RÉPUBLIQUE FRANÇAISE
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INRAE

Bioeconomy for urban areas

MOSAIC

Consortium
2020-2021

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MetabOlism of agricultural and food systems in the city-hinterland continuum

> Material and energy flows between town and country, questioning agri-food systems: relocation, non-food uses of biomass, opposing soil artificialisation, etc.

Bioeconomic strategies imply using technological innovations (in the broad sense of the term) to intensify and diversify the uses of biomass, particularly agricultural biomass (products and co-products). For researchers, the aims of the bioeconomy raise the question of the capacity of ecological systems and natural resources to support economic activity and to renew themselves. In parallel, they raise the question of trade-offs in the allocation of resources (food vs. energy; feed vs. food, etc.), between spaces, between uses, and between users. The challenge is to understand the interactions between the activities that produce, process, value and consume biomass in a systemic rather than sectoral way, and to account for the dynamics of the water, energy and land resources that underpin these activities.

Progress and results

The MOSAIC project examined the flow of materials and energy between the town and the countryside, in a context In which agri-food systems are being called into question: relocation, non-food uses of biomass, the fight against soil artificialisation, and so on. A series of 3 distance (online) seminars was organised, showcasing a diversity of work and approaches and initiating exchange of knowledge between researchers.

The seminars were followed by a week-long collective writing workshop. The final article "Flow approaches in agrifood systems research: Revealing blind spots to support social-ecological transformation" has been submitted for publication. Starting from the premise that approaches based on flows are increasingly used to respond to the challenges posed by the ecological crisis, the article points out the limitations and biases of these approaches in providing practical support for the transition of agri-food systems (decontextualization effects, failure to account for the complexity of production systems, weak link with issues of governance and environmental justice, among others). These weaknesses are illustrated by concrete examples drawn from the case of Brussels and other European cities. A number of avenues for research are highlighted.

The work carried out by the MOSAIC consortium has identified a number of models for studying city-hinterland relations and research fronts to render 'flow' approaches (social metabolism, life cycle analysis, footprints) more effective in transforming agri-food systems.

Coordination
Sandrine Allain (UMR LESSEM)
sandrine.allain@inrae.fr

Keywords
Bioeconomy
Flow
Urban metabolism
Nexus WEFE
Water energy food environment
Urban / periurban area

INRAE departments
ACT
AGROECOSYSTEM
AQUA
TRANSFORM

MOSAIC: Overview of achievements in 2021

An inter-INRAE division consortium

ACT : S. Allain, S. Madelrieux, M. Moraine, J. Wohlfahrt
Agroecosystem : O. Therond
Aqua : O. Barreteau
Transform : A. Trémier, L. Aissani

Speakers brought together at 3 seminars

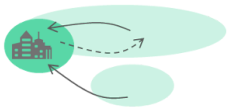
Spring
G. Billen, JB Bahers, C. Petit, S. Fernandez, R. Barbier

Summer
L. Verharghe, A. Athanassiadis, A. Papangelou, S. de Muynck, R. Lombard-Latune, F. Esculier, Morel et L. Boros, L. Aissani

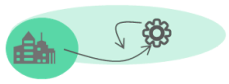
Autumn
P. Guillemin, J. Vayssière, P. Brémond

SEVERAL APPROACHES TO CITY-LAND RELATIONS

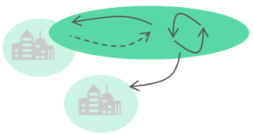
Via supply and consumption systems (food, water)



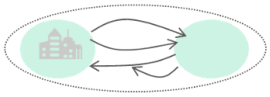
Sociotechnical systems for recycling (organic waste, wastewater)

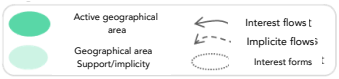


Via (agricultural) production systems



Via the forms of interaction between territories





Via footprints and externalities (environmental, vulnerability)

STUDY MODELS

- Island territories
- Major European conurbations (Paris, Brussels)
- Medium-sized cities (Rennes, Nantes)
- Production basins

COMPLEMENTARY OBJECTIVES

- Characterise and quantify flows and identify their determining factors
- Understand the dynamics of securing strategic resources and of creating/displacing vulnerabilities
- Highlight and modify impacts and footprints
- Design, evaluate and implement innovative

Partners

INRAE Division	INRAE research units	Expertise and contributions
ACT	UR LESSEM	Ecological economics, system agronomy
	UR LAE	Integrated modelling
	UMR INNOVATION	System agronomy (theme: food)
AGROECOSYSTEM	UR LAE	Integrated modelling
AQUA	UMR G-EAU	Water science
TRANSFORM	UR OPAALE	Bioengineering, environmental engineering, environmental assessment, systems approach (waste & co-products)

Contact
better@inrae.fr