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## Background concepts of landscape and territory agronomy

Daide Rizzo

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**<https://hal.science/hal-03979613>**

Submitted on 8 Feb 2023

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# BACKGROUND CONCEPTS IN LANDSCAPE & TERRITORY AGRONOMY

*Spring School Landscape and  
Territory Agronomy 2015*  
'Interactions between  
ecosystems services and land  
use management'  
*Pisa 23-27 March 2015*

**Davide RIZZO**

This Spring School received financial support from the International Doctorate Programme in Agrobiodiversity of the Scuola Superiore Sant'Anna



# BACKGROUND CONCEPTS IN LANDSCAPE & TERRITORY AGRONOMY

*Spring School  
Landscape & Territory  
Agronomy 2015  
'Interactions  
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services and land  
use management'  
Pisa 23-27 March 2015*

INRA UMR AGIR  
équipe Magellan  
Castanet-Tolosan, France

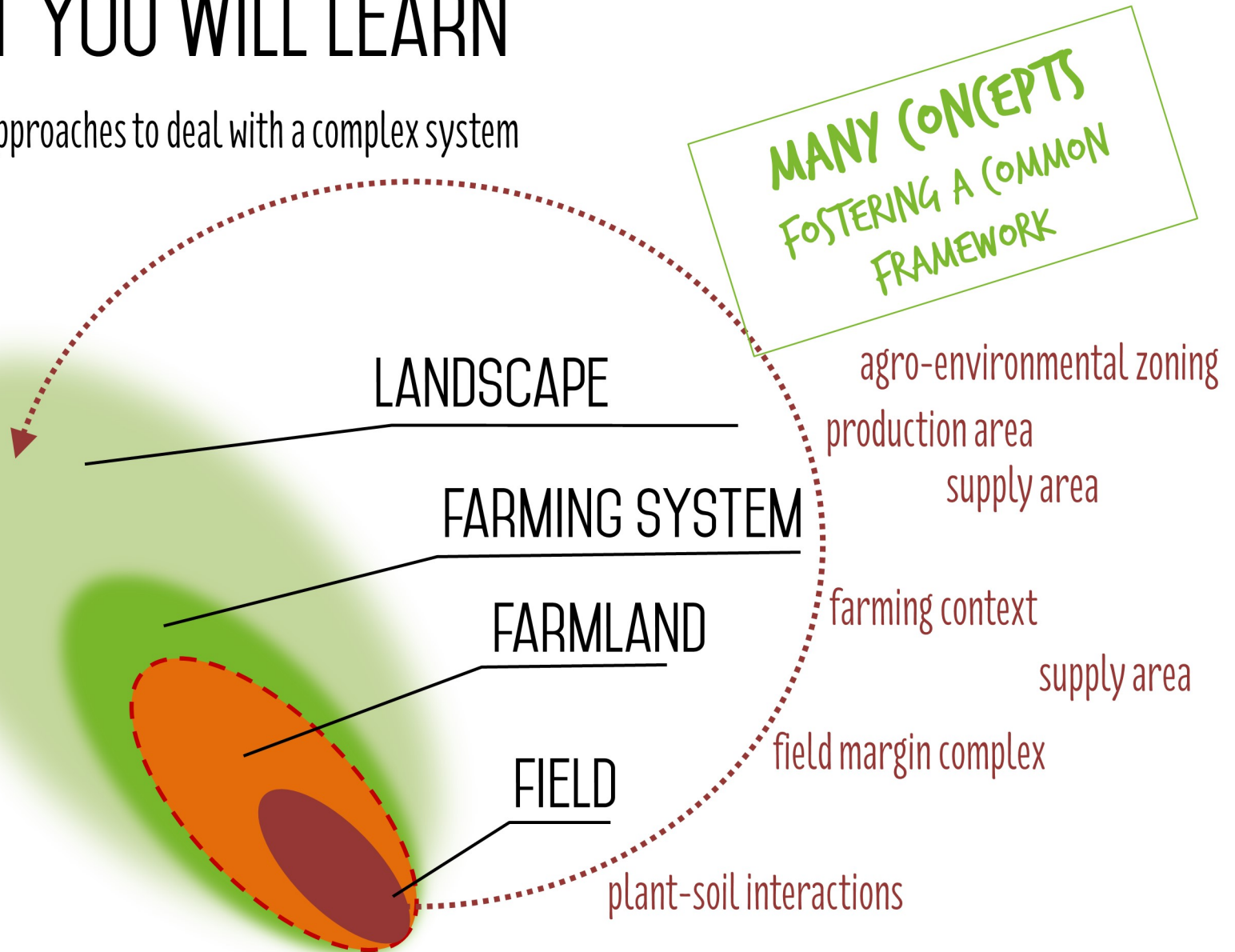


**Equipe MAGELLAN**  
Méthodes pour l'Agroécologie et la  
GEstion Locale des ressources Agricoles et Naturelles

**Davide RIZZO, PhD**

# WHAT YOU WILL LEARN

Different approaches to deal with a complex system



# CONTENTS

## SECTION 1 | Background

- 1/2 Land management issues
- 2/2 Current approaches

## SECTION 2 | Conceptual framework

- 1/2 Landscape agronomy and ALaDyn
- 2/2 Territory agronomy

## CONCLUSIONS



SECTION 1

# BACKGROUND 1/2

AN INTRODUCTION TO LAND MANAGEMENT ISSUES



# WHY DEALING WITH LANDSCAPE?

→ Because at this wider level it is possible to involve the other actors with the farmers... to work in a **shared space** especially for issues to be tackled at a community level

→ To allow for **multifunctionality** of agriculture and rural land and the integration of activities different from production some of which area at a territorial level **biodiversity management, prevention of natural hazards, transformation and adaptation to climate change, ...**

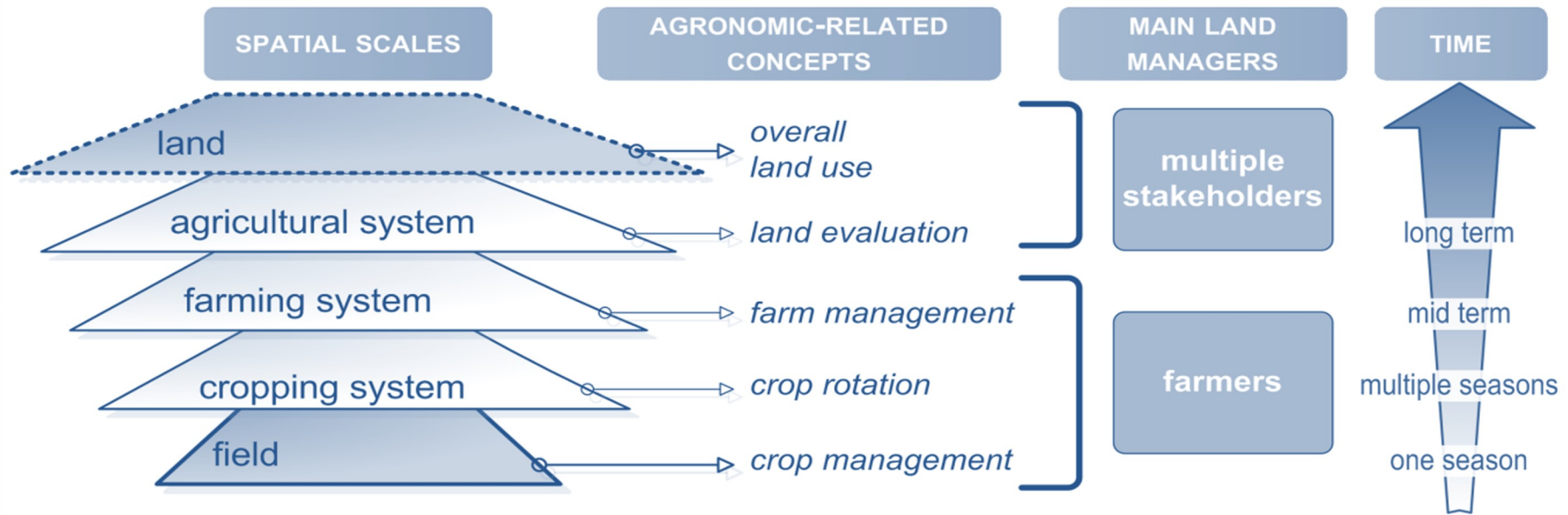
→ To make science capable of expected impact, where the land plays the role of **integrative platform** of decision-making processes and framework for action



Monte Pisano near Massaciucoli, photo Rizzo D.



# MULTIPLE LAND MANAGEMENT UNITS



Opportunity for agronomists to deal with complex land management issues related to agricultural activities

→ landscape perspective

Increasing attention of agronomy for the territorial aspects of agriculture

→ emerging social expectations, research gaps

BENOIT, RIZZO ET AL. 2012

LARDON ET AL. 2012

BOIFFIN ET AL. 2014



# LAND MANAGEMENT ISSUES



CF MARRACCINI ET AL. IFSA 2012

A SHARED PLACE FOR DIFFERENT SPACES OF ACTION

# SUPPLY AREA & OTHER LAND ORGANIZATION

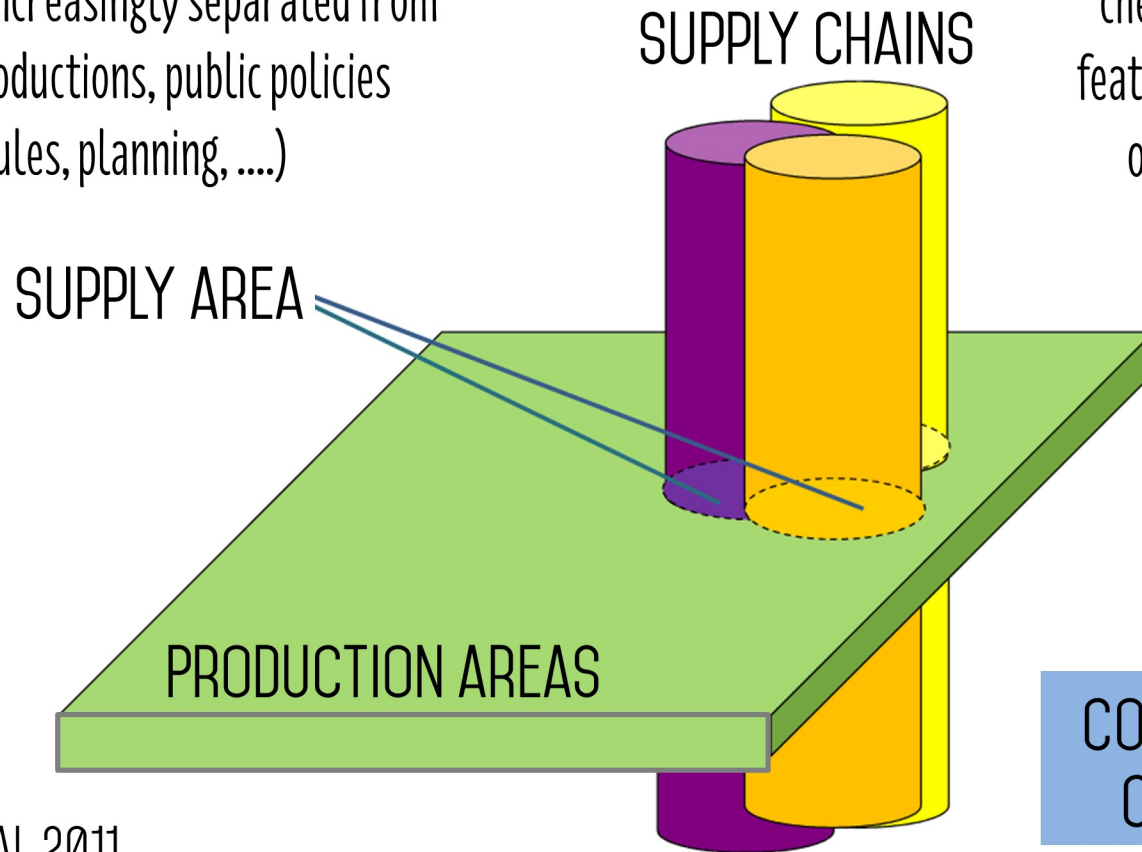
Influences on farming activities

Supply chain, social expectations in municipalities increasingly separated from agricultural productions, public policies (subventions, rules, planning, ....)



Agriculture influences land

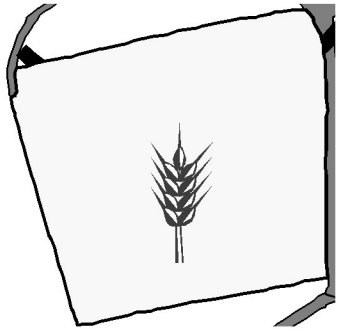
Morphology, water and chemical fluxes, landscape features, etc. What feedbacks on rules, on logistics, ...?



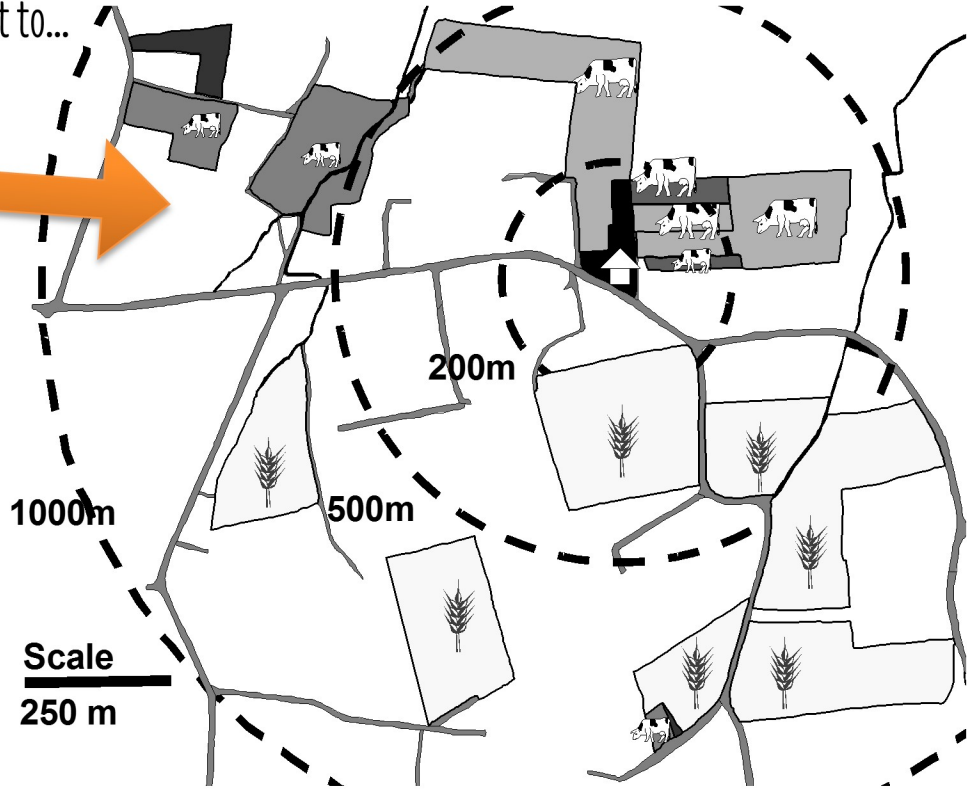
LE BAIL & LE GAL 2011

CONFLICTS AND/OR  
COORDINATION

# FIELD IN CONTEXT → FARMLAND



From crop /pasture management to...



