UNISECO

UNDERSTANDING & IMPROVING THE SUSTAINABILITY OF AGROECOLOGICAL FARMING SYSTEMS IN THE EU

Ostrom's Socio-Ecological System (SES): a framework for agro-ecological farming systems?

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Outline

- Transition to sustainable agriculture
- Ostrom's conceptual framework for farming systems
- Development of typology for UNISECO
- Final comments

Transition towards sustainable agriculture

Challenges in agriculture

- Impact of conventional agriculture on environment, human health and food industry.
- Alternative agriculture and farming practices.
- Agro-ecology: a practice, a social movement and action-science based a transdisciplinary research approach.

UNISECO's aim

- Assess the environmental, economic and social impacts of agro-ecological practices and transition pathways in EU farming systems.

Introduction

- **Agro-ecological farming system (AEFS)**
  - *UNISECO* : … as a set of agricultural practices more or less based on a holistic use of ecological inputs and processes. In these farming systems farmers use their knowledge and decision priorities for sustainable use of local renewable resources and biodiversity to provide multiple benefits (environmental, economic, social) at different interacting scales, from the level of agricultural practices to farming system, local community and food system levels.

Key challenges for UNISECO

- Drivers of change towards sustainable agriculture
  - Farm productivity
  - Markets
  - Governance
  - Policy Incentives
  - Social factors
- Complex number of options for farmers and society as a whole to move away from conventional farming.

UNISECO approach

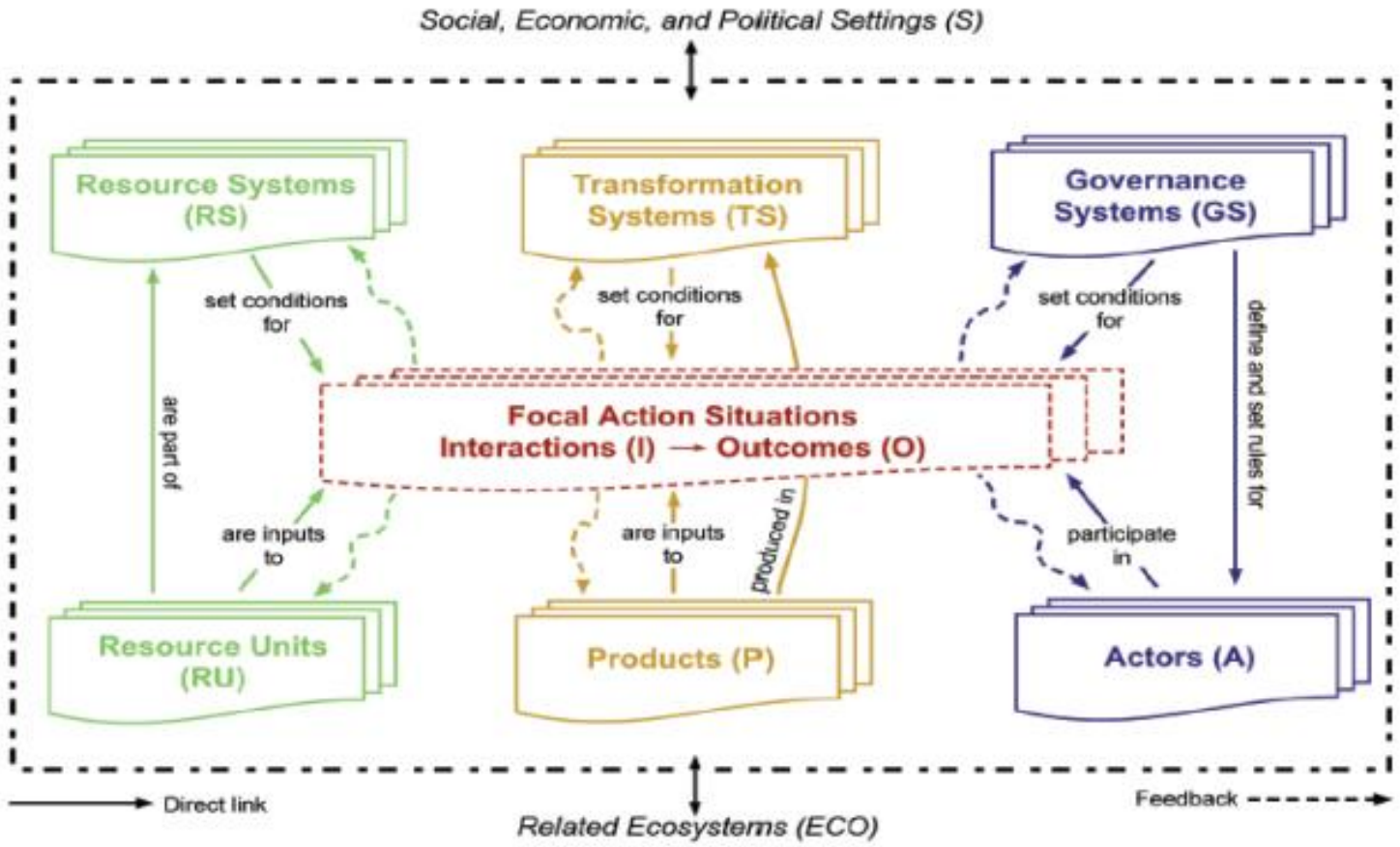
- Ostrom’s conceptual framework : Socio Ecological Systems

