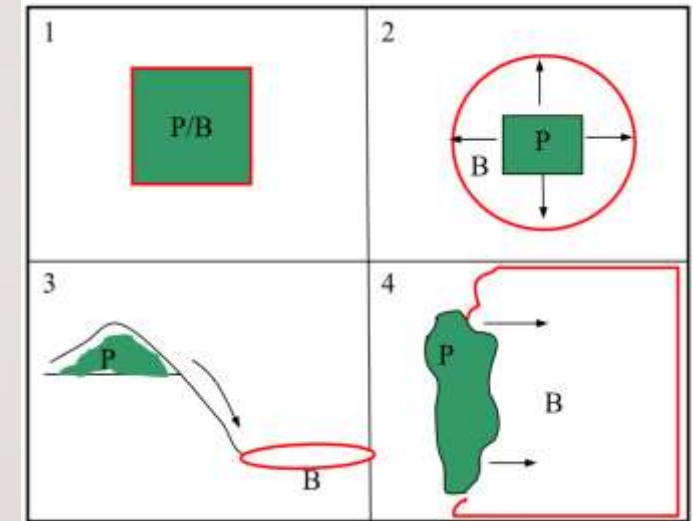
Global services

= services independent from the forest patch location

User movement-related services

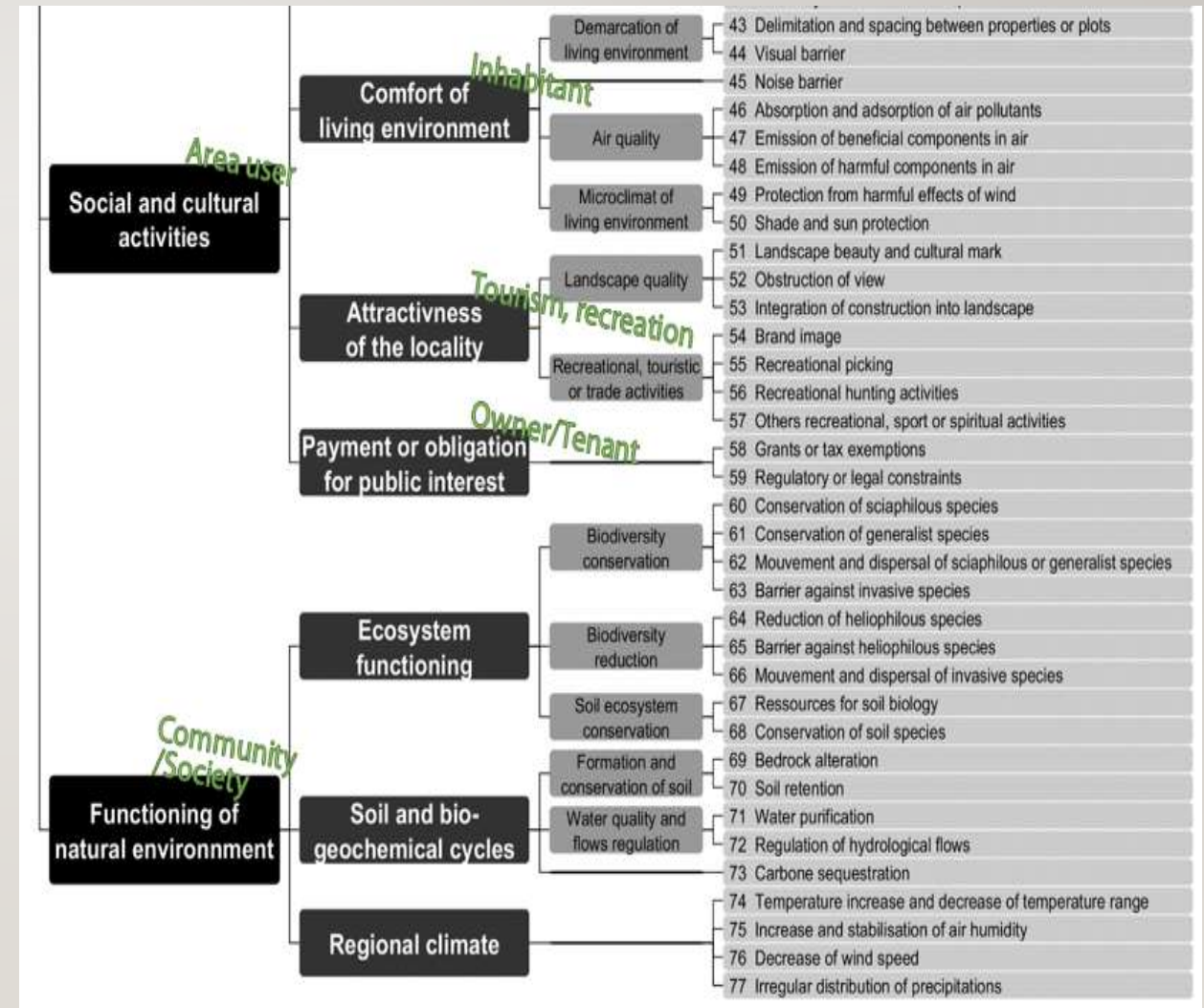
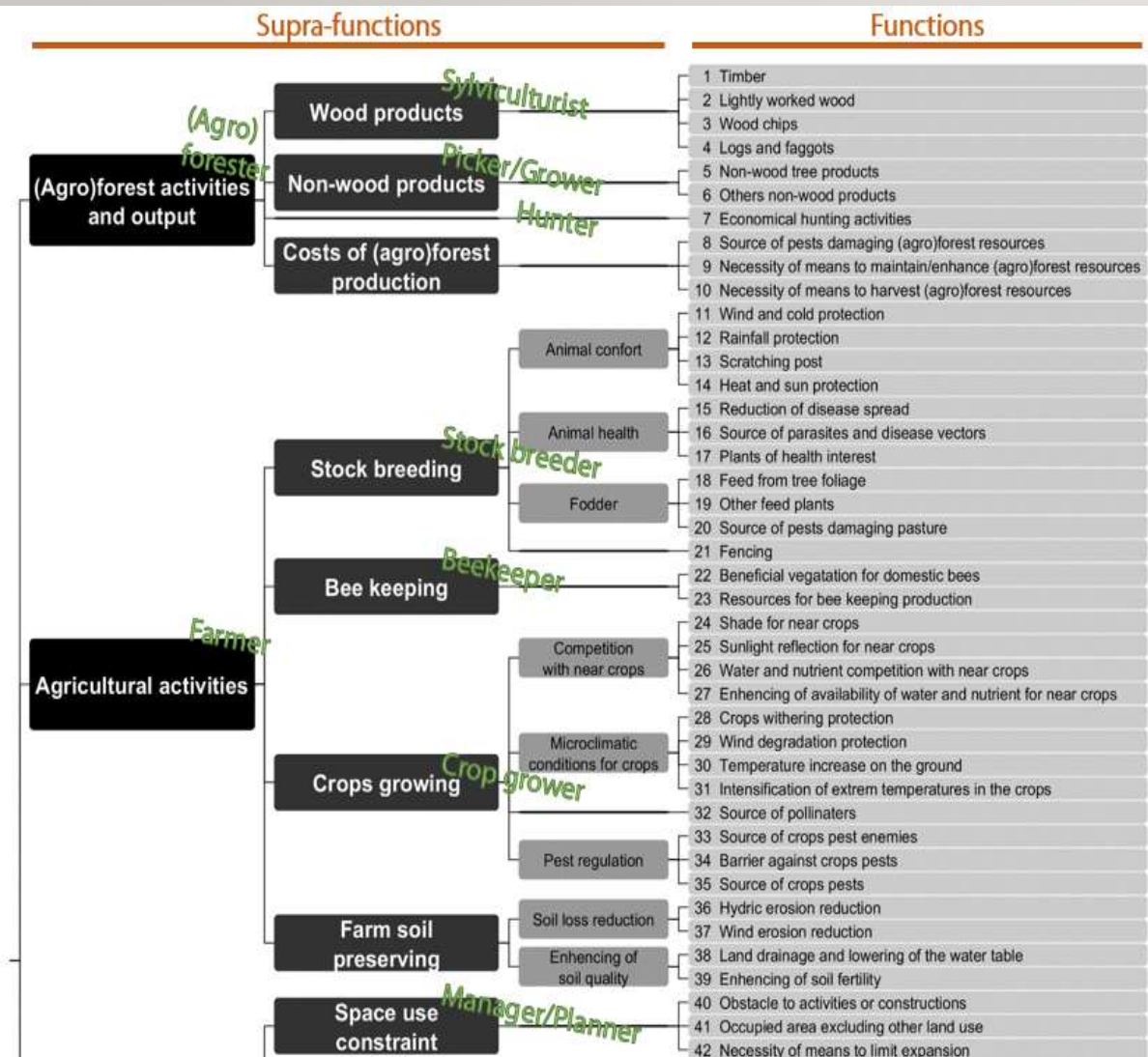
= services involving a movement of people towards the forest patches

