# AGROECOLOGY and RESEARCH in FRANCE

## 3. MANAGING LANDSCAPES AND WATERSHEDS

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**ABSTRACT**
The 'Agroecology and Research' symposium held in October 2013 in Paris has organized three thematic workshops intending to explore today's practices in agroecology, possible developments involving research and likely scenarios for the future. About 50 examples have been provided in the second workshop devoted to the management of landscapes and watersheds in agroecology. Ecological and biogeochemical processes are in part regulated at the landscape and watershed scales. Mobilizing these processes for agroecology requires an increased understanding of the interactions between agricultural systems and i) ecological networks providing pest and disease regulation and pollination, ii) biogeochemical and hydrological processes controlling soil and water resources. Adapting agricultural systems to promote synergies with natural resources (soil, water and biodiversity) and engaging a dialog with stakeholders sharing landscapes and watersheds can facilitate transitions towards agroecology.

## Agricultural systems and the landscape matrix

INTEGRATION

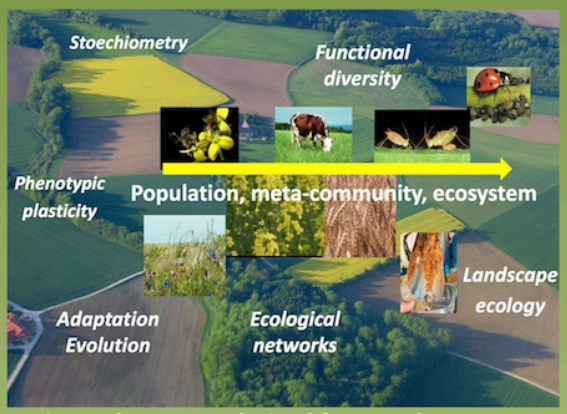
→ **Field boundaries** such as hedges support auxiliaries and promote regulation services,

→ **Restoring landscape elements** (e.g. ponds, wetlands, woodlands) increases functional diversity, water quality and soil protection,

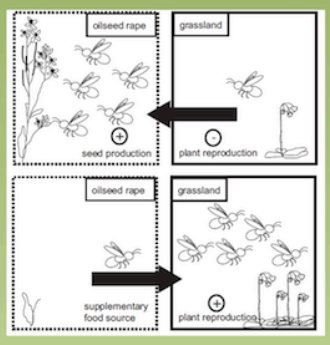
→ **Ecological infrastructures** assembled in networks increase connectivity within landscapes (permanent pastures, riparian zones, streams)

→ **Increased landscape heterogeneity** in space and time (land use mosaic, crop diversification, livestock integration, agroforestry…) reduces pest and disease spread.

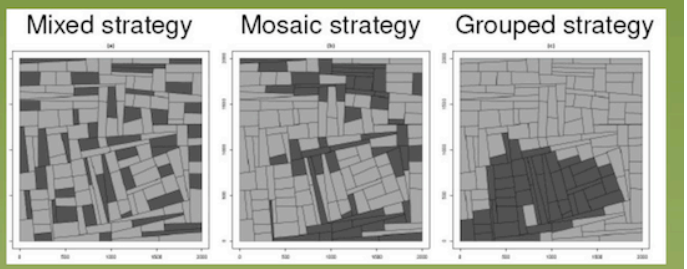
→ **Social dialogue** to build projects for territories. The objective is to adapt finely agricultural systems to natural and social systems.



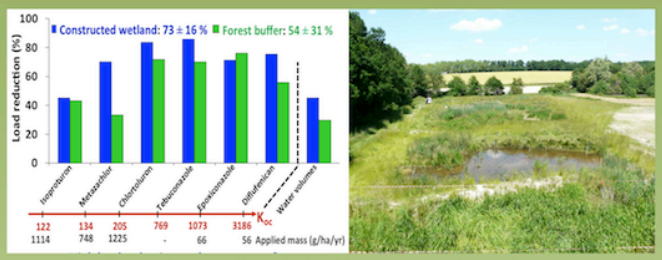

**Theories and concepts derived from ecology support the design and management of agroecological landscapes.**




**Mixing grasslands and diverse arable crops provides a sustained resource for pollinators throughout the year**




**Modeling the epidemiological incidence for rust of contrasted spatial arrangements of wheat cultivars.**
Generalist rust strains are impaired by a spatial mix of cultivars with contrasted resistance genes (Petit, Lannou et al.)




**Restoring wetlands and woodlands buffers strongly reduces pesticide loads from drained fields and improves donwnstream water quality**

**Landscape and watershed management provide opportunities for agroecology through the buildup of ecological services (pollinisation, soil and water conservation, plant and animal health, …) based on negotiated agreements across stakeholders sharing a 'territory'**