Ostrom’s conceptual framework for farming systems

Key Terminology

- **Socio-Ecological System (SES)**
  - *Defined as "an integrated complex system that includes social (human) and ecological (biophysical) subsystems in a two-way feedback relationship" (Ostrom, 2009; Berkes et al. 2011).*
  - *SES is a holistic transdisciplinary approach proposed to analyse how interacting sub-systems influence a given situation ("Focal Action Situation").*

Ostrom's SES



Social-ecological system (SES) framework (Source: McGinnis Ostrom, 2010, revised by Marshall, 2015)

SES and agriculture

- **To adapt and use SES in UNISECO :**
  - Integrated Marshall's proposal to consider the transformation and products sub-systems - rather considering the agricultural production part only.
  - Adapted the approach of SES sub-systems to the specificities of agriculture - e. g. resource systems correspond to farming system in UNISECO, and biodiversity is not considered as a resource unit but as an outcome;
  - Modified some variables in each sub-system and simplified as far as possible the variables;
  - Specified the purpose of each variable within agricultural context

SES and agriculture

Approach of SES sub-system	Objective/core questions for UNISECO
Focal Action Situation = Interactions (I) + Outcomes (O) environmental, social and economic performances and impacts	What are the agro-ecological performances of concerned farming systems? What are their transition pattern, their drivers and barriers?
Resource systems (RS) : farming systems (from conventional to agro-ecological ones)	How are farming systems organized and managed? - *all types of agriculture*
Resource unit (RU) : agricultural productions of the resource systems (RS)	What are the different factors of production and agricultural productions (*at farm gate*)
Actors (A) : e.g farmers or environmental NGOs, state representatives, …	Who are the actors involved in agricultural governmance? Who are the major actors able to influence the system?
Governance (GS) : strategic decision-making bodies	What are the main governance systems? What are the main decision-making processes?
Transformation systems (TS) : secondary and tertiary transformation processes	How do the food systems work? Are farmers the main beneficiaries of the added value?
Products (P) : generated by processes in TS	What are the final marketed products?
Social, economic and political settings (S)	Reference to the general context

Development of typology for UNISECO

AEFS typology for UNISECO

- **Typology for UNISECO**
  - Build on development of earlier typologies
  - Recognising farming systems as an SES
  - Transitions from conventional farming systems to sustainable farming systems are non-linear and complex
  - Able to describe existing non-conventional farming systems in a way that they can be compared
  - Multi-dimensional typology
    - Conventional farm typology
    - AES practices
    - CES context