Practices: variations implemented by farmers about a « theoretical » technique

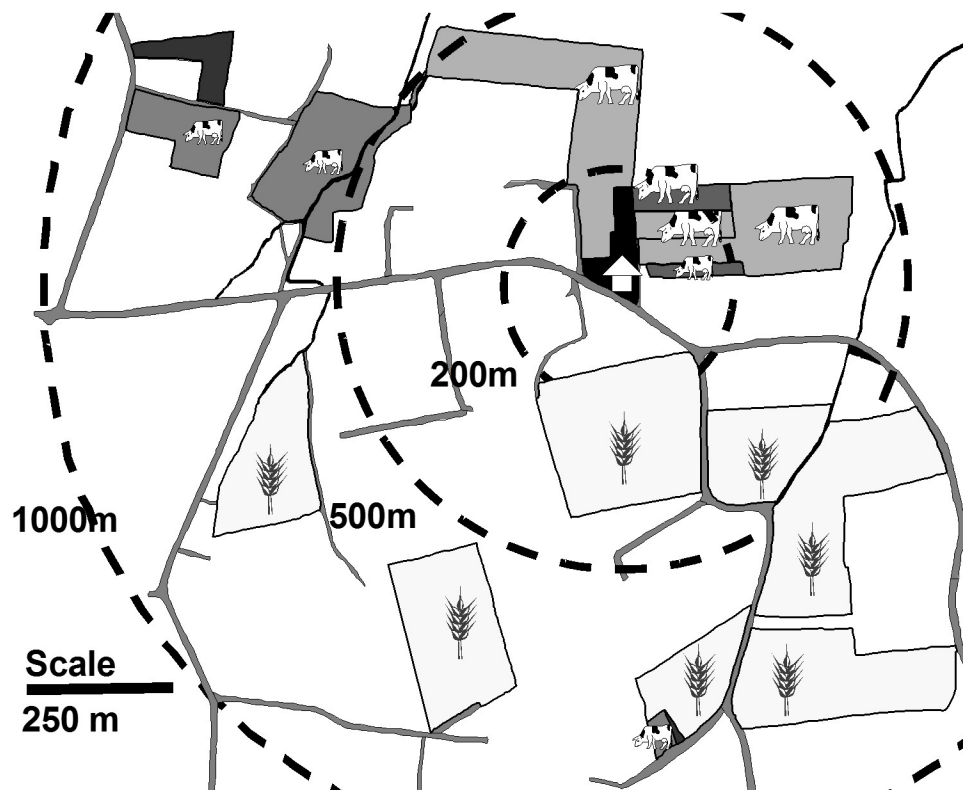
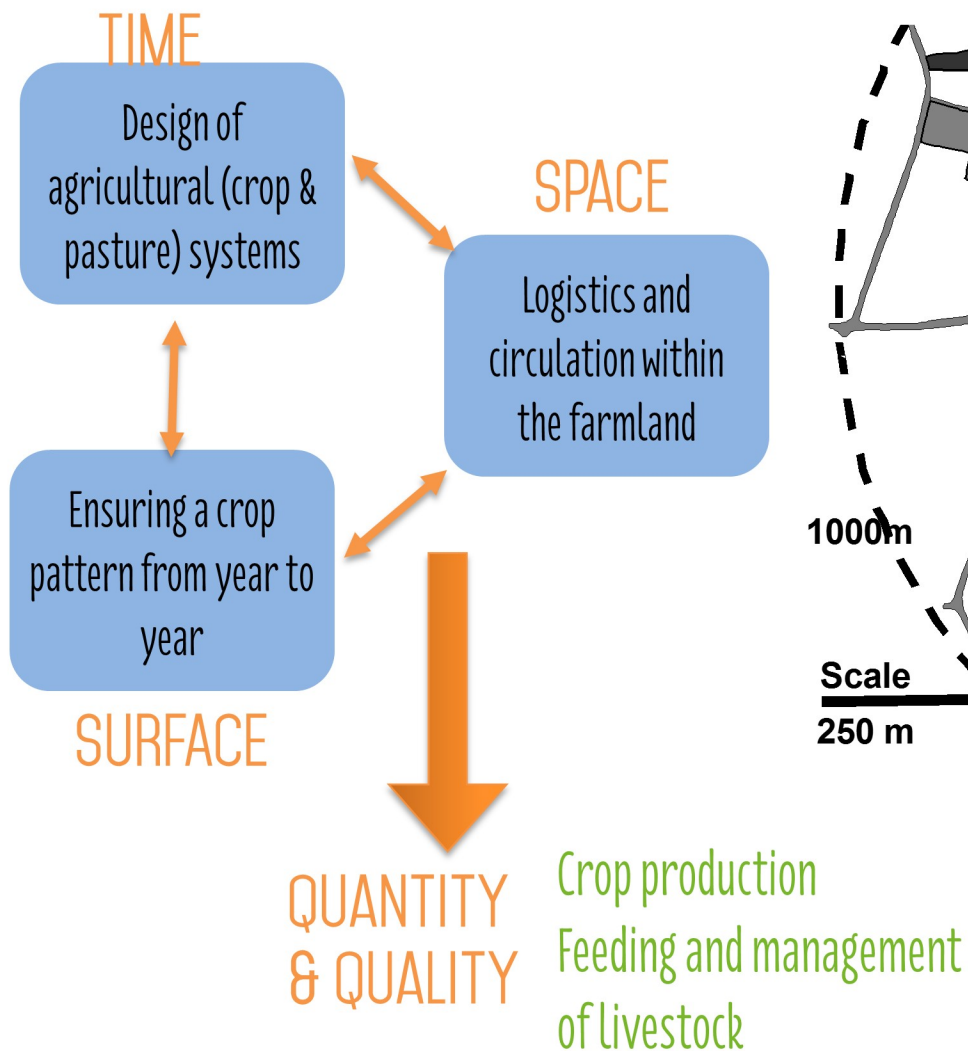
Agricultural system  
crop sequences & crop management practices

Farmland management: spatio-temporal and functional organization of agricultural systems on the fields belonging to the same farm  
each field is managed in function on what is performed on the other fields

THENAIL, 2014  
DORÉ ET AL, 2006.  
L'AGRONOMIE AUJOURD'HUI. ED QUAE



# FIELD IN CONTEXT → DYNAMICS



THENAIL, 2014

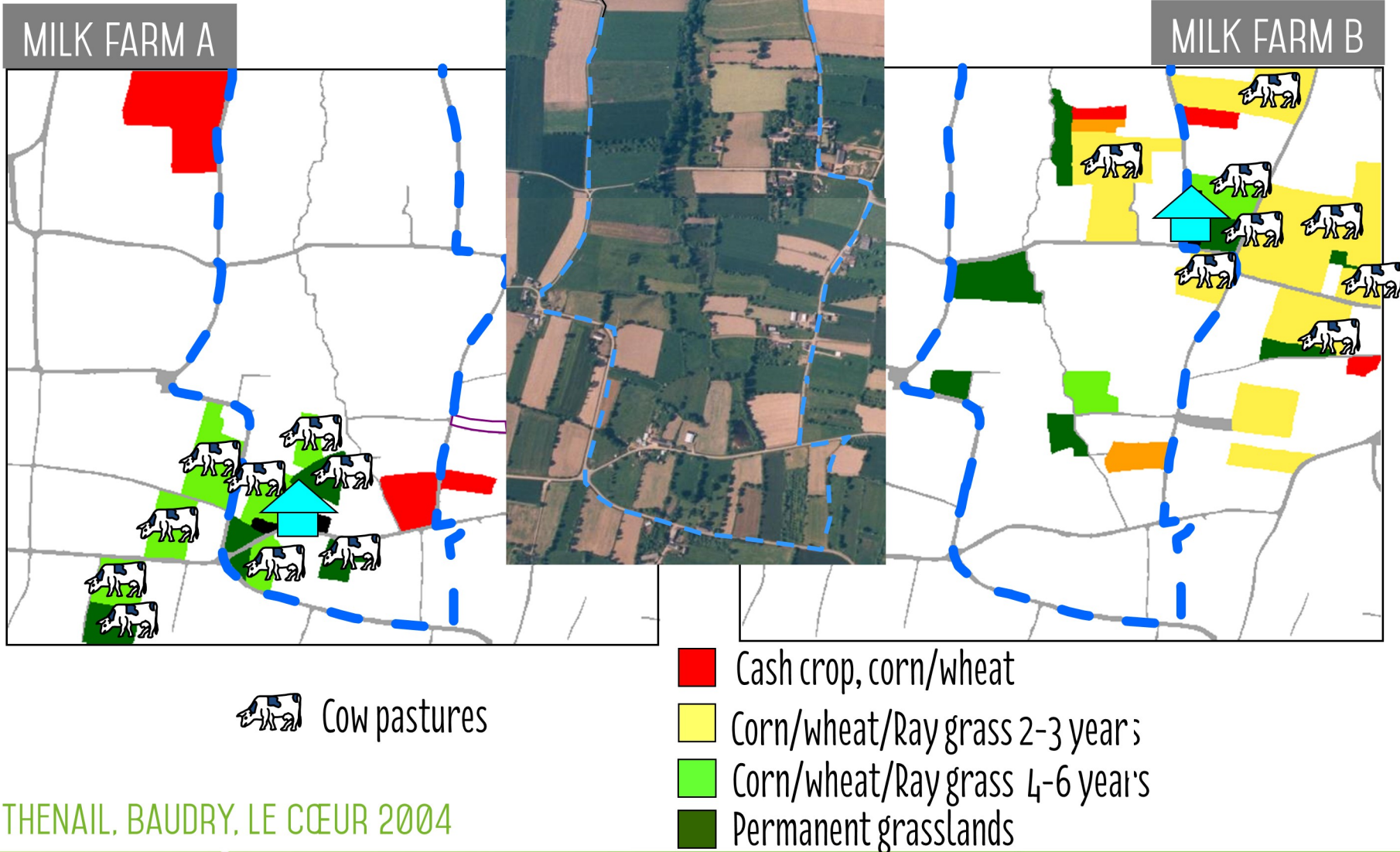


DORÉ ET AL, 2006.

L'AGRONOMIE AUJOURD'HUI. ED QUAE



# EXAMPLE: WATERSHED & FARMLANDS



THENAIL, BAUDRY, LE CŒUR 2004

SECTION 1

# BACKGROUND 1/2

WIDENING THE PERSPECTIVE FROM FROM FIELD AND FARM TO LAND SYSTEM

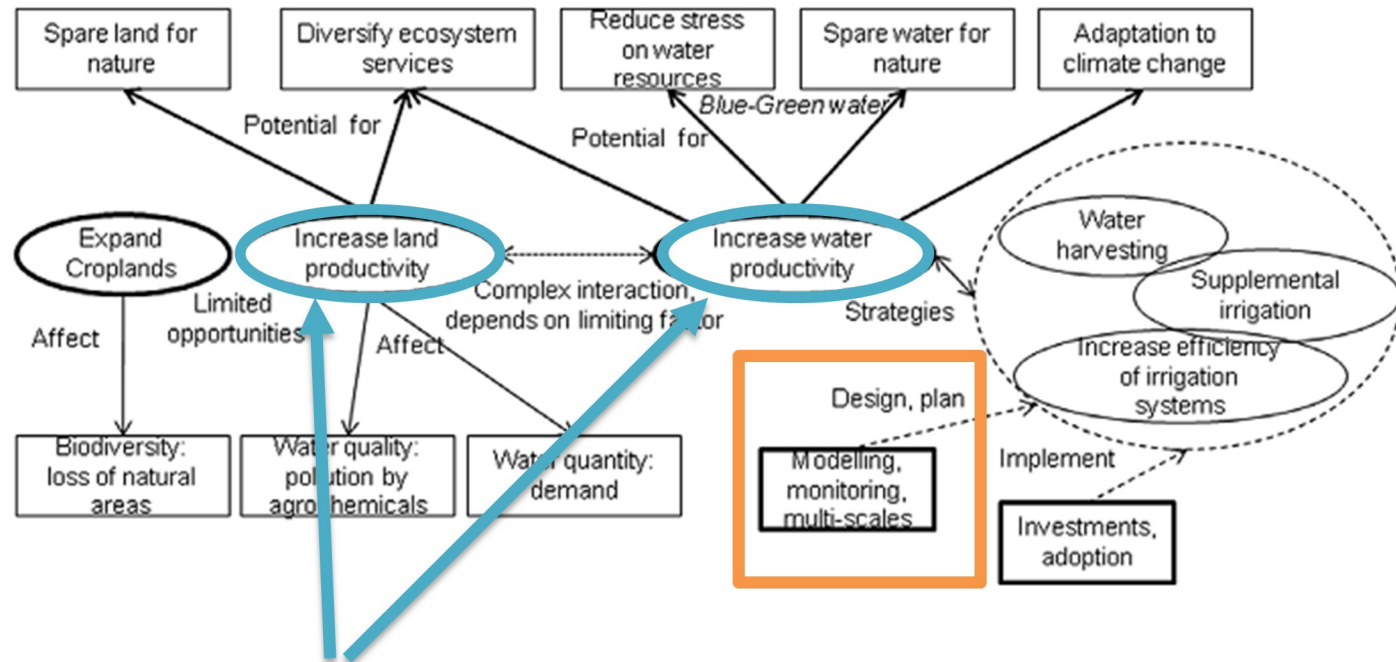


# AGRICULTURAL PRODUCTION PEAKS

Although yields continue to increase in many areas, we find that across 24–39% of maize, rice, wheat and soybean-growing areas, yields either never improve, stagnate or collapse

RAY ET AL. 2012, NAT COMMUN

ACEVEDO 2011, ENV CONSERV

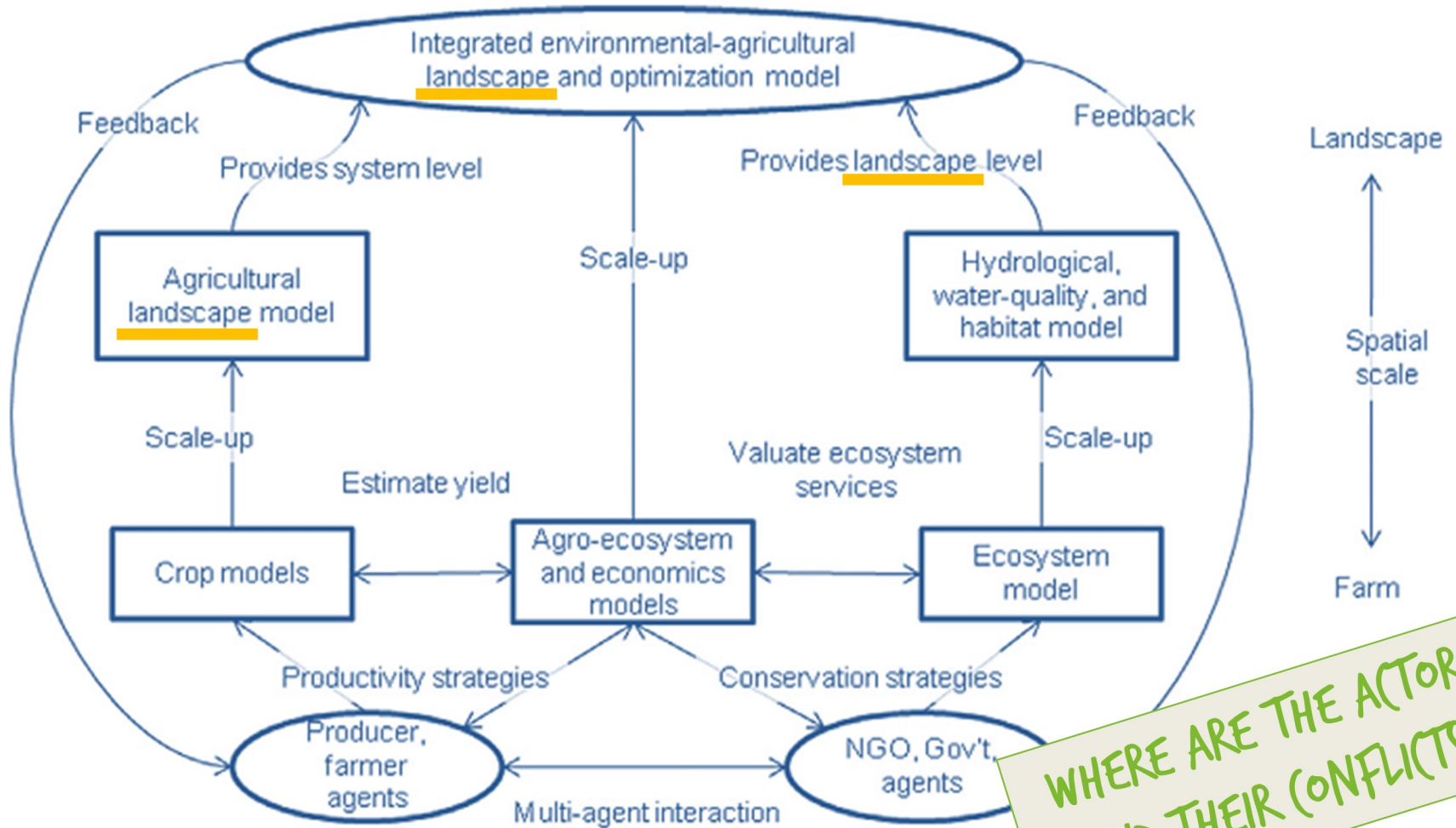


2 major strategies for greater food production in existing croplands

- increasing 'land productivity'  $\rightarrow$  + food per unit area
- increasing 'water productivity'  $\rightarrow$  + food per unit of water

complex interactions depend on limiting factors (land, water)

# INTEGRATED PRODUCTION-CONSERVATION MODEL



WHERE ARE THE ACTORS (AND THEIR CONFLICTS?)