- Recreational activities
- Aesthetics
- Construction of local identity



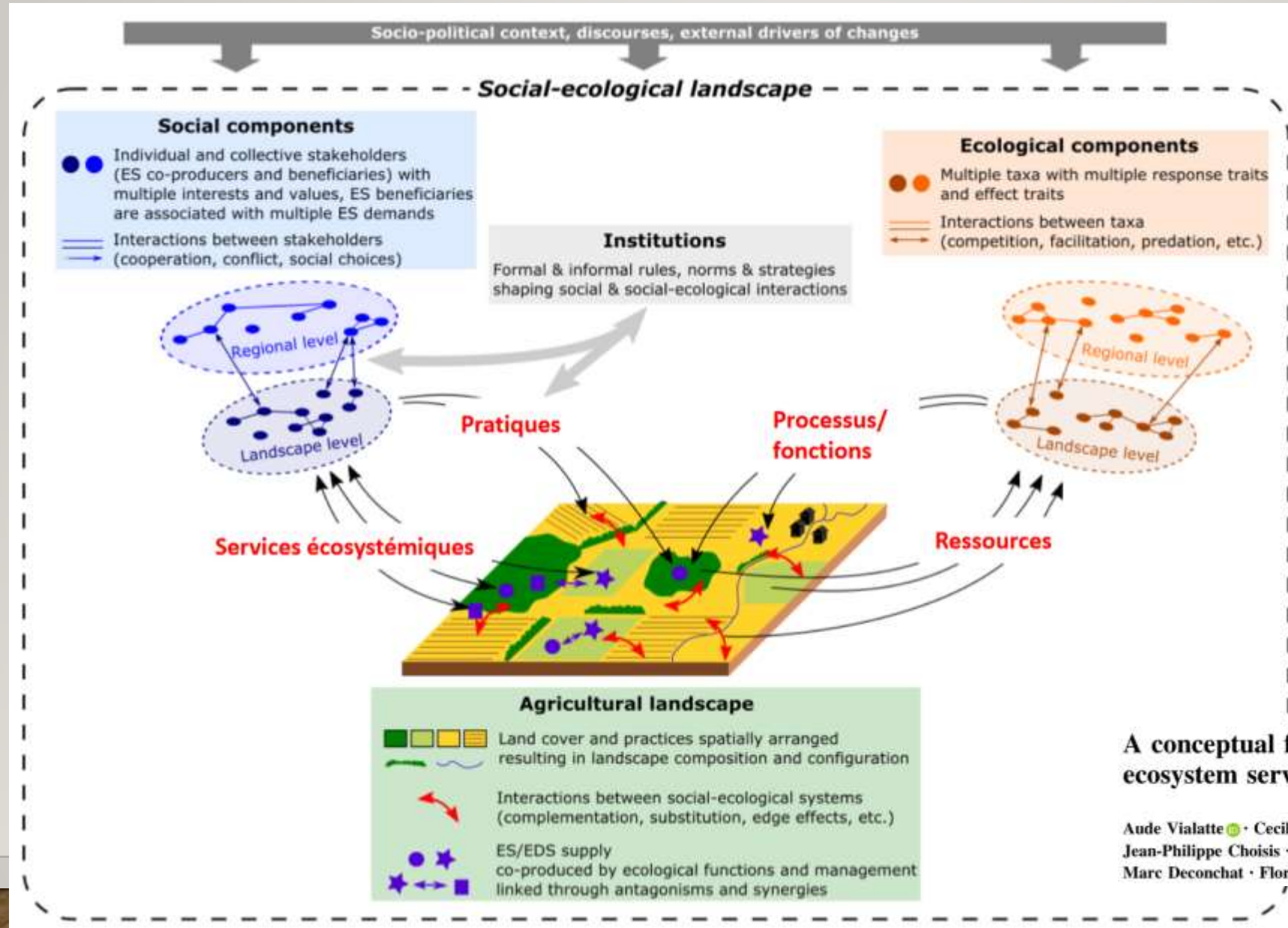
Decocq, G., Andrieu, E., Brunet, J., Chabrierie, O., De Frenne, P., De Smedt, P., Deconchat, M., Diekmann, M., Ehrmann, S., Giffard, B., Mifsud, E.G., Hansen, K., Hermy, M., Kolb, A., Lenoir, J., Liira, J., Moldan, F., Prokofieva, I., Rosenqvist, L., Varela, E., Valdés, A., Verheyen, K., Wulf, M., **2016. Ecosystem Services from Small Forest Patches in Agricultural Landscapes.** *Current Forestry Reports* 2, 30-44.

