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Landscape Agroecology and ecosystem services

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Seminar with Dr. Miguel Altieri, Professor of Agroecology at UC Berkeley organized by the Agroecology group of the SAD division. February 1st 10h00 - 17h00 ENGREF, 19 avenue du Maine PARIS XVIème
Landscape agroecology

From Agroecology as a science, a movement and a practice. A review
A. Wezel, S. Bellon, T. Dore, C. Francis, D.Vallod, C.David
Landscape agroecology: ecology of a productive countryside

- Interaction between human-derived, -managed, and/or -influenced ecosystems
- Interaction between those that yield useful output and neighboring natural and nonproducing ecosystems

See also Dalgaard 2009
Links with landscape ecology

• 1) the understanding of how the functioning of farming systems within a landscape drive spatiotemporal landscape patterns, hence part of ecological processes AND

• 2) how the design of farming systems at individual farms and sets of farms can foster the management of ecological processes, hence of natural resources.

• Landscape: spatial organization produced by a society to manage natural resources
Farming systems: Decisions, practices, transformations

Contribution of farming practices to landscape organization, impact on biodiversity...

Delivered service: biological corridor, biodiversity conservation...

Delivered service: Biological regulation

Biodiversity as a resource (stock and changes)

Delivered service: patrimonial service

Local communities

Synergies, antagonisms?
Hot issues

• Plant & animal movements between habitats. Where do they come from?
• Ecological vs management levels of organization: which is the best level for agroecology?
• Multiple services/multiple managers: how to get a compromise for landscape agroecological engineering?
Carabid beetles hoverwinter in woodlot edges

Species (Roume et al., 2011)
Birds and farming systems

Ecological data
A grid of point counts to record birds

A typology of farming systems in 5 modalities

Few links between Farming systems and bird populations

Agronomical data
34 interviewed farms

Bonthoux S. et al.
Landscapes: levels and scales

• Modifications in farms have consequences at landscape level:
  – can be difficult to deduce consequences at landscape level from modifications at the farm level

• Availability of spatial data needs careful methods

• Uncertainty of (spatial) ecological models
Landscape agroecological engineering

• How to use and modify landscape structures to improve ecosystem services?
• Policy & regulation of land management
• Must consider the social & technical limits and opportunities
  – Local cultural rules
• Involve people (farmers, foresters, land managers...):
  As producers of patterns that influence biodiversity at different scales
  As managers who adapt their practices according to landscape structure
Landscapes change

- Slowly for their structure and global pattern
- Rapidly for their land covers (rotation of crops)
- They have (small) components that play key roles
- How to identify them?
**Models**: tools to study landscapes as complex changing ecological systems

- Realistic models (ex: Multi agent models)
- Spatiaaly explicit/ availability of spatial data
- --> In silico landscape

- Companion modeling (Commod)
  - RECORD
  - Modelisad
  - Payote

HoverWinter model (Arrignon et al., 2007)
Long term and integrated socio-ecological studies (LTER)

- Detailed analysis of processes
- History
- Scenario
- Participative research
- Interdisciplinarity
- Comparative studies:
  - Networks: LTER-Europe, ILTER, ZA, ...

Brittany: Pleine fougères

Gascony: Hills & Valleys of Gascony