ACEVEDO 2011, ENV CONSERV





# LAND CHANGE SCIENCE (MODELLERS)

land **change** science  
 land **system** science  
 land system **architecture**



Global land project



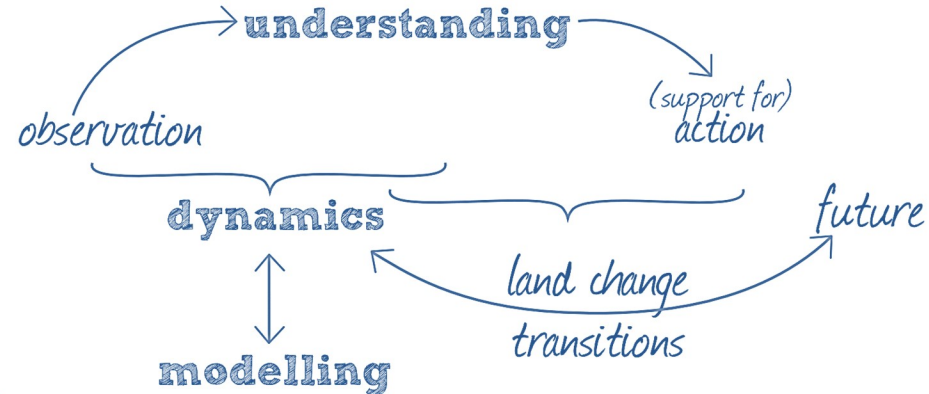
Future Earth

Session at the Open science program  
 UNDERSTANDING **FARMING PRACTICES**  
 TO RETHINK LAND CHANGE TRANSITIONS



Wordle.net

First 50 words from abstracts



# AGROECOLOGY...

a scientific approach used to study, diagnose and propose alternative low-input management of agroecosystems

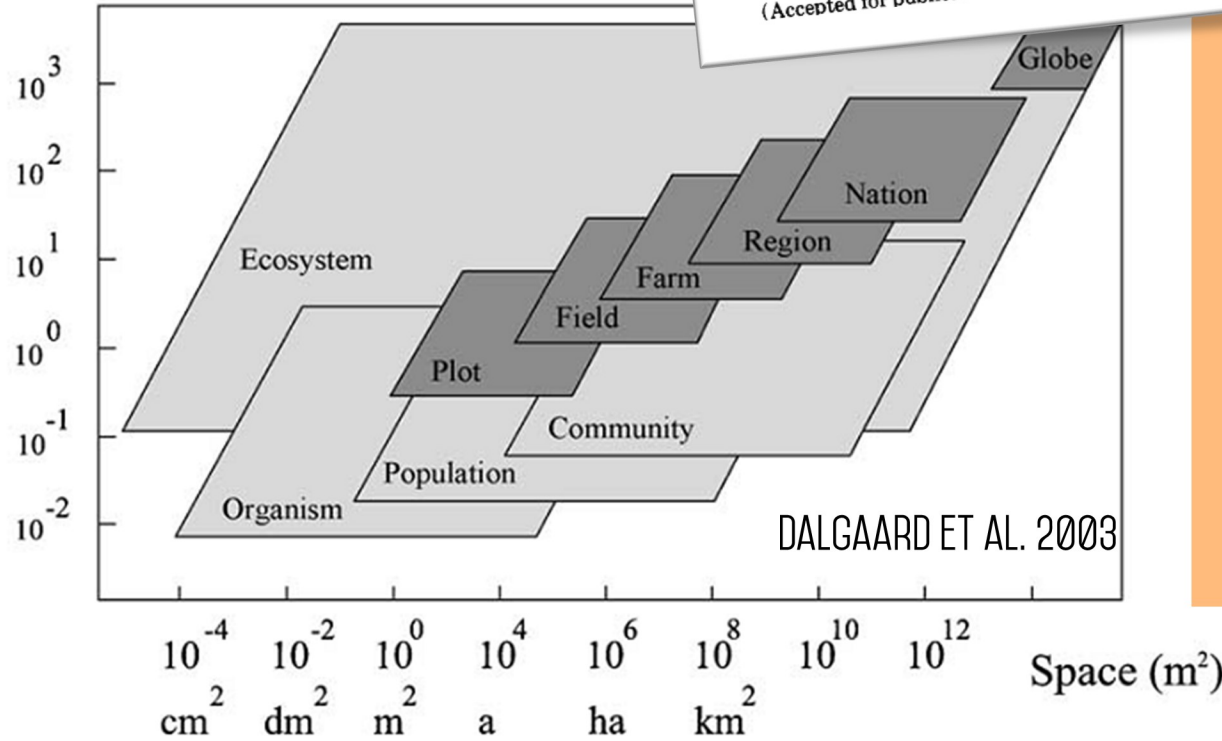
*Agriculture, Ecosystems and Environment*, 27 (1989) 37-46  
Elsevier Science Publishers B.V., Amsterdam — Printed in The Netherlands

## Agroecology: A New Research and Development Paradigm for World Agriculture

MIGUEL A. ALTIERI

Division of Biological Control, University of California, Berkeley, 1050 San Pablo Avenue, Albany, CA 94706 (U.S.A.)  
(Accepted for publication 19 April 1989)

Time (yr)



Social Sciences

Economics

Natural Sciences

SMALL ROOM FOR SOCIAL SCIENCES

# ...A FRENCH PRIORITY

## LE PROJET POLITIQUE

Conférence nationale  
Produisons Autrement  
18 décembre 2012

“Faire  
de l’agro-écologie  
une force  
pour la France”

Les programmes d’action :

- 🔄 Ecophyto
- 🔄 Ecoantibio
- 🔄 Apiculture durable
- 🔄 Ambition bio 2017
- 🔄 Plan Énergie Méthanisation
- Autonomie Azote
- 🔄 Semences et agriculture durable

AGRICULTURES  
PRODUISONS  
AUTREMENT

PROJET  
AGRO-ÉCOLOGIQUE  
POUR LA FRANCE



<http://agriculture.gouv.fr/Produisons-autrement>

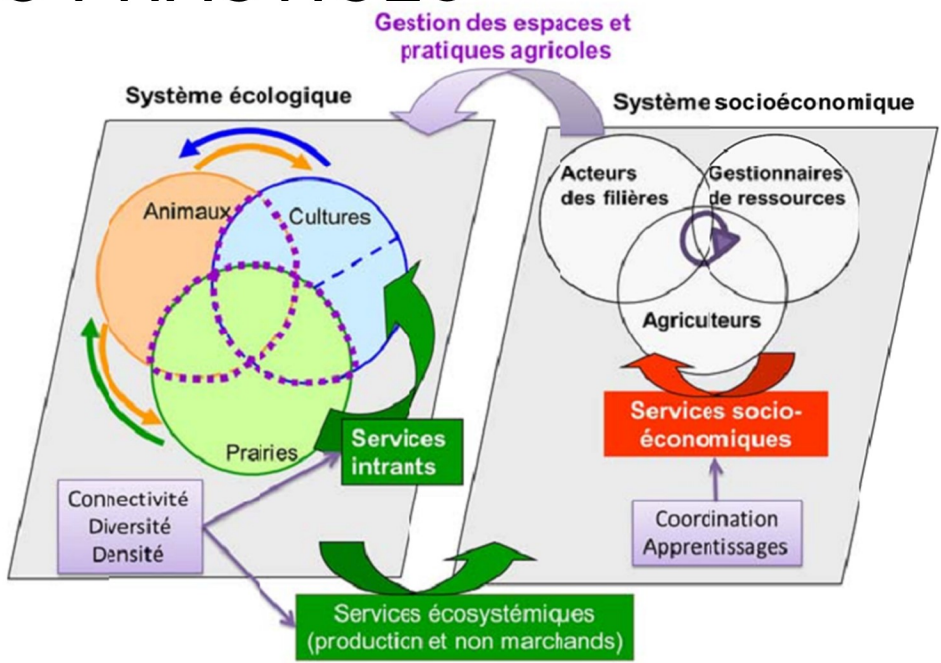
# DESIGN (WITH) FARMING PRACTICES

Agron. Sustain. Dev. (2012) 32:15–29  
 DOI 10.1007/s13593-011-0027-z  
**REVIEW ARTICLE**  
**Designing cropping systems from nature**  
 Eric Malézieux

Agron. Sustain. Dev. (2014) 34:623–632  
 DOI 10.1007/s13593-013-0177-2  
**RESEARCH ARTICLE**  
**Farmers and agronomists design new biological agricultural practices for organic cropping systems in France**  
 Vincent Lefèvre · Mathieu Capitaine · Joséphine Peigné · Jean Roger-Estrade

Farmscaping aims to prevent damaging levels of pests from developing in the crop ecosystem.

Agron. Sustain. Dev. DOI 10.1007/s13593-013-0181-6  
**REVIEW ARTICLE**  
**Permaculture for agroecology: design, movement, practice, and worldview. A review**  
 Rafter Sass Ferguson · Sarah Taylor Lovell



**Farming system design for innovative crop-livestock integration in Europe**  
 M. Moraine<sup>1†</sup>, M. Duru<sup>1</sup>, P. Nicholas<sup>2</sup>, P. Leterme<sup>3</sup> and O. Therond<sup>1</sup>  
<sup>1</sup>INRA, UMR 1248 AGIR, F-31320 Castanet-Tolosan, France; <sup>2</sup>Institute of Biological, Environmental and Rural Science, Aberystwyth University, Aberystwyth, SY23 3EE, UK; <sup>3</sup>INRA, Agrocampus, UMR 1069 SAS, F-35042 Rennes, France

**DESIGNING AGROECOSYSTEM OR SYSTEMS OF PRACTICES**

# FARMING SYSTEM DESIGN

5th International Symposium  
for Farming Systems Design

SEPTEMBER  
7-10, 2015  
MONTPELLIER  
France



an informal interdisciplinary **scientific community of practice** to promote research and capacity building on farming systems design.

Focus on

- farm system level, interactions and feedbacks at lower and higher levels of integration
- tools and methods required for understanding and implementing multi-functional farming systems expressing good trade-offs between agricultural production and ecosystems services

GROWING LANDSCAPES-  
CULTIVATING INNOVATIVE  
AGRICULTURAL SYSTEMS



ESA14

EDINBURGH, SEPTEMBER 5-9, 2016



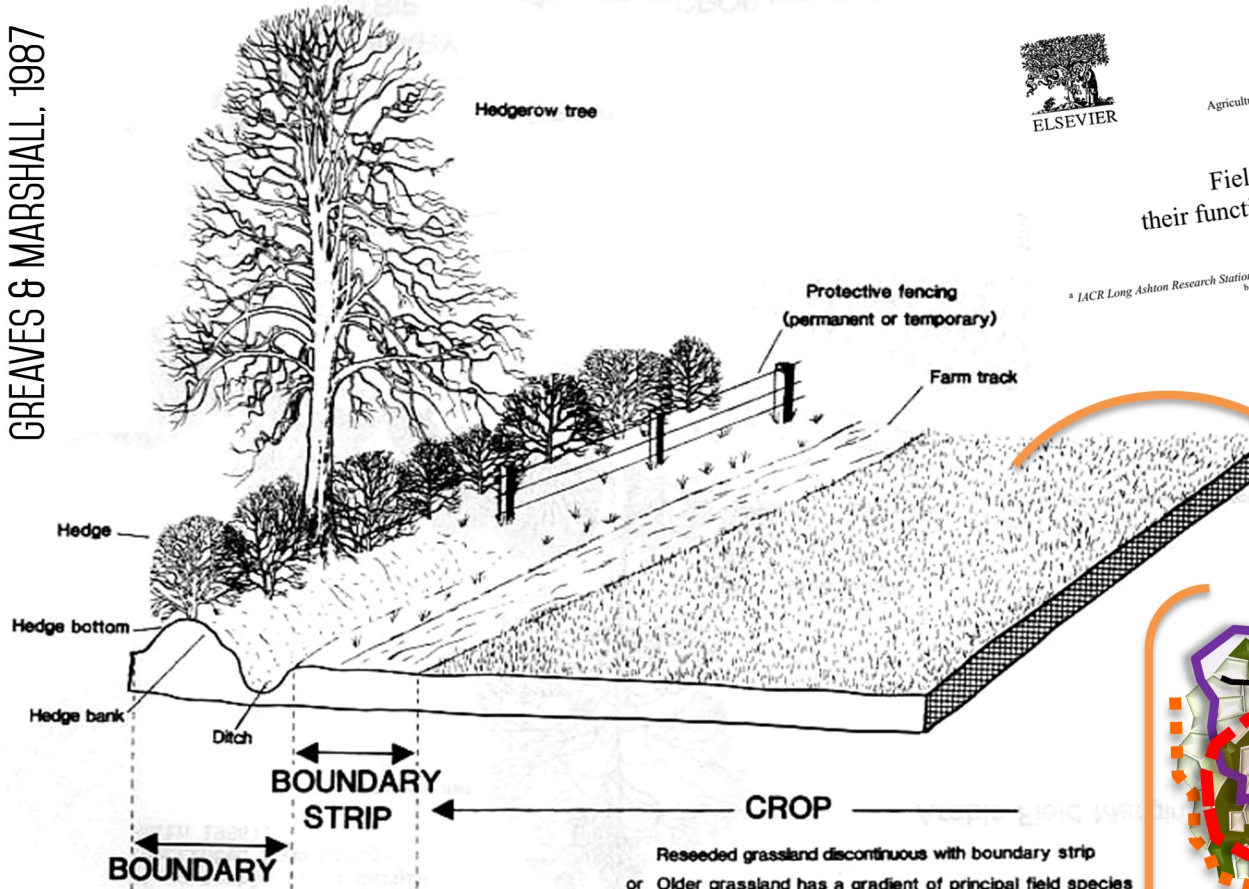
ESA, DIVISION 3

Cropping Systems at Farm, Regional and Global Scales

# LANDSCAPE ECOLOGY: PATTERNS & PROCESSES

## An agroecosystem perspective (e.g., field-margin complex)

GREAVES & MARSHALL, 1987



Agriculture, Ecosystems and Environment 89 (2002) 5-21

Agriculture Ecosystems & Environment

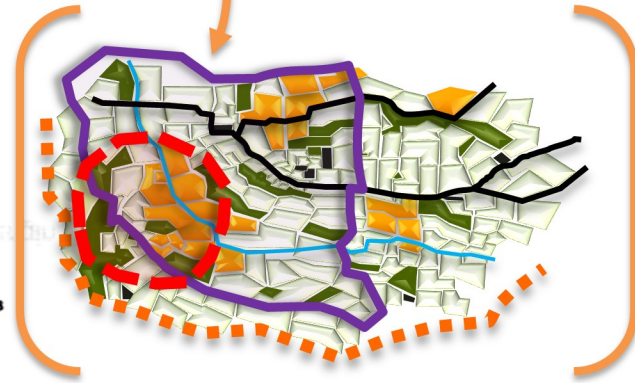
www.elsevier.com/locate/agee

Field margins in northern Europe: their functions and interactions with agriculture

E.J.P. Marshall<sup>a,\*</sup>, A.C. Moonen<sup>b</sup>

<sup>a</sup> IACR Long Ashton Research Station, Department of Agricultural Sciences, University of Bristol, Long Ashton, Bristol BS41 9AF, UK  
<sup>b</sup> Scuola Superiore S. Anna, Via Carducci 40, 56127 Pisa, Italy