Which ecosystem (dis)services can we imagine?



Terafor: DEXI-based multicriteria model
to consider all multiple fonctions of tree formations
in temperate agroforestry area

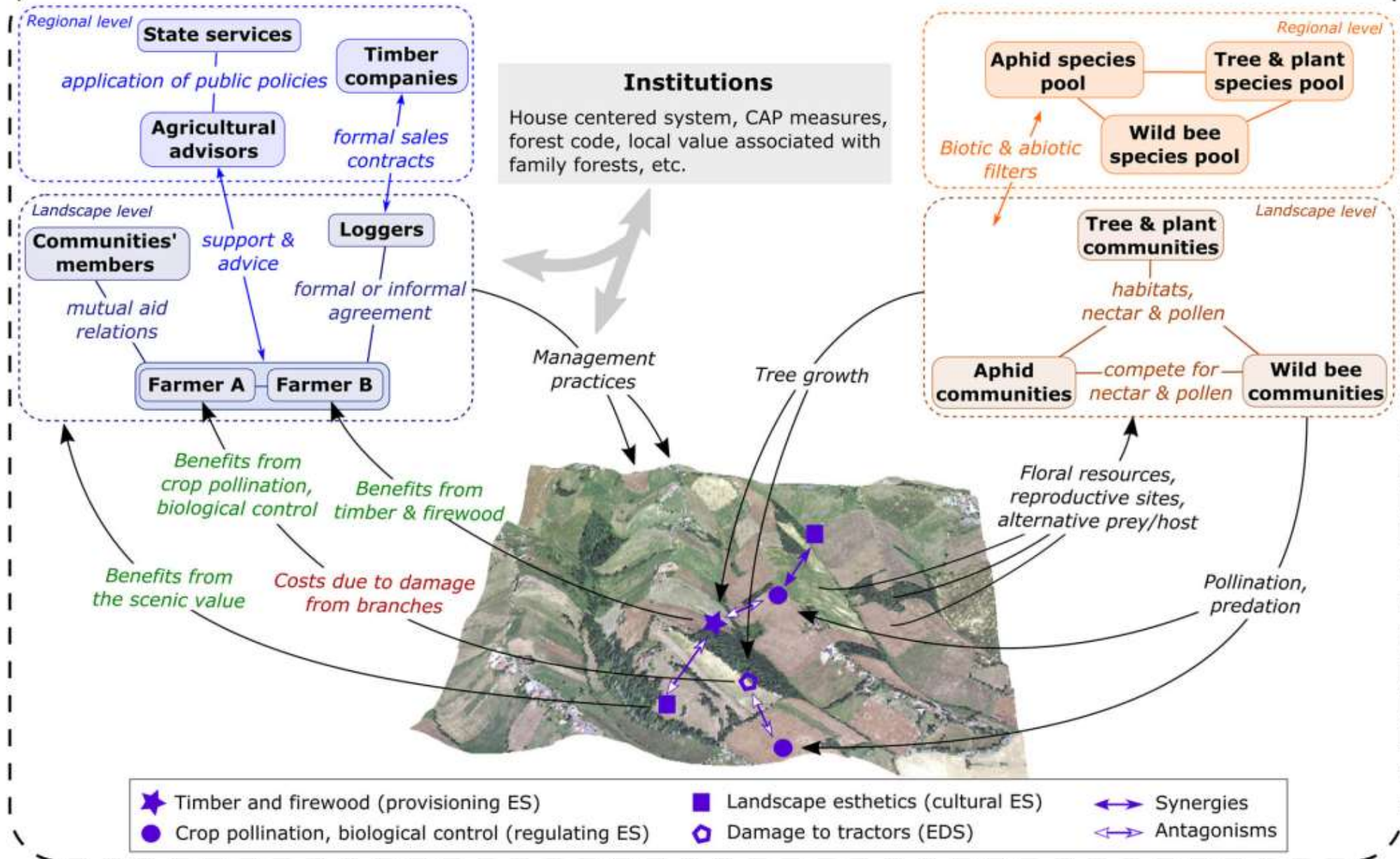
A more general framework



A conceptual framework for the governance of multiple