AEFS typology

- **First dimension -** common farming typology
  - Farm Accountancy Data Network = FADN
- **Second dimension** - AEF practices
  - Management of soil and water
  - Management of pest and diseases
  - Spatial & temporal diversity in production elements
  - Inclusion and diversity of semi-natural/non-productive elements
  - Role/integration of livestock

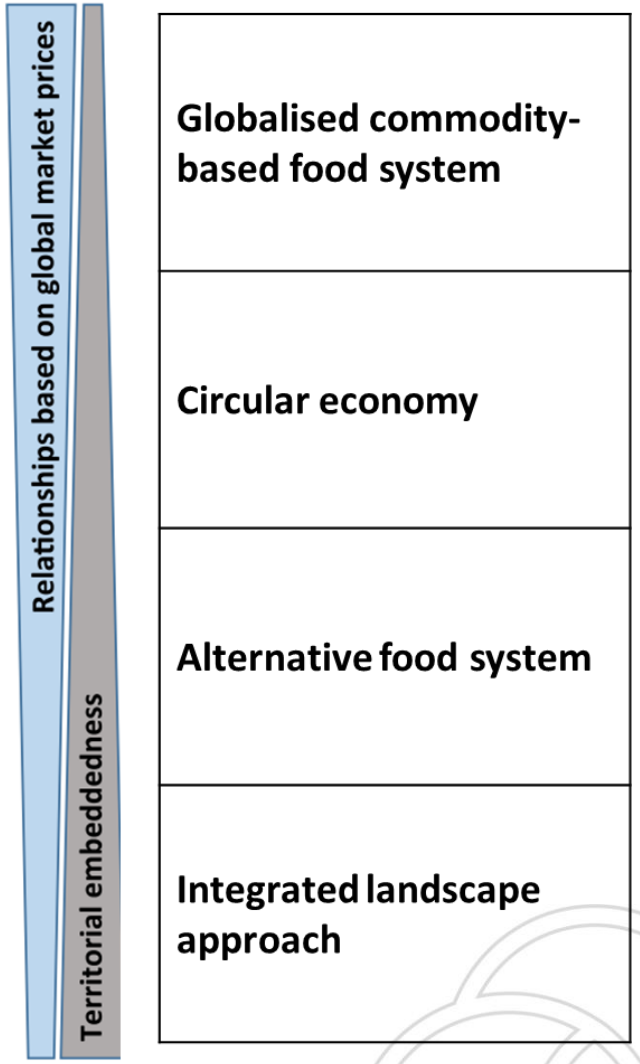
AEFS typology

- Typology of AEF practices in relation to conventional / standard practices
  - Efficiency – increase input efficiency
  - Substitution – replace chemical for organic inputs
  - Redesign
- AEF practices by scale of application
  - Field level: tillage, crop fertilisation and irrigation
  - Farm level : crop choice, spatial and temporal distribution, management of weed, pest and disease
  - Landscape level : management of landscape elements