Field as puzzle piece in a system composed of mosaics and networks



INRA  
AgroParisTech  
INRAE  
LaSalle

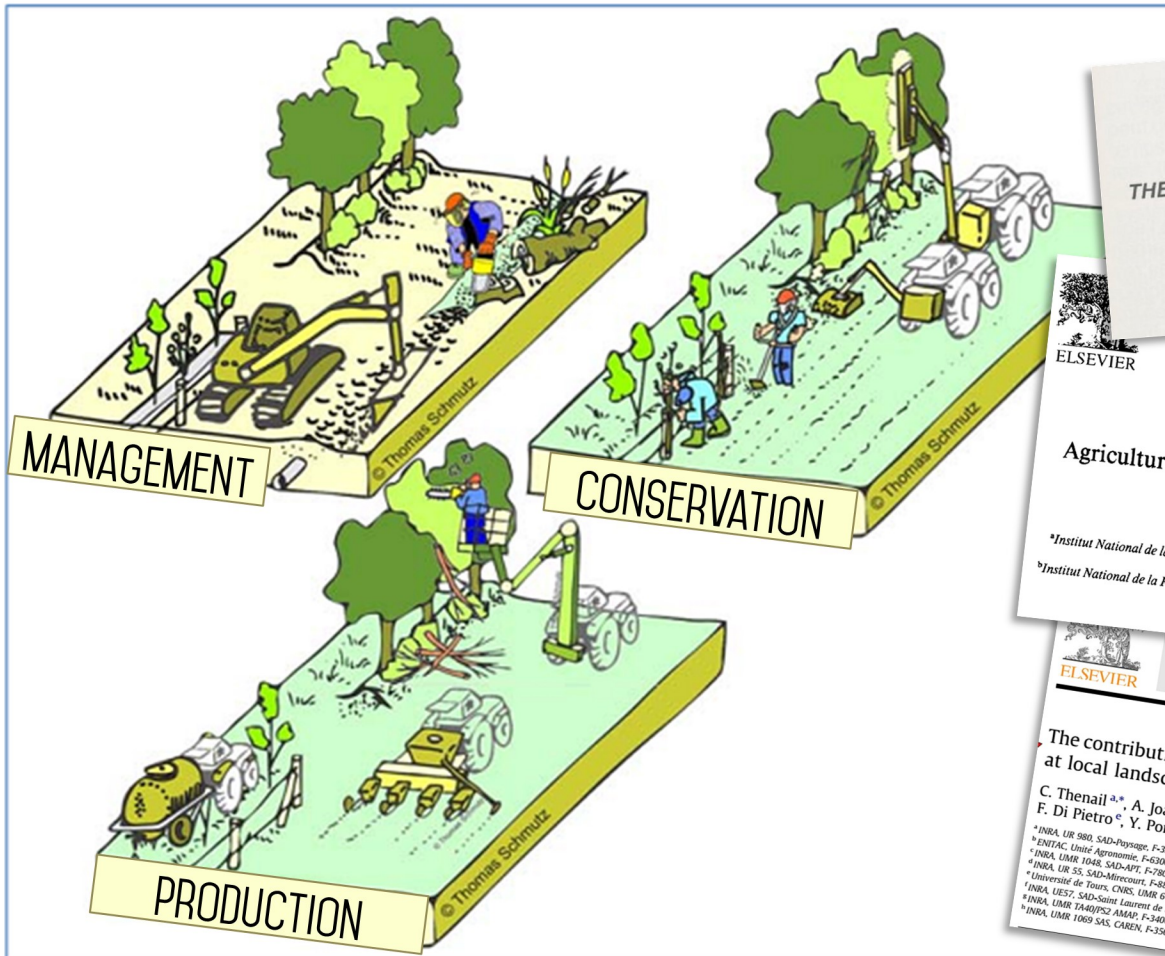
INRA  
SCIENCE & IMPACT

AGIR  
UMR 1248 INRA / INPT

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GEstion LocalE des ressources Agricoles et Naturelles

D. RIZZO, 26 March 2015  
BACKGROUND CONCEPTS

# FARMING AS A BUNDLE OF PROCESSES IN SPACE



LA NÉCESSAIRE ARTICULATION DE L'ÉCOLOGIE ET DE L'AGRONOMIE POUR LA GESTION DES PAYSAGES AGRICOLES  
 THE ARTICULATION BETWEEN AGRONOMY AND ECOLOGY, A PREREQUISITE FOR THE MANAGEMENT OF FARMING LANDSCAPES

par Jacques Baudry (\*) et Claudine Thenail (\*)  
 (note présentée par Jacques Baudry)

ELSEVIER

Landscape and Urban Planning 31 (1995) 3-10

LANDSCAPE AND URBAN PLANNING

Agricultural systems and landscape patterns: how can we build a relationship?

J.P. Deffontaines<sup>a,\*</sup>, C. Thenail<sup>b</sup>, J. Baudry<sup>b</sup>

<sup>a</sup>Institut National de la Recherche Agronomique, Département de Recherches sur les Systèmes Agraires et le Développement, Route de Saint-Cyr, 78026 Versailles Cedex, France  
<sup>b</sup>Institut National de la Recherche Agronomique, Département de Recherches sur les Systèmes Agraires et le Développement, 65, Rue de Saint-Brieuc, 35042 Rennes Cedex, France

ELSEVIER

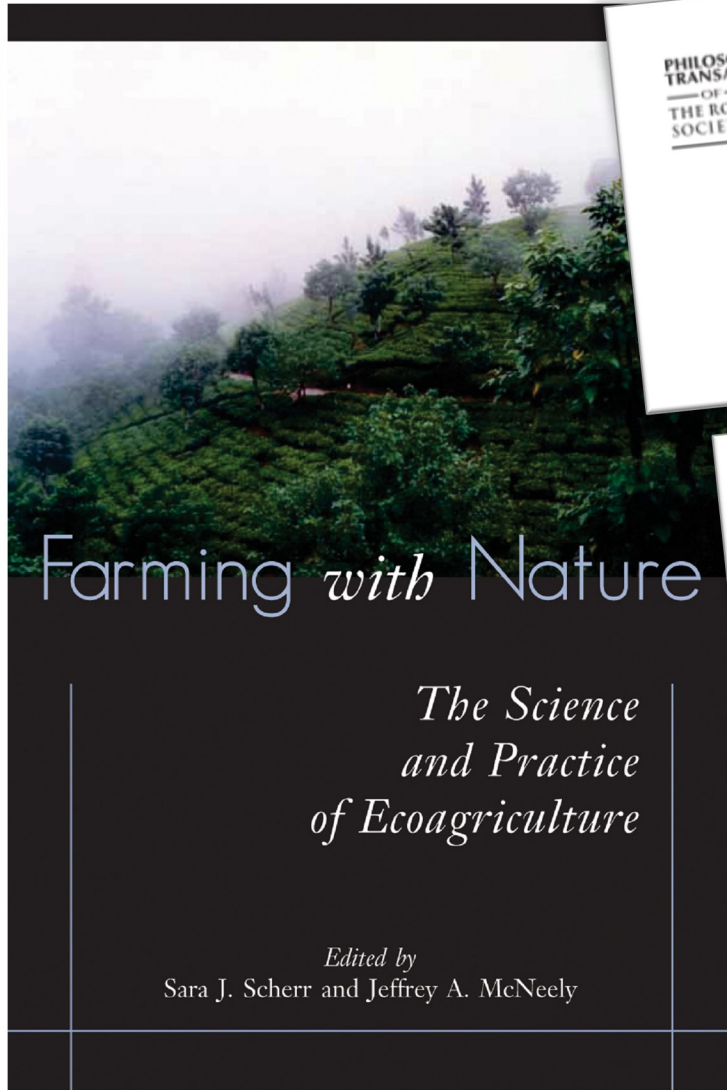
Agriculture, Ecosystems and Environment  
 journal homepage: www.elsevier.com/locate/agee

The contribution of crop-rotation organization in farms to crop-mosaic patterning at local landscape scales

C. Thenail<sup>a,\*</sup>, A. Joannon<sup>a</sup>, M. Capitaine<sup>b</sup>, V. Souchère<sup>c</sup>, C. Mignolet<sup>d</sup>, N. Schermann<sup>a</sup>, F. Di Pietro<sup>e</sup>, Y. Pons<sup>f</sup>, C. Gaucherel<sup>g</sup>, V. Viaud<sup>h</sup>, J. Baudry<sup>a</sup>

<sup>a</sup>INRA, UR 980, SAD-Paysage, F-35000 Rennes, France  
<sup>b</sup>ENITAC, Unité Agronomie, F-63000 Lempdes, France  
<sup>c</sup>INRA, UMR 1048, SAD-AP, F-78000 Thiverval Grignon, France  
<sup>d</sup>INRA, UR 55, SAD-Mirecourt, F-54000 Mirecourt, France  
<sup>e</sup>Université de Tours, CNRS, UMR 6173, CITERES DEP, F-37000 Tours, France  
<sup>f</sup>INRA, UES7, SAD-Saint Laurent de la Prée, F-17000 Fouras, France  
<sup>g</sup>INRA, UMR TA40/FS2 AMAP, F-34000 Montpellier, France  
<sup>h</sup>INRA, UMR 1069 SAS, CAREN, F-35000 Rennes, France

Thenail C (2015) Comprendre et accompagner la gestion agricole des ressources paysagères. Une contribution à l'agronomie des territoires et paysages. HDR, Université de Lorraine (FRA)



PHILOSOPHICAL  
TRANSACTIONS  
OF  
THE ROYAL  
SOCIETY **B**

Phil. Trans. R. Soc. B (2008) 363, 477–494  
doi:10.1098/rstb.2007.2165  
Published online 25 July 2007

## Biodiversity conservation and agricultural sustainability: towards a new paradigm of 'ecoagriculture' landscapes

Sara J. Scherr<sup>1</sup> and Jeffrey A. McNeely<sup>2,\*</sup>

<sup>1</sup>Ecoagriculture Partners, Washington, DC 20001, USA  
<sup>2</sup>World Conservation Union (IUCN), 1106 Club Street, Cambridge, MA 02142, USA

Scherr et al. *Agriculture & Food Security* 2012, 1:12  
<http://www.agricultureandfoodsecurity.com/content/1/1/12>



**Agriculture &  
Food Security**

Open Access

REVIEW

## From climate-smart agriculture to climate-smart landscapes

Sara J Scherr\*, Seth Shames and Rachel Friedman

Scherr SJ, McNeely JA (2012) *Farming with Nature: The Science and Practice of Ecoagriculture*. Island Press

Scherr SJ, McNeely JA (2008) Biodiversity conservation and agricultural sustainability: towards a new paradigm of "ecoagriculture" landscapes. *Philosophical Transactions of the Royal Society B: Biological Sciences* 363:477–494. doi: 10.1098/rstb.2007.2165





# ECOAGRICULTURE /2

A landscape-management approach to promote Science, Practice and Policy for Land Use Systems that Jointly increase **Food Production**, Reduce **Rural Poverty**, and Conserve Biodiversity and **Ecosystem Services** by catalysing:

- \* Research and land-use innovation with farmers and conservationists
- \* Capacity building
- \* Education and public awareness
- \* Enabling policies
- \* Resource mobilisation



ecoagriculturepartners  
landscapes for people, food and nature

United Nations voluntary initiative for action network



SUSTAINABLE DEVELOPMENT  
KNOWLEDGE PLATFORM

<http://bit.ly/19jx8Wh>





## Foro Global de Paisajes

REDD+ como un medio para lograr un desarrollo verde  
en la región Madre de Dios

El Gobierno Regional de Madre de Dios y WWF Perú  
presentan los avances y lecciones aprendidas  
durante el proceso REDD+ en la región  
como un modelo para la Amazonia peruana.

Sábado 6 de diciembre del 2014  
8:45 a.m.

Hotel Westin  
Calle Las Begonias 450, San Isidro



Global Landscapes Forum | Lima  
6 - 7 December 2014



GLF, held alongside the UN climate negotiations, create a platform for positioning landscapes in the new international agreements on climate and sustainable development.

CIFOR (FAO for the forest)

CGIAR

....



# LANDSCAPE APPROACH...

## MODULE 2: MANAGING LANDSCAPES FOR CLIMATE-SMART AGRICULTURAL SYSTEMS

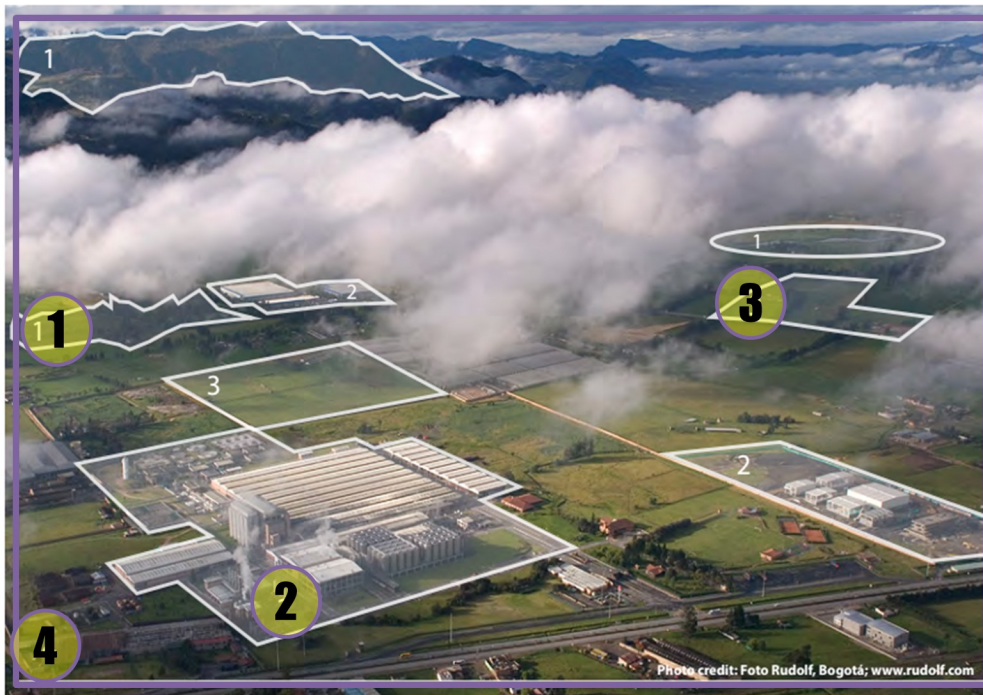
### Overview

This module describes how a gradual transition to climate-smart agriculture (CSA) can take place. The first section describes the landscape approach and explains why this approach should be followed when moving towards CSA. In a landscape approach, the management of production systems and natural resources covers an area large enough to produce vital ecosystem services, but small enough to be managed by the people using the land which is producing those services.