ecosystem services in agricultural landscapes

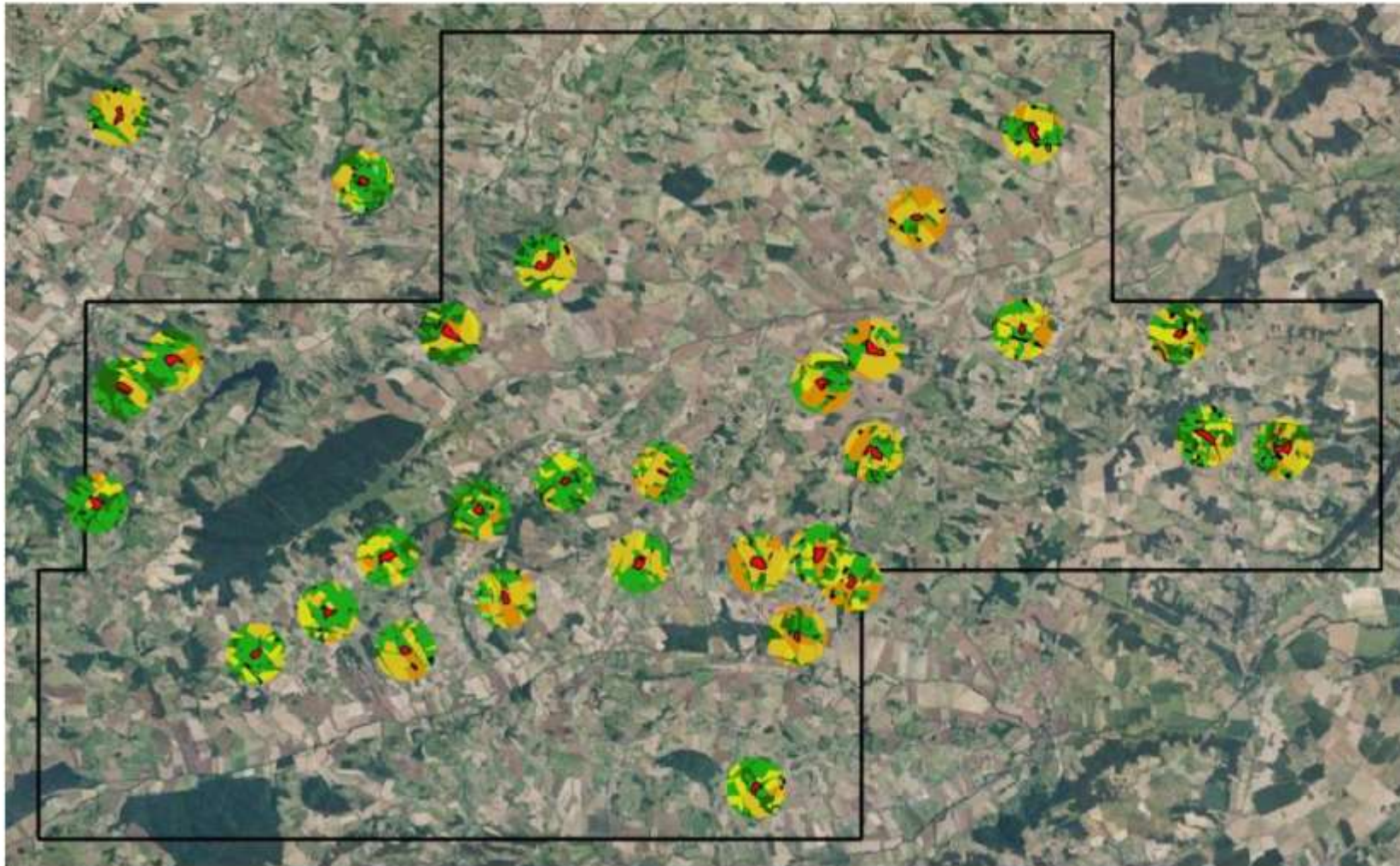
Aude Vialatte · Cecile Barnaud · Julien Blanco · Annie Ouin ·
Jean-Philippe Choisis · Emilie Andrieu · David Sheeren · Sylvie Ladet ·
Marc Deconchat · Floriane Clément · Diane Esquerré · Clélia Sirami