AEFS typology

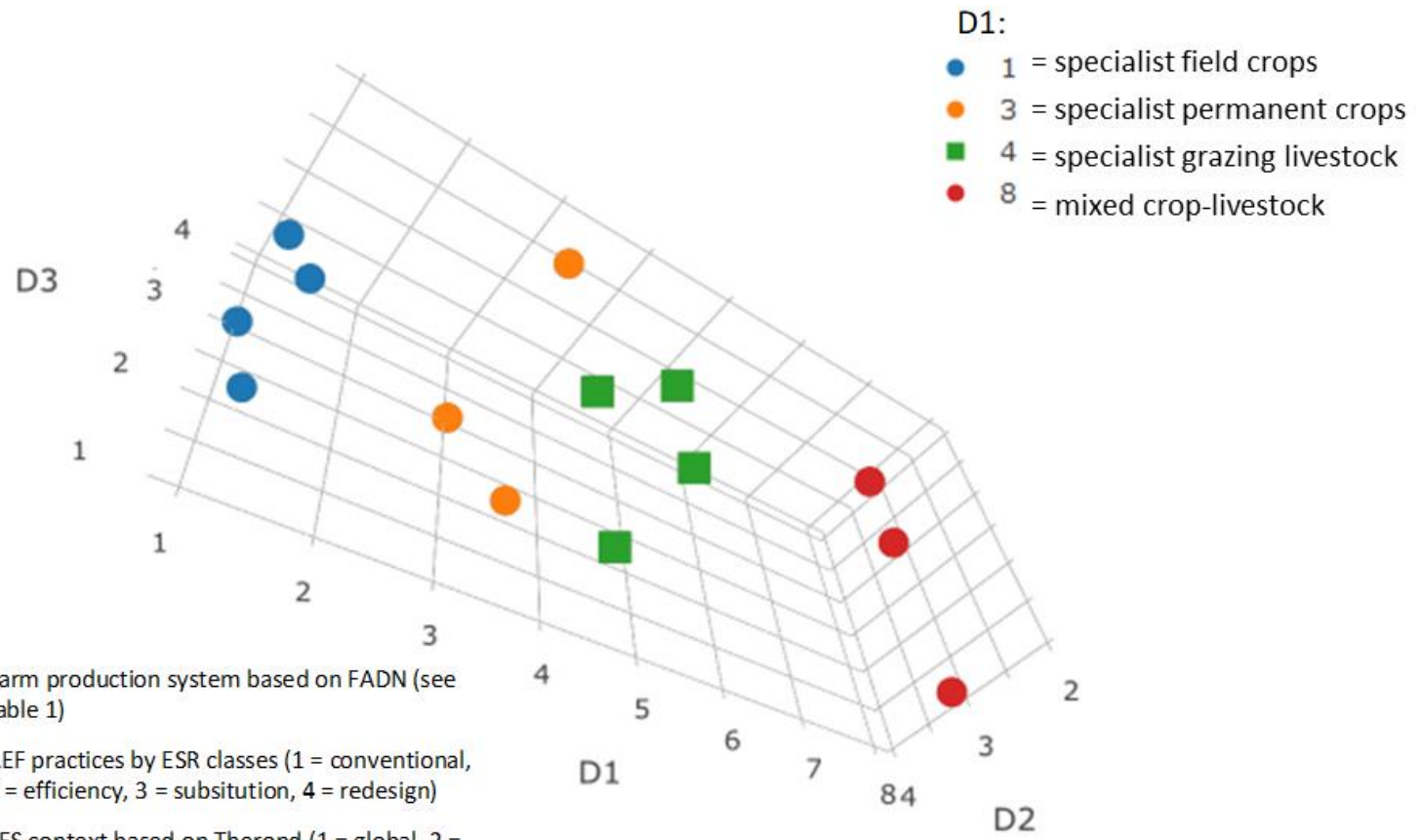
- **Third dimension** - SES context
  - Food system
  - Cooperation
  - Governance
  - Multifunctionality

  - INRA - Agro-ecological transition towards sustainable agriculture (Therond et al, 2017)



Therond et al (2017)

Three dimensional typology



D1 = Farm production system based on FADN (see table 1)

D2 = AEF practices by ESR classes (1 = conventional, 2 = efficiency, 3 = subsitution, **4** = redesign)

D3 = SES context based on Therond (1 = global, 2 = circular economy, 3 = alternative food system, **4** = integrated landscapes)

Final Comments

- Agricultural transition pathways towards sustainability are ‘non-lineair’
- The value of Ostrom for the assessment of farming systems – farming systems as part of a food system
- Implications for the farming system typology

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