FAO report for the development of climate-smart agricultural systems based on a landscape approach

SAYER ET AL. 2013

FAO 2013



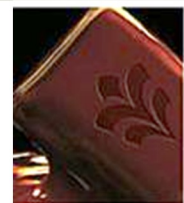
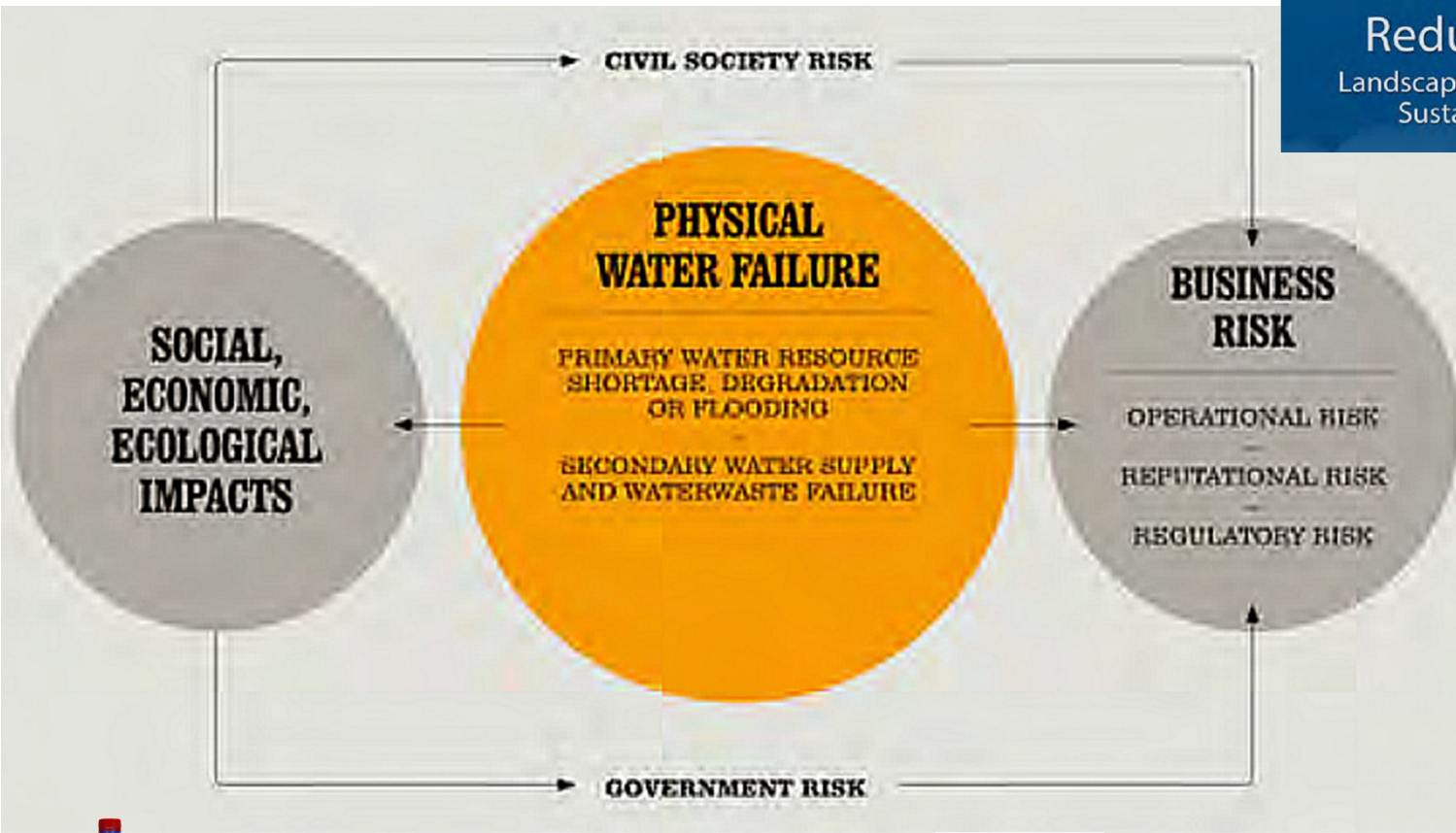
1. **resources**  
identify risks and preserving resources
2. **coordination**  
between sectors & actors
3. **livelihood**  
for local communities
4. **synergy**  
between users and planners

KISSINGER ET AL. 2013

# ...TO MANAGE RISKS

KISSINGER ET AL. 2013

Reducing Risk  
Landscape Approaches to Sustainable Sourcing



# CHINA'S URBAN SPRAWL RAISES KEY QUESTION: CAN IT FEED ITS PEOPLE?

PHOTOGRAPH: AFP/GETTY IMAGES FOR THEGUARDIAN.COM

<http://bit.ly/19JBWuN>



D. RIZZO, 26 March 2015  
BACKGROUND CONCEPTS

SECTION 2

# CONCEPTS 1/2

LANDSCAPE AGRONOMY TO ADDRESS AGRICULTURAL LANDSCAPE DYNAMICS



# INSTITUTIONAL INSPIRATIONS

## CONSTITUTION OF THE ITALIAN REPUBLIC

Art. 9

The Republic promotes the development of culture and of scientific and technical research. It safeguards the landscape and the historical and artistic heritage of the Nation.

## EUROPEAN LANDSCAPE CONVENTION

Art 1a

“Landscape” means an area, as perceived by people, whose character is the result of the action & interaction of natural and/or human factors

*territorial dimension of human rights and democracy*

## COMMON AGRICULTURAL POLICY

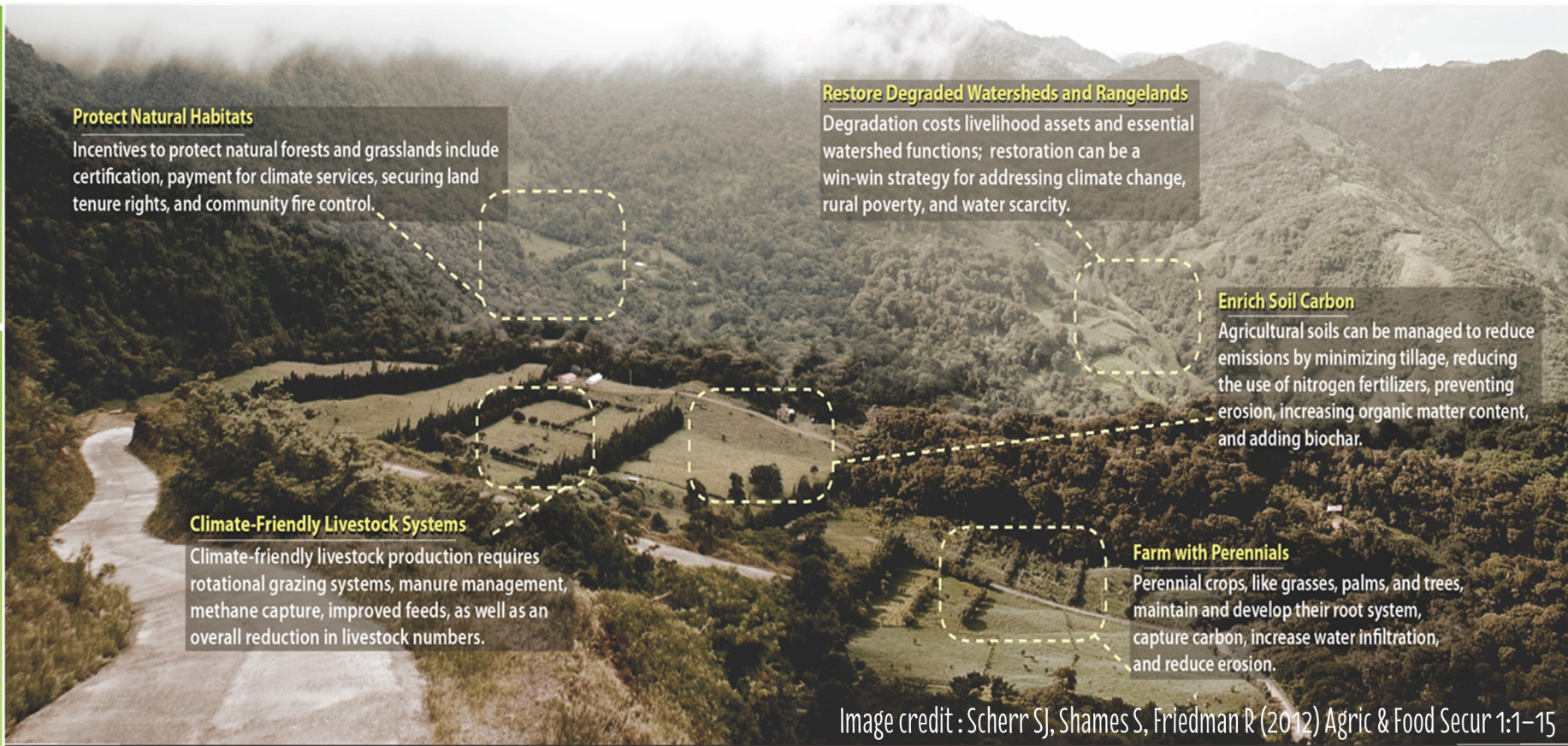
Maintaining ecosystem services requires investing in Green Infrastructure







# THE LANDSCAPE BEYOND THE « AGER »



**Protect Natural Habitats**

Incentives to protect natural forests and grasslands include certification, payment for climate services, securing land tenure rights, and community fire control.

**Restore Degraded Watersheds and Rangelands**

Degradation costs livelihood assets and essential watershed functions; restoration can be a win-win strategy for addressing climate change, rural poverty, and water scarcity.

**Enrich Soil Carbon**

Agricultural soils can be managed to reduce emissions by minimizing tillage, reducing the use of nitrogen fertilizers, preventing erosion, increasing organic matter content, and adding biochar.

**Climate-Friendly Livestock Systems**

Climate-friendly livestock production requires rotational grazing systems, manure management, methane capture, improved feeds, as well as an overall reduction in livestock numbers.

**Farm with Perennials**

Perennial crops, like grasses, palms, and trees, maintain and develop their root system, capture carbon, increase water infiltration, and reduce erosion.

Image credit : Scherr SJ, Shames S, Friedman R (2012) Agric & Food Secur 1:1–15

**AGER**

Cropping systems

**SALTUS**

Pastures and grasslands

**HORTUS**

Gardens and groves

**SILVA**

Woods and forests

INSTITUT NATIONAL DE LA RECHERCHE AGRICOLE

INSTITUT NATIONAL DE LA RECHERCHE EN SCIENCES

AgroParisTech

INRA

LaSalle

**INRA**  
SCIENCE & IMPACT

**AGIR**  
UMR 1248 INRA / INPT

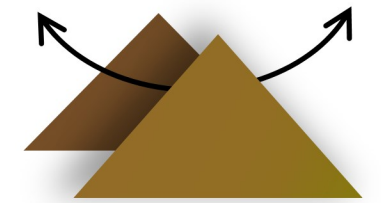
**Equipe MAGELLAN**  
Méthodes pour l'Agroécologie et la  
GEstion LocalE des ressources Agricoles et Naturelles

D. RIZZO, 26 March 2015  
BACKGROUND CONCEPTS

# LAND MANAGEMENT DYNAMICS



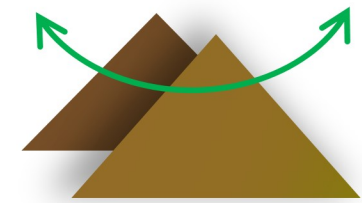
Monte Pisano, Tuscany (Italy) photo: Rizzo D.



OLD IMPLICIT BALANCE



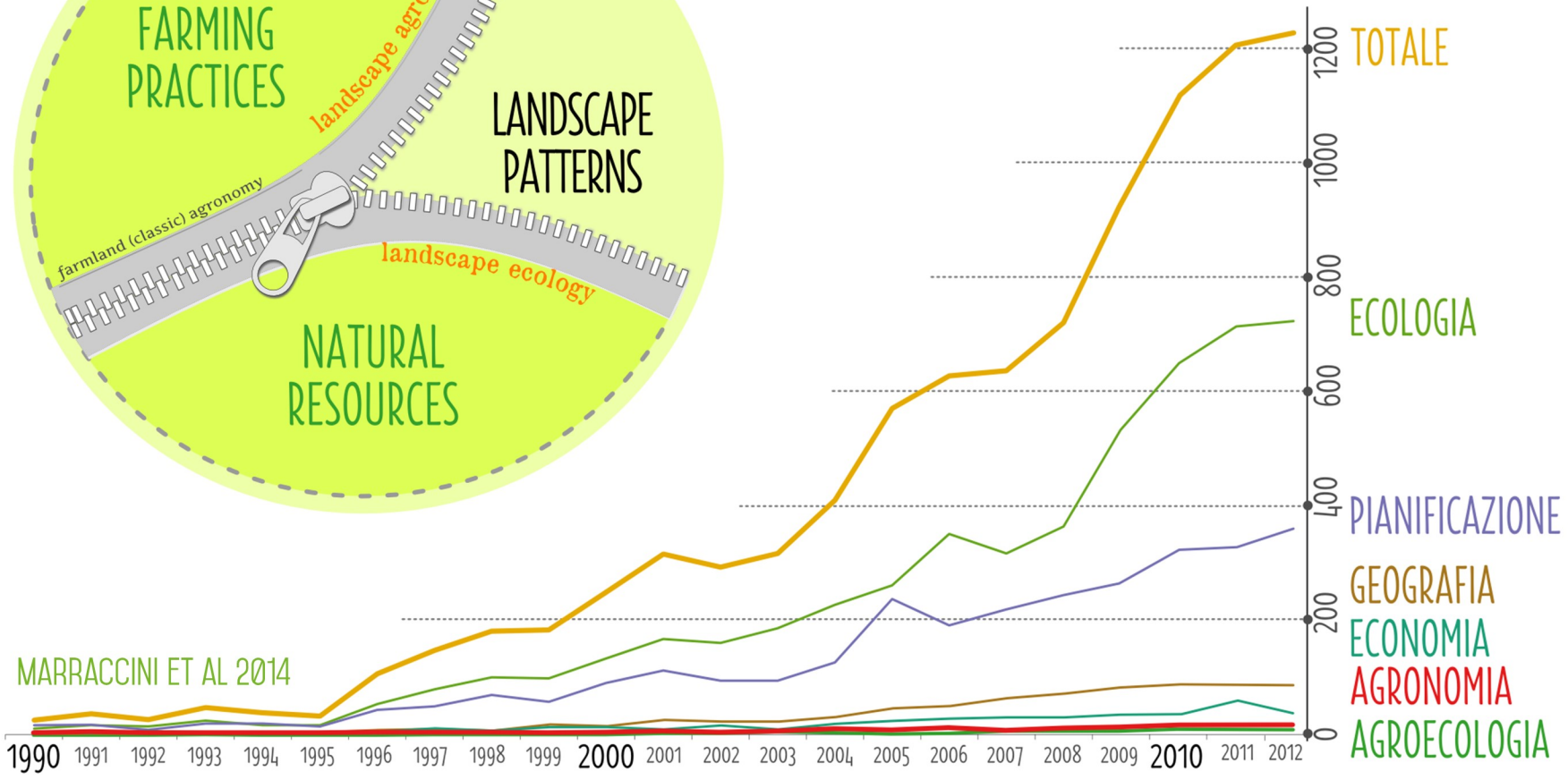
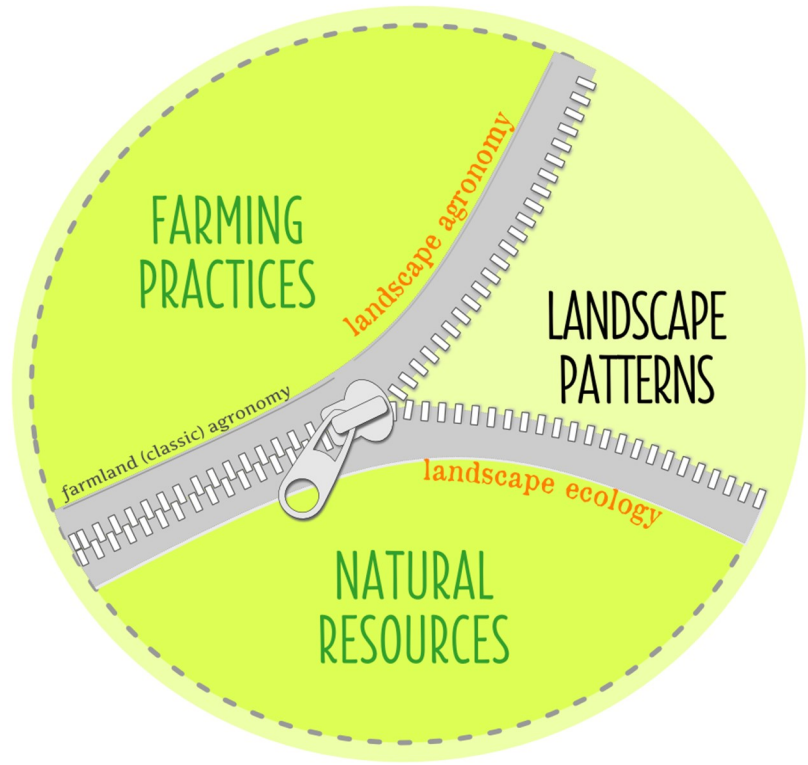
TRANSITION



NEW EXPLICIT BALANCE

# LOCATING INTERACTIONS BW AGRICULTURE & NATURE

Occurrences of the term landscape &... in scientific literature (1990-2012)



MARRACCINI ET AL 2014

Méthodes pour l'Agroécologie et la GEstion LocalE des ressources Agricoles et Naturelles

D. RIZZO, 26 March 2015  
 BACKGROUND CONCEPTS

# FORMALIZING A CONCEPT

Riv. di Agron., 1996, 30, 3 Suppl., 310-319

## Agronomia aziendale e agronomia del territorio (1)

Luigi Cavazza (2)

LAND AGRONOMY 1996

Si è verificata nel corso di questo secolo circa gli aspetti della scienza del territorio e se ne propone un'organica sistemazione come ben definita branca a sé stante. Si evidenziano le differenze tra l'agronomia aziendale e l'agronomia del territorio e di quest'ultima si delineano gli obiettivi essenziali e le leggi caratteristiche dell'agronomia del territorio, mettendone in evidenza differenze distintive e ciò tanto in generale che per specifici campi d'applicazione. Si citano esempi di tematiche di studio agronomico del territorio riferendosi a particolari settori applicativi.