The social-ecological landscape of 'Vallées et Coteaux de Gascogne'



How to map ecosystems services related to small forests?

- > 28 woodlands were sampled in Coteaux de Gascogne / Toulouse
- > Hyperspectral images were acquired for the study zone

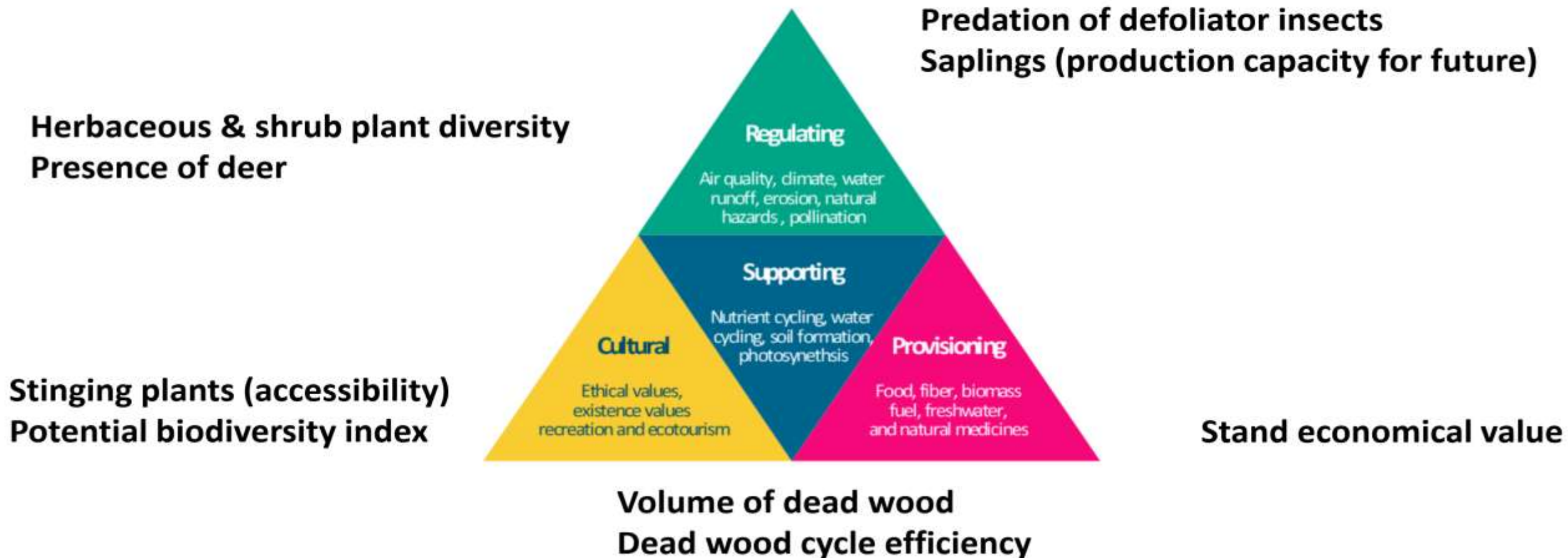


Duflot, R. ; San Cristobal, M. ; Fauvel, M. ; Vialatte, A.
Understanding the complex relationships between
landscape structure and various ecosystem services of
agricultural woodlands IUFRO 8.01.02 Landscape
Ecology Conference 2017



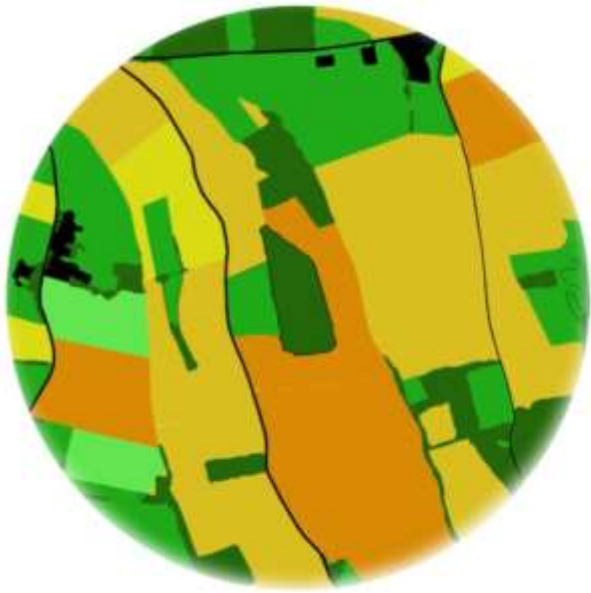
Which ecosystem (dis)services can we measure?

> 19 measure of services using standard protocols



Spatial data: land cover not always the best descriptor

- New data: high spatial, spectral and temporal resolution
- New methods for highly multidimensional data



