Landscape Agronomy

Background concepts and emerging challenges to address agri-food system design beyond the farm level
Landscape Agronomy

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Landscape agronomy contribution to FSD

1. Thematic challenge
2. Landscape agronomy
3. Examples and perspectives for FSD
1. Thematic challenge
Farming system design has to account for divergent uses and expectations of multiple stakeholders, thus to integrate spatially explicit land management issues and socio-technical systems operating beyond spatial constraints:

- **Farming system research** needs to address how global agri-food systems evolve through the transitions of local farming systems.
- **Intensification** of agricultural productivity to meet food security and safety goals can conflict with the sustainable use of natural and local resources.
- **Climate change** and socio-economic instabilities create uncertainties for stakeholders, especially in drylands.
The development and implementation of concepts such as multifunctionality and landscape management represent areas in which I believe agronomists need to become engaged and understand the implications of how one field links to many others across the landscape.
Contributing to a landscape sustainability science

- Spatially-explicit approaches in agronomy tend to address specific (embedded/hierarchical) spatial scales but farming systems include also non-spatial management issues.

- Landscape level is the best candidate to address sustainable farming system design because it integrates physical (spatially explicit) processes and socio-technical systems.

- HOWEVER, the landscape has been mostly addressed by agronomy as a spatial scale only, hence losing all the richness of a system approach.

- “Increasing landscape-level management in agricultural lands requires a science of landscape agronomy yet to be fully developed.”

*Sayer et al. (2013) Ten principles for a landscape approach to reconciling agriculture, conservation, and other competing land uses. PNAS.


**Estrada-Carmona et al. (2022). Complex agricultural landscapes host more biodiversity than simple ones: A global meta-analysis. PNAS, 119(38), e2203385119.
2. Landscape agronomy
Background concepts and issues

How to anchor field and farm management to landscape?

Farmland is a limited resource that hosts place-based activities linked to wider networks *

Farm is the core management unit laying at the node of entrepreneurial networks

Farming system design requires to integrate place-based activities and entrepreneurial networks that go beyond field and farm-gate.

Landscape is intended here as a level that integrates economy, environment and the local socio-cultural identity.

https://doi.org/10.1016/j.geoforum.2013.12.005
Landscape agronomy is a system perspective

Observing, understanding and supporting action

This framework addresses spatially-explicit management of agricultural activities at the landscape level.

It integrates the cropping system notion and geographic methods for system observation.

3. Examples and perspectives for FSD
What is landscape agronomy about?

Ten chapters to illustrate its use and challenges

Chapter 1: Scientific background and literature overview
Chapter 2: Agri-meteorological data (Italy and Europe)
Chapter 3: Agri-environmental data (France)
Chapter 4: GIS multicriteria analysis (Italy)
Chapter 5: Scenarios and spatially explicit models
Chapter 6: Territory-based agrifood chain (France)
Chapter 7: Education and training (Italy and Portugal)
Chapter 8: Collaborative research program (PSDR - France)
Chapter 9: Multifunctional landscape changes through collaboration (Denmark)
Chapter 10: Lessons learned and challenges ahead

Examples

How landscape agronomy can help farming system design?

Main novelty is to help *agronomy* identifying the *components* of the landscape level and to explicit the *interdisciplinary* links.

This has helped to *frame* research and extension services, and to *inform* decision and policy-making.

In perspective, it should feed *geoprospective* and ease *coordination* among landscape stakeholders.


What’s next?

Sustainable farmland management at the landscape level

- The book (Springer 2022) follows the ideas of “Pays, Paysans, Paysages” (INRA-ENSSAA 1977)
  - Focus on the role of agriculture in the management of local economy, resources, and culture by associating the territory (as an administrative entity), farmers and landscape.
  - The title could be rephrased as “Participation, Prospective and Public Policies” to address agriculture within the broader commitment to achieve sustainability of human activities and UN SDG as the best known targets.

- New questions can be raised
  - How to explicitly consider temporal dimensions of agri-food land management units?
  - How to account for the (invisible) patterns emerging from newly available data and agricultural digitalisation?
Further references


Rizzo et al (2016) Participatory scenario building for the management of agricultural areas. In: 14° ESA Congress, Edimbourg, United Kingdom


MENA region

Kissinger G, Brasser A, Gross L (2013) Reducing Risk: Landscape Approaches to Sustainable Sourcing. EcoAgriculture Partners, on behalf of the Landscapes for People, Food and Nature Initiative, Washington DC, USA


Thank you for your attention

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