Parole chiave: agronomia aziendale, agronomia territoriale, ambiente.

### Summary

#### FARM AGRONOMY AND LAND AGRONOMY

The evolution occurred in the past century in the agronomic science directed to the study of the territory and an organic set up of this branch of the agronomic science is attempted. Main differences between farm agronomy and land agronomy are evidenced and objectives of the latter are outlined. Elementary concepts of land agronomy are described and distinguishing differences in techniques, both in general and in specific applications, are given. Examples are given for specific applications.

Key words: farm agronomy, land agronomy, environment.

## POUR UNE THÉORIE DU MÉNAGE DES CHAMPS : L'AGRONOMIE DES TERRITOIRES FOR A THEORY OF FIELD MANAGEMENT: AN AGRONOMY OF TERRITORIES

par François Papy (\*)

AGRONOMY OF THE TERRITORY 2001

## POUR UNE AGRONOMIE DU TERRITOIRE : PRENDRE EN COMPTE L'ESPACE POUR ACCOMPAGNER LE CHANGEMENT TECHNIQUE TAKING SPACE INTO ACCOUNT TO GO ALONG WITH TECHNICAL CHANGE : AN AGRONOMY OF THE TERRITORY

par Sylvie Lardon (\*), Jean-Pierre Deffontaines (\*\*)  
et Pierre-Louis Osty (\*\*\*)

# TOWARDS A COMMON FRAMEWORK

*Satellite Session: Education in landscape and territory agronomy*

## Experiences from a winter school on landscape agronomy: stakes, difficulties, perspectives

*Hélène Rapey<sup>a</sup>, Sylvie Lardon<sup>b</sup>, Mariassunta Galli<sup>c</sup>, Camilla Moonen<sup>c</sup>, Marc Benoit<sup>d</sup>, Claudine Thenail<sup>e</sup>, Paolo Barberi<sup>c</sup>, Patrick Caron<sup>f</sup>, Elisa Marraccini<sup>a,c</sup>, Davide Rizzo<sup>c</sup>, Enrico Bonari<sup>c</sup>*

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1<sup>ST</sup> WINTER SCHOOL 2007

*WS5.4 – Education in landscape and territory agronomy*

## A winter school in landscape agronomy and the synergies it created

*Anna-Camilla Moonen<sup>a</sup>, Mariassunta Galli<sup>a</sup>, Sylvie Lardon<sup>b</sup>, Hélène Rapey<sup>c</sup>, Nicola Silvestri<sup>d</sup>, Marc Benoit<sup>e</sup>, Claudine Thenail<sup>f</sup>, Elisa Marraccini<sup>a</sup>, Davide Rizzo<sup>a</sup>, Marta Debolini<sup>a</sup>, Paolo Barberi<sup>a</sup> and Enrico Bonari<sup>a</sup>*

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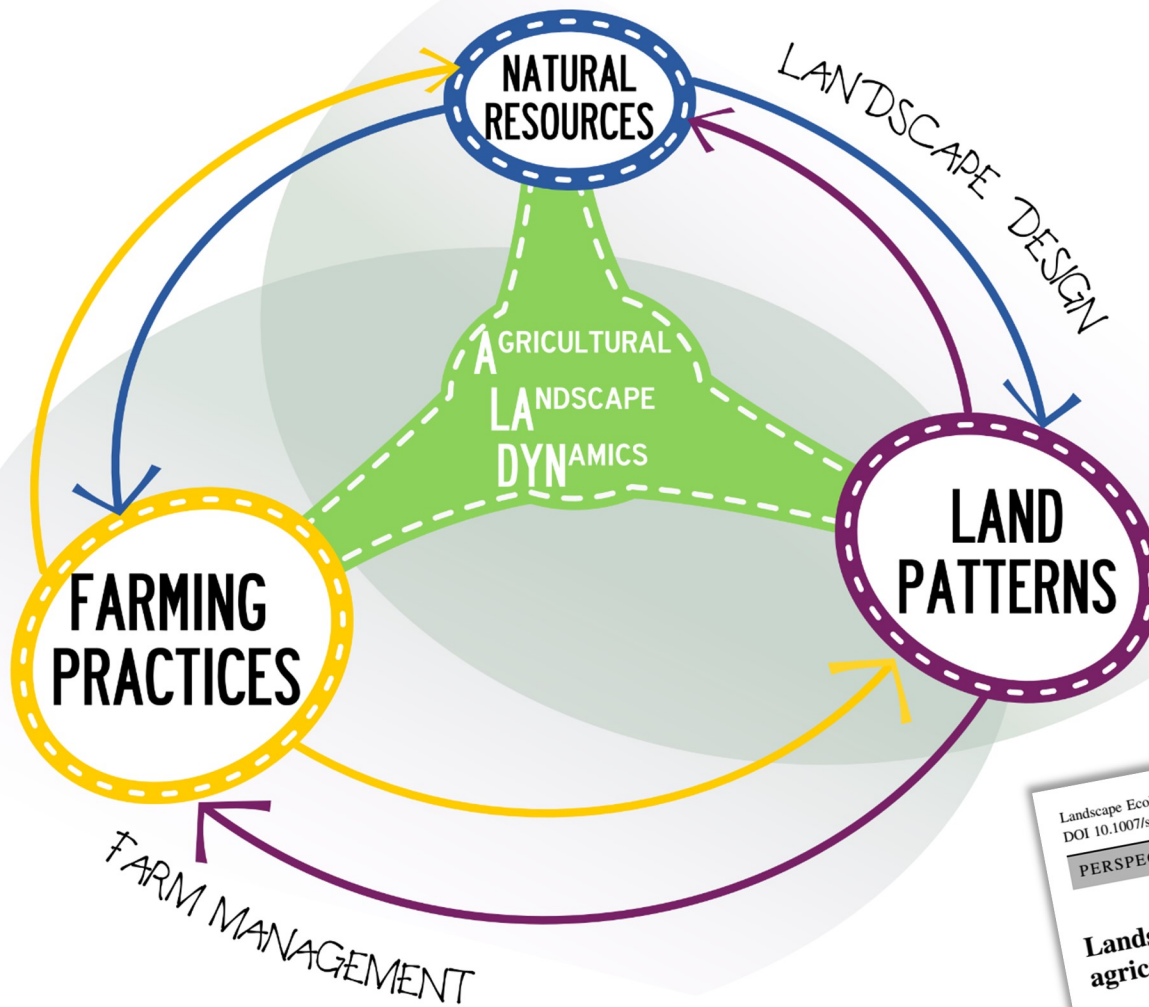
*<sup>f</sup>INRA Sciences pour l'Action et le Développement (SAD), Paysage (Rennes, France)*

2<sup>ND</sup> WINTER SCHOOL 2009

SATELLITE SESSIONS AT INTERNATIONAL FARMING SYSTEM ASSOCIATION (IFSA)



# AGRICULTURAL LANDSCAPE DYNAMICS



- **Characterizing** landscape patterns as a result of farming practices
- **Understanding** farming practices to assess current landscape patterns
- **Improving** tools to design future agricultural landscapes

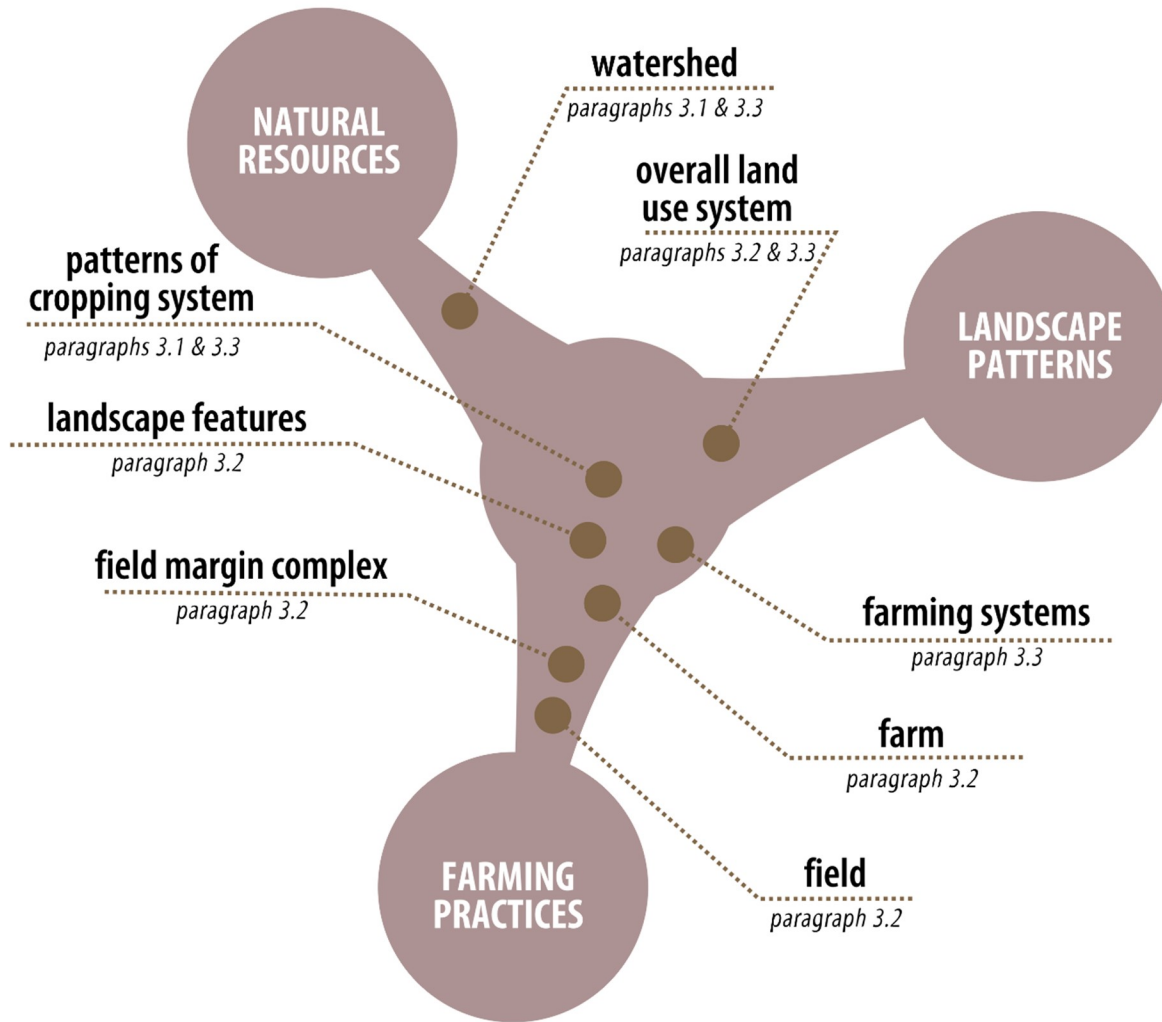
Landscape Ecol  
DOI 10.1007/s10980-012-9802-8

PERSPECTIVE

**Landscape agronomy: a new field for addressing agricultural landscape dynamics**

Marc Benoit · Davide Rizzo · Elisa Marraccini · Anna Camilla Moonen · Mariassunta Galli · Sylvie Lardon · H el ene Rapey · Claudine Thenail · Enrico Bonari

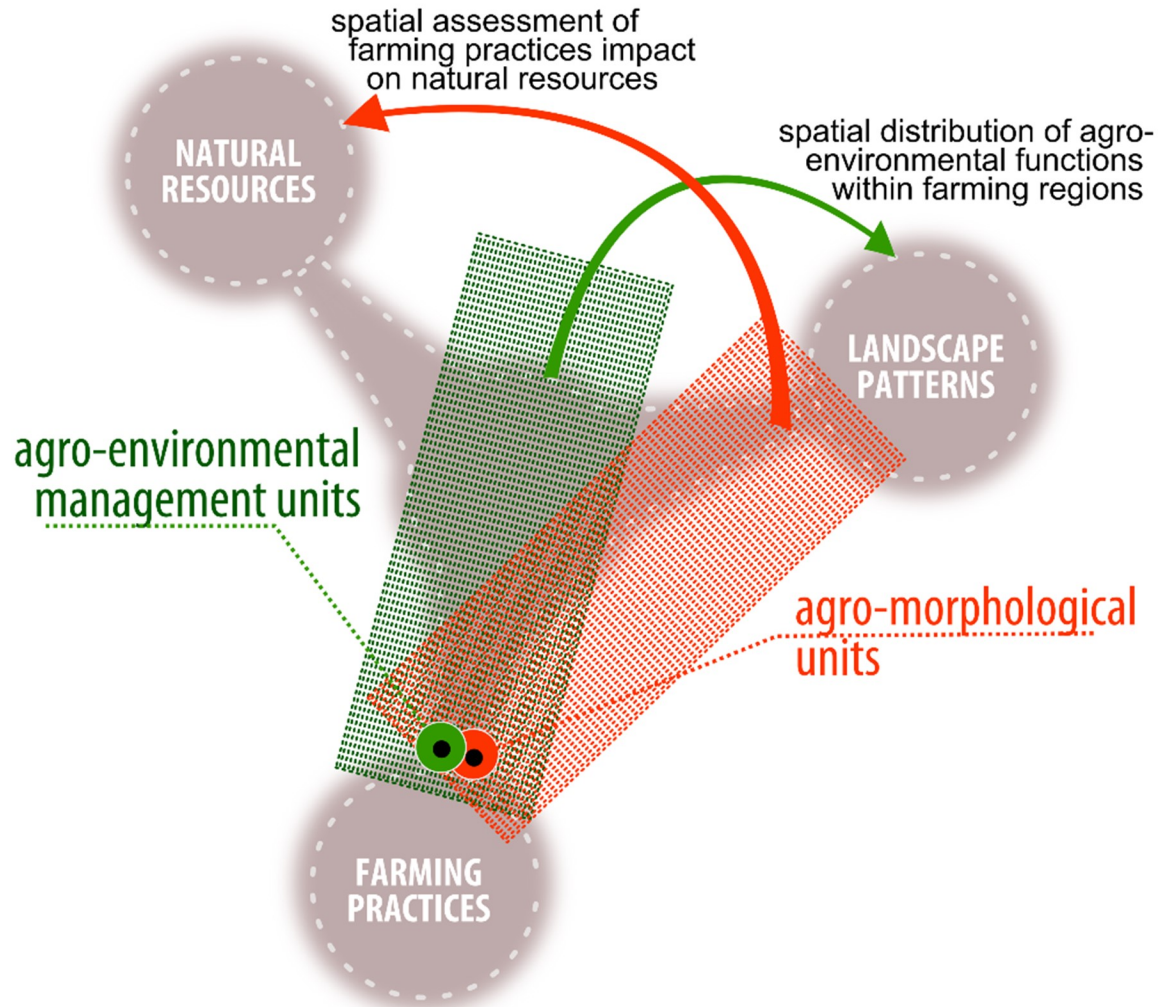
# AGRICULTURAL LAND MANAGEMENT UNITS



Rizzo D, Marraccini E, Lardon S, et al. (2013) Farming systems designing landscapes: land management units at the interface between agronomy and geography. *Geografisk Tidsskrift-Danish Journal of Geography* 113:71–86. doi: 10.1080/00167223.2013.849391