Land-cover



NDVI

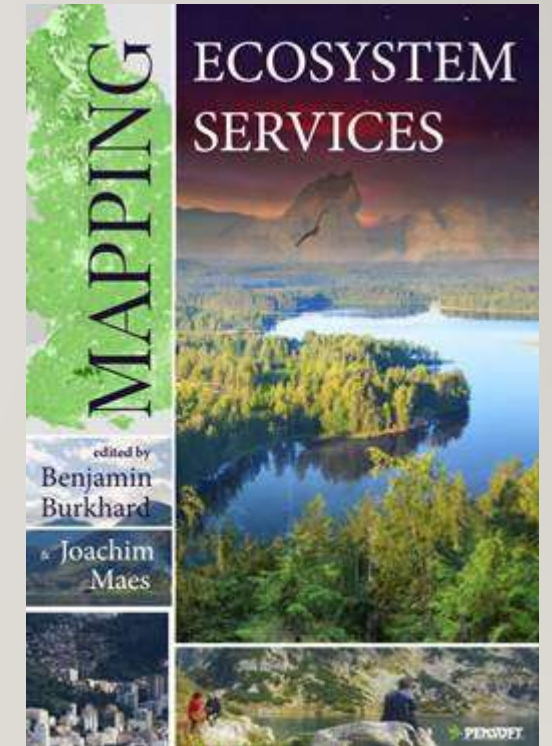
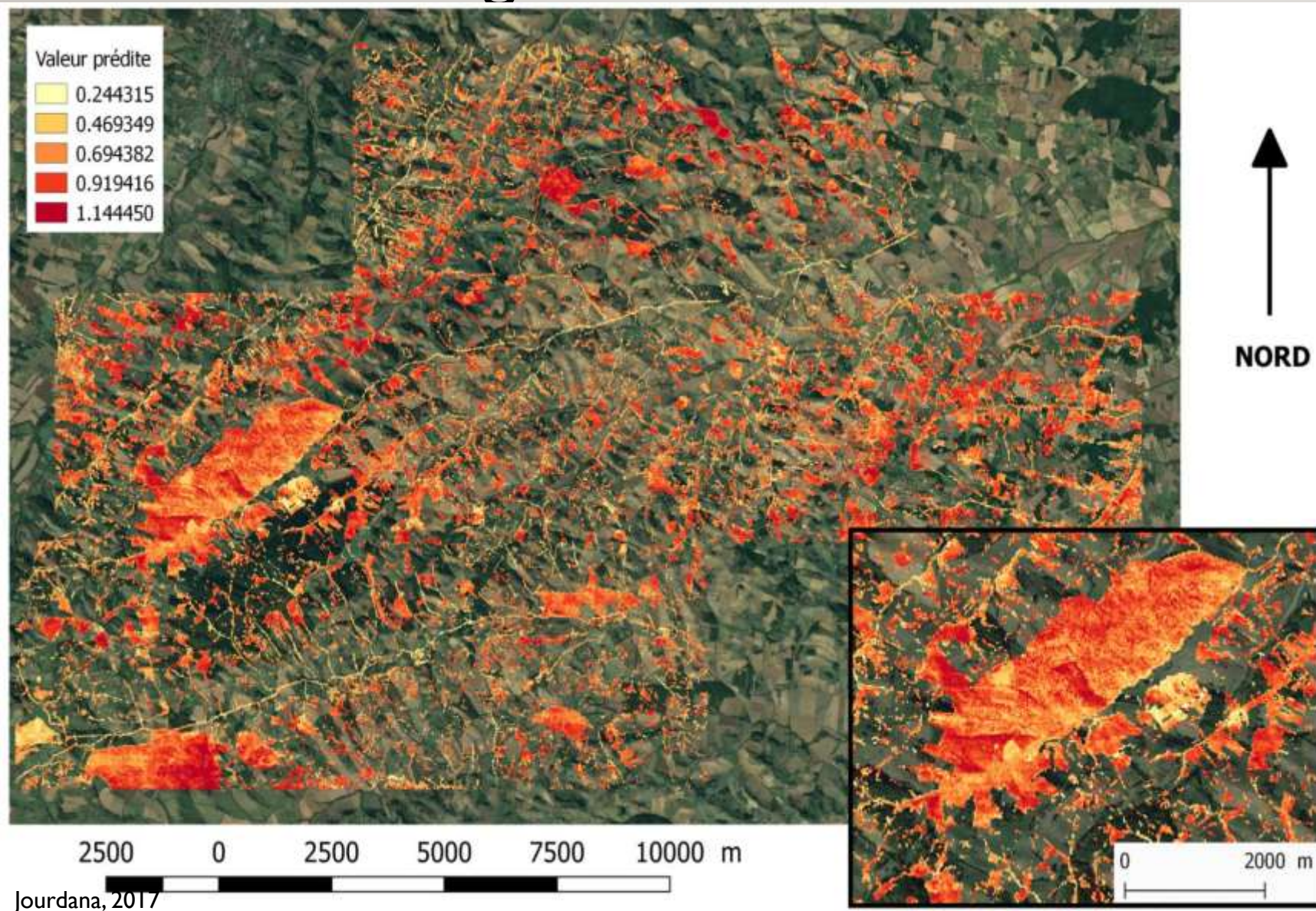


NDWI



VARImre

Map of potential impact of roe deer browsing on forest vegetation



Conclusion: small but important,
consider small forests
for ecosystem services with adequate methods !