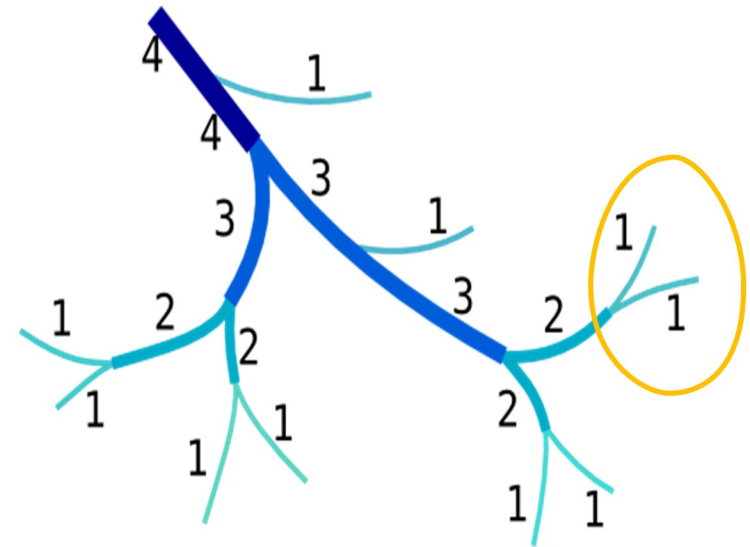
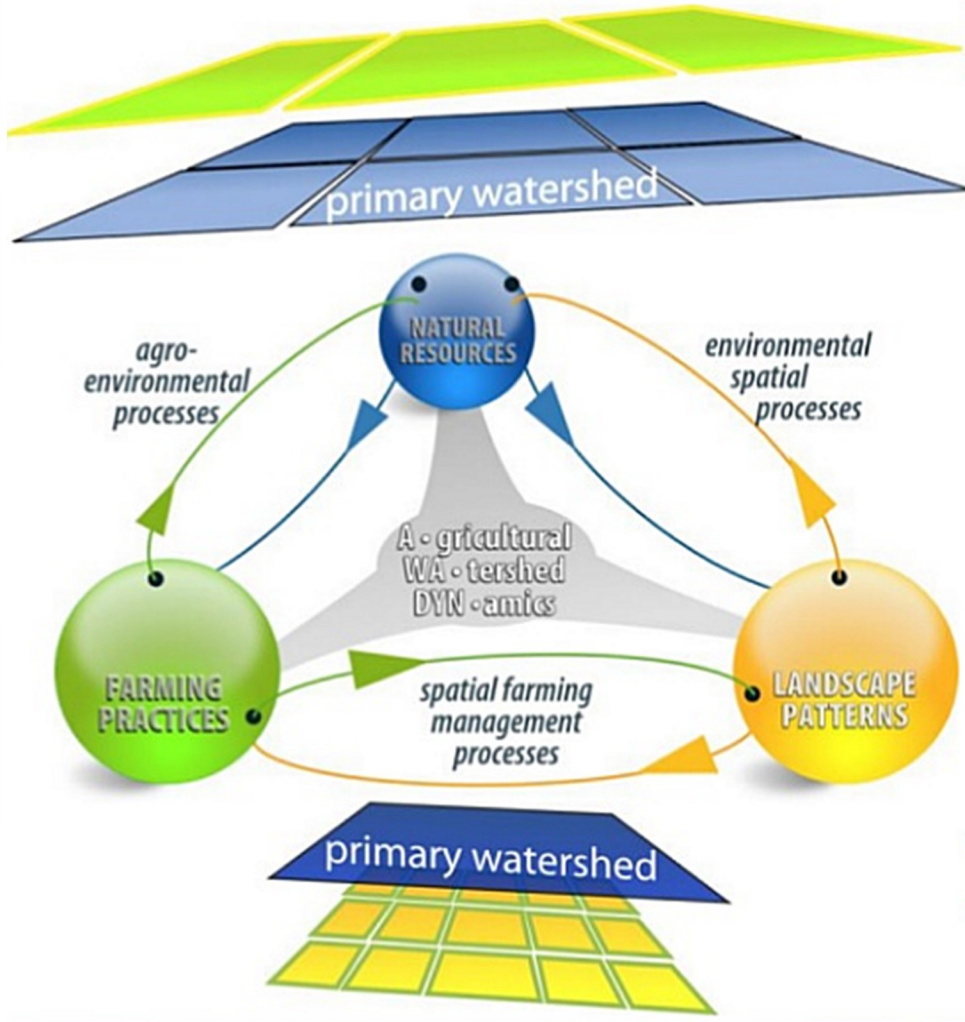
# TWO METHODS TO TACKLE WITH LMU



Rizzo D, Marraccini E, Lardon S, et al. (2013) Farming systems designing landscapes: Land management units at the interface between agronomy and geography. *Geografisk Tidsskrift-Danish Journal of Geography* 113:71–86. doi: 10.1080/00167223.2013.849391

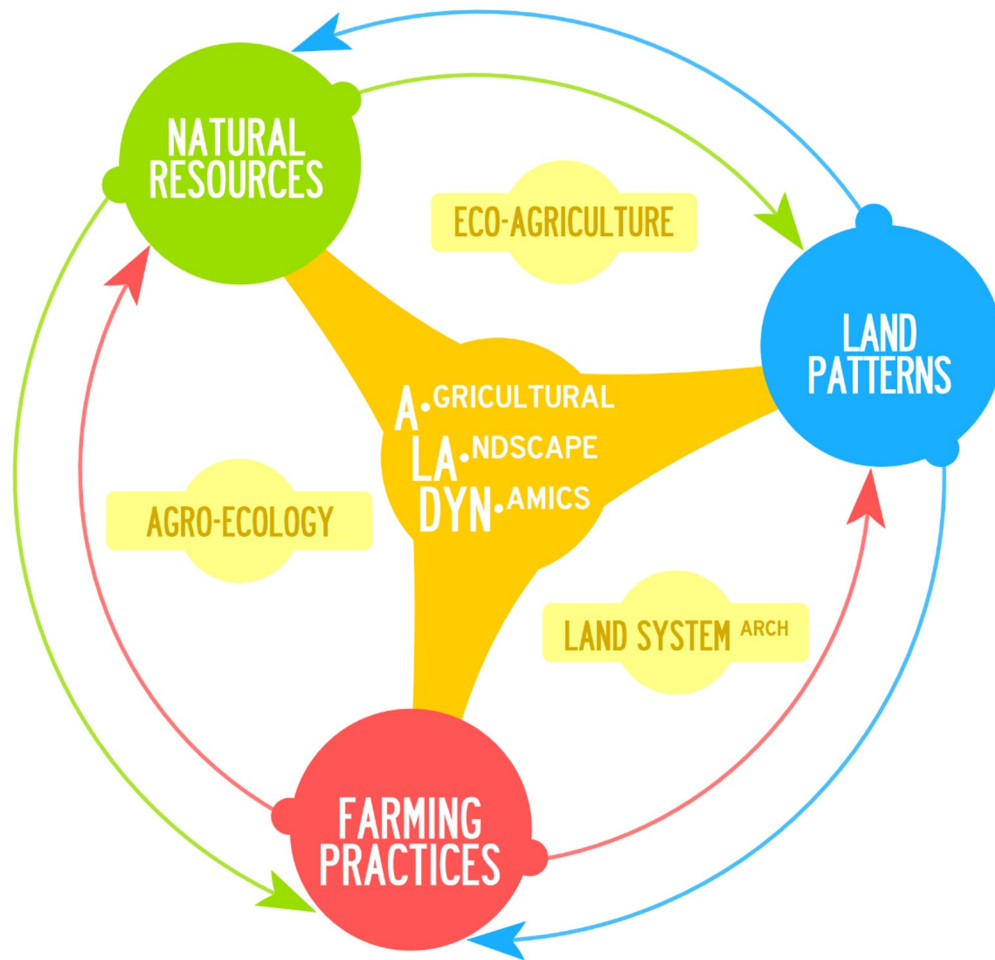


# MODELLING VS MANAGEMENT UNITS



Rizzo D, Lazrak EG, Benoît M (2013) Landscape agronomy at the watershed scale: comparing two complementary methods dealing with the agricultural systems architecture.

# IN SUMMARY...



What are the **levers of action** to support or reorient these practices?

Are the **policies** appropriate?

How are farmer practices **influenced** by landscape features?

Are the proposals for new multifunctional landscapes sustainable to combine practices for landscape **management** and practices for **production** management?

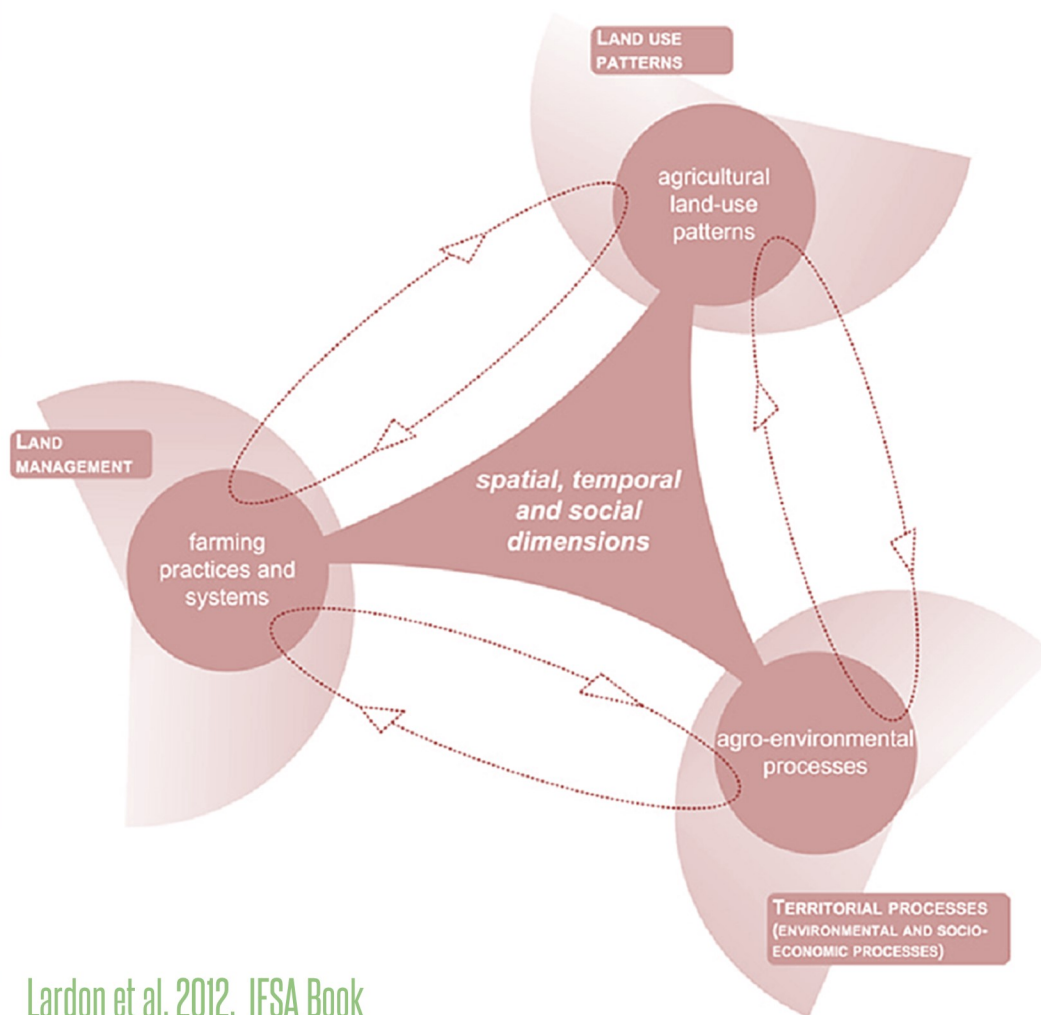
SECTION 2

# CONCEPTS 2/2

TERRITORY AGRONOMY : WIDENING THE PERSPECTIVE



# TERRITORY AGRONOMY



Lardon et al. 2012, IFSA Book

## CONTEXT

Farming practices together with all the different land management activities

## PROJECT

Visions and representations can help understanding spatial patterns

## INTERDISCIPLINARITY

original disciplinary backgrounds Agronomy, Ecology and Geography, combined and placed in a spatio-temporal and social context, create the synergies and innovation

## EDUCATION & EXTENSION

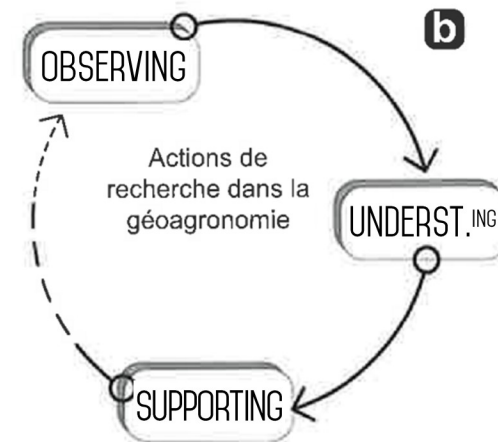
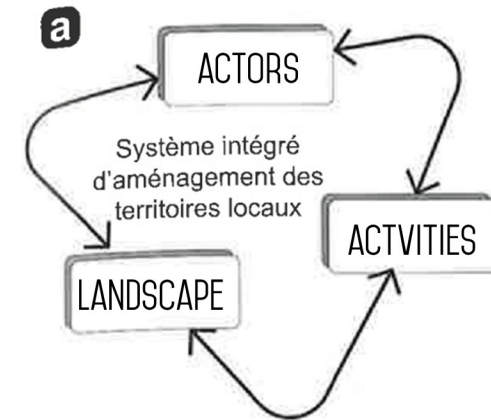
How to improve capabilities of future professionals and researcher at dealing with territorial issues?

# TERRITORIAL PERSPECTIVE TO LAND MANAGEMENT

**Observer** (décrire) et **comprendre** (modéliser) l'organisation spatiale des pratiques et des systèmes productifs agricoles en relation avec :

- la (non)**hiérarchie** entre pratiques agricoles individuelles et collectives
- l'impact de **conseil** technique, "services d'appui" et la formation sur le tripode pratique-ressources-patrons spatiaux
- l'influence (perturbations) des **investissements** agroindustriels
- le rôle de l'agriculture comme **levier** de la gestion des milieux et des ressources (paysages)

... pour **accompagner** les sociétés locales dans le pilotage des dynamiques des paysages vers les buts souhaités



## SEE RIZZO ET AL. 2013, DANISH JOURNAL OF GEOGRAPHY

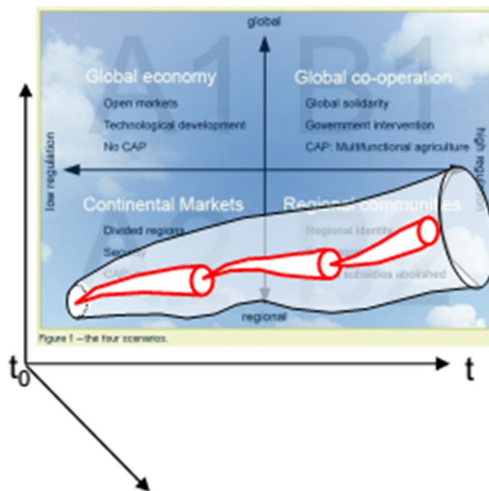
	AGRONOMY	AGROECOLOGY	GEO-AGRONOMY	LANDSCAPE AGRONOMY	TERRITORY AGRONOMY
MAIN SCOPE	Improving farming practices for crop and livestock production, understanding their use of or impact on natural resources	Modelling and improving the relationships between land use patterns and agro-environmental processes	Modelling and explaining the spatial organisation of farming practices and systems	Modelling and improving the relationships between natural resources, landscape patterns and farming practices with a landscape approach	Supporting stakeholders in the management of place-based socio-ecological processes
SPATIAL SCALE	→ local to global	→ local to regional	→ local to regional	→ regional	→ regional
	Crop, field, farm, (globe)	Agroecosystem	Farmland, watershed	Landscape	Landscape, administrative areas, regions
TEMPORAL SCALE	→ days to years	→ months to years	→ months to years	→ (months to) years	→ years, decades
	Cropping season, crop rotation (nutrient cycle)	Crop rotation, agro-environmental processes, (weed and pests life cycle)	cropping season, crop rotation, agro-environmental processes	single farm project to farming system dynamics	policy and stakeholders projects formulation and lifespan, farming systems dynamics
STAKEHOLDERS	(farmers), extension services, agro-business enterprises (local authorities)	farmers, extension services, (planners)	(farmers), planners	farmers, planners, local authorities	farmers, planners, local authorities and other local stakeholders
FARMING PRACTICES	•	•	•	•	# <sup>1</sup>
NATURAL RESOURCES	•	•	#	•	•
LANDSCAPE PATTERNS		#	•	•	•

WORKSHOP " La Géo en prospective"  
Brest 23 - 26 septembre 2012

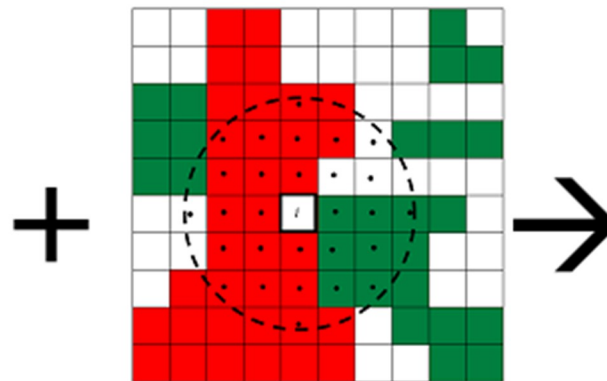


## Modélisation prospective des *LUCC*

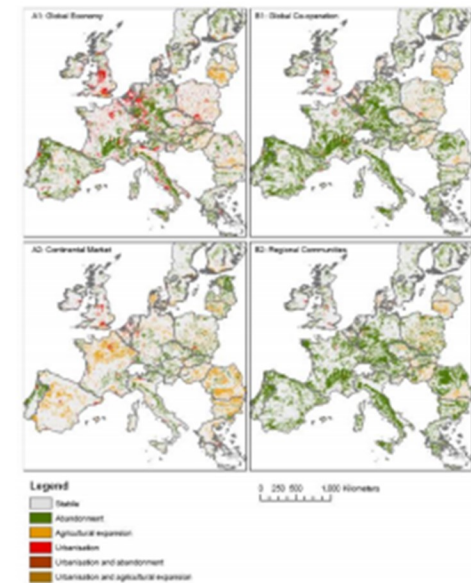
Scénarios



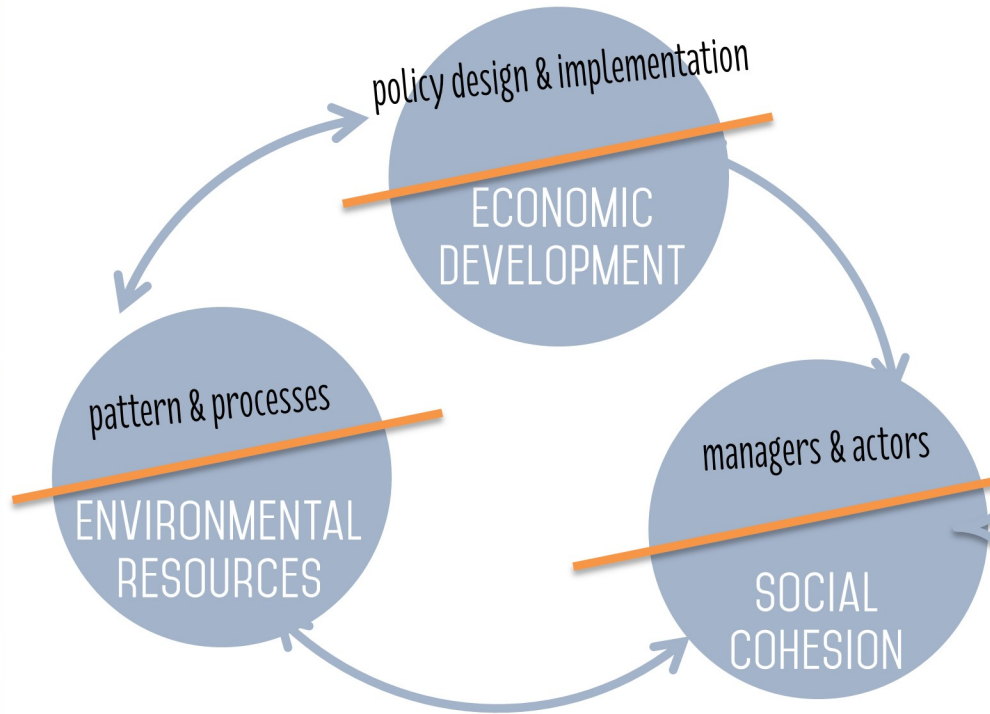
Modèles spatiaux



Scénarios spatialisés



# COMPANION MODELLING



THREE PILLARS OF SUSTAINABILITY

Role individuals in the communities

Use of (simplified) models as « intermediary objects » (transaction costs)

Making explicit the different types of knowledge

Improving community learning and awareness

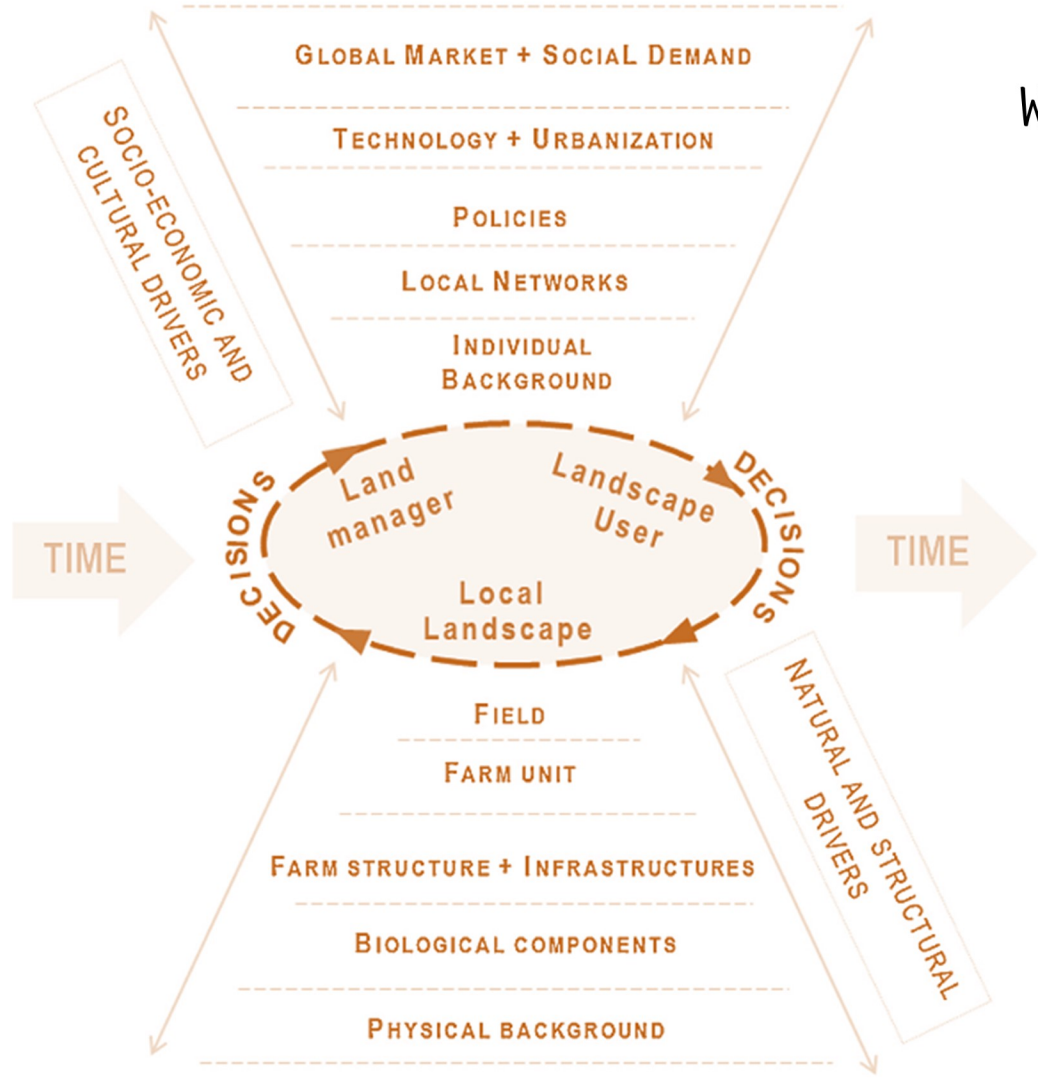
EMPOWERMENT FOR RESILIENCE





# LANDSCAPE AS THE ARENA

where structural features and social constriction converge



**Pinto-Correia & Kristensen 2013**

Linking research to practice: The landscape as the basis for integrating social and ecological perspectives of the rural (Landsc. Urban Plan.)

# CONCLUSIONS



# HOW CAN AGRONOMY ADDRESS LANDSCAPE DYNAMICS?

## AGRICULTURAL PRODUCTION SYSTEM

Crop / pasture type

- sequence in time
- pattern in space

two crucial  
farmer'  
choices

SEBILLOTTE 1974

Farming practices

- scheduling
- intensity

## « FORCE FIELDS »

Land management issues

- tenure
- Shape
- accessibility

Dynamics of  
multiple  
drivers

Environmental processes

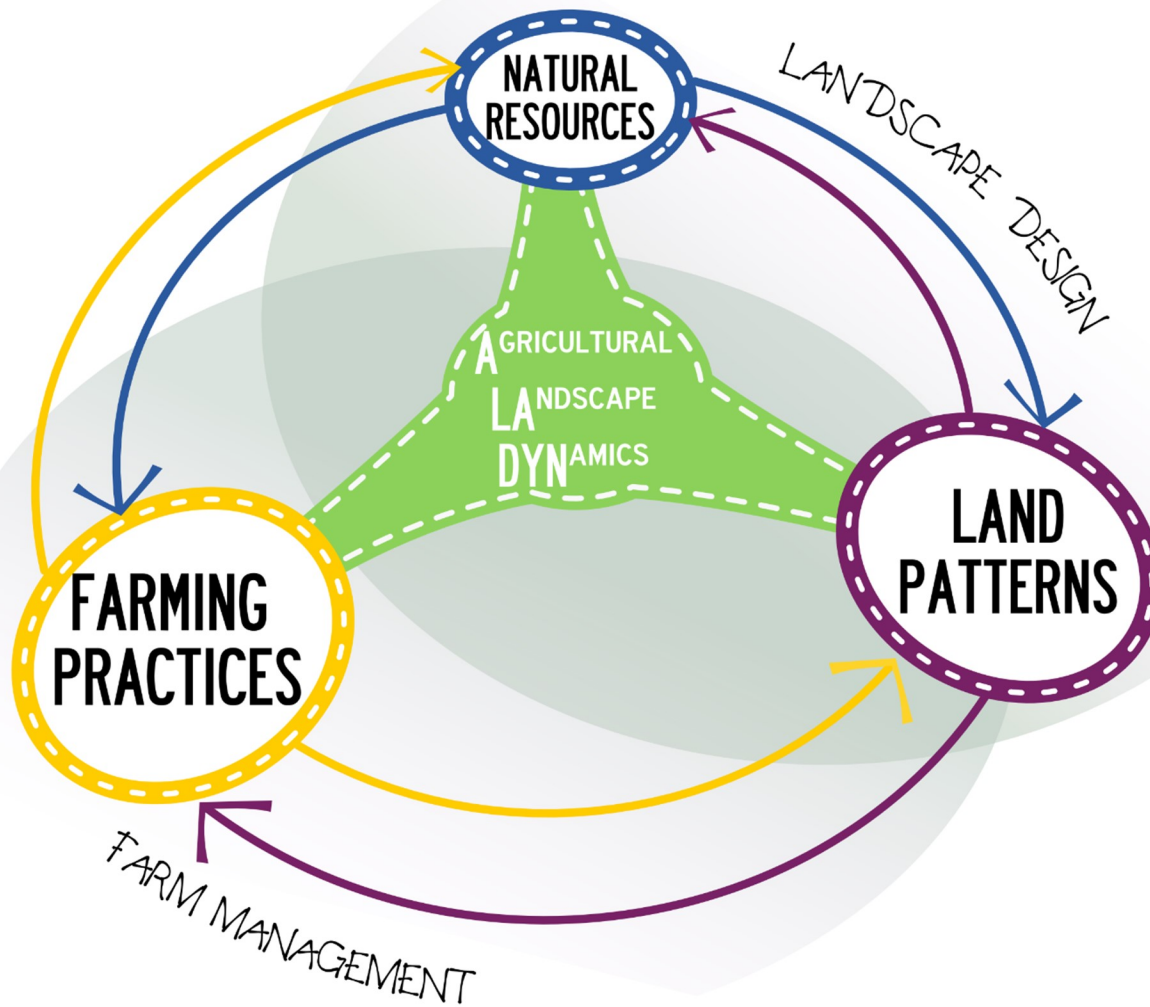
- morphology
- climate
- networks and flows

DEFFONTAINES 2006

SOCIO-TECHNICAL & SOCIO-ECOLOGICAL SYSTEMS

OSTROM 2009

# TAKE HOME MESSAGE



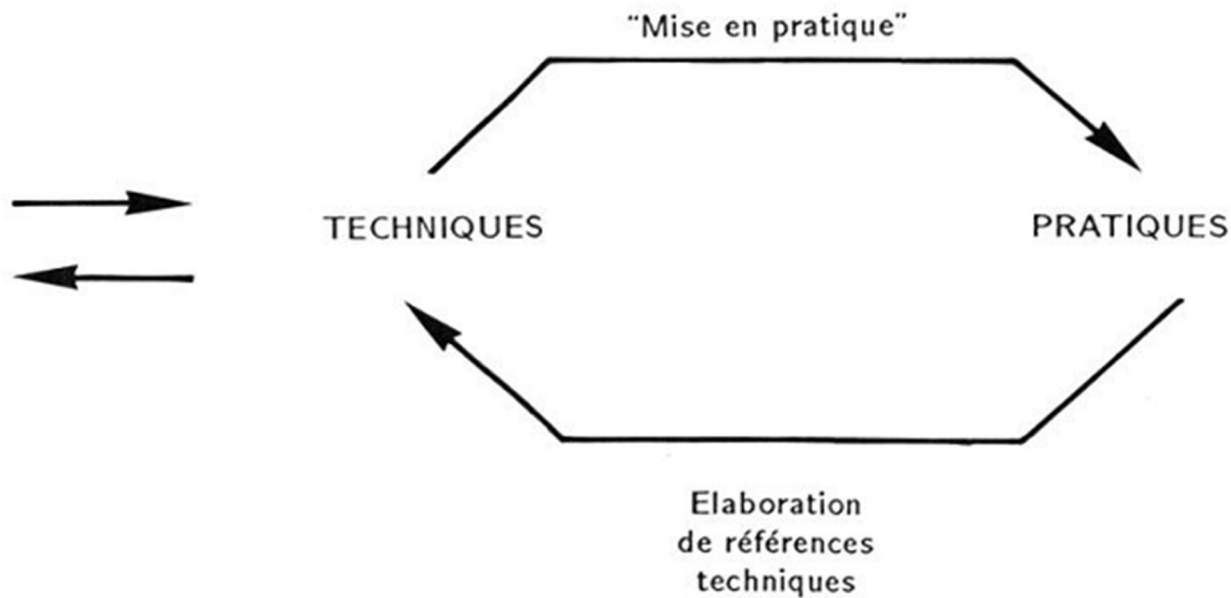
- MULTIPLE LAND MANAGEMENT ISSUES
- ≠ LAND UNITS (FOR MANAGING & MODELING)
- THREE POLES TO BE TACKLED
- COUPLING FARM MANAGEMENT & LANDSCAPE DESIGN

Monte Pisano, Tuscany (Italy)

Photo Rizzo D.

*Grazie per l'attenzione*





**Fig. 1 - Relations entre techniques et pratiques :  
Savoir → faire et faire → savoir.**

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