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INRAE

Bioeconomy for urban areas

Consortium
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CIRCUTEIO

CIRCular economy models in Urban TErritories: what transitions toward a BIOeconomy?

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AQUA
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> Compare and articulate a comprehensive approach to the bioeconomic transition combining field observations and modelling

In 2018, the European Union revised its bioeconomy strategy, to focus on developing the circular economy (CE) as an alternative to the linear economy that can reduce resource dependency and waste management costs. Given the projected growth of urban systems and the associated demand for food, energy, water as well as increased waste production, developing these sectors based on the principles of the circular economy is a major challenge, but also an opportunity for ecological transition for cities and their surrounding areas. The challenge to developing a CE is that waste management will change production models, particularly in favour of the use of secondary resources. It is thus essential to identify the technical, economic, social and political components which contribute to the diversity of the models, and to study whether such diversity will manifest itself in the form of confrontation, competition or porosity, or even hybridisation, of the models.

Progress and results

The Circutebio consortium received support from the metaprogramme BETTER MP for two years in 2021 and 2022. Initially made up of around 20 researchers, the consortium's actions were based on the active involvement of around ten researchers and the occasional, targeted mobilisation of the consortium's second component. The aim of the consortium, which was particularly heterogeneous in terms of disciplinary and thematic skills and with a significant SHS component, was to increasing interdisciplinarity within the SHS but also between the SHS and biotechnical sciences and modelling approaches. The members of the consortium undertook to draft a position paper based on the two cross-cutting issues presented below and developed collectively:

1) The processes involved in transforming waste and biowaste into resources are complex, interdependent and long-term. By focusing on the processes by which waste becomes a resource and vice versa, the distinction between waste and biowaste becomes secondary.
2) On the scale of an urban system, these processes combine regulatory, technical and socio-economic dimensions which define physical, technological and institutional trajectories that require elucidation. Who are the players involved in defining/appropriating regulations at

local level? Do they represent a diversity of value systems that could lead to confrontation and/or inequalities in environmental effort and transformation? What role(s) do Life Cycler Assessment (LCA) and infrastructures play a role in defining/valuing the qualities that support the development of a circular bioeconomy that is not uniform?

Collective drafting of a position paper proposing an interdisciplinary reading of the diversity and hybridisation of circular economy models. While inspired by the analysis of economic models in institutional economics, the aim is to conceive an interdisciplinary theoretical proposal that updates the range of possibilities and goes beyond the limits of individualist or holistic approaches and methods that specialise in a single type of waste and/or resource.

Interdisciplinary exploratory survey of the economic research, political science, and modelling required before drafting the position paper. The survey was carried out at the Gardanne site (France), whose industrial history has led some players to describe the area as an intermediate zone, or even a "garbage" area. The survey included archival work and semi-structured interviews with socio-economic players in the circular economy in Gardanne (France), the PACA (Provence-Alpes-Côte d'Azur, France) region and the Aix-Marseille community (France). It was conducted between June 2022 and February 2023, with the support of a Master 2 intern In the summer of 2022. The results of the survey were used to test and refine the working group's hypotheses, particularly those concerning the structuring components and trajectories of circular economy models.

Advancing more specific interdisciplinary work between political economy and modelling to address the issue of the coexistence and hybridisation of different circular economy models and the contribution of these dynamics to socio-ecological transitions. A thesis project combining modelling and institutional economics will support this research objective.

The consortium benefited from the support of 4 trainees, 2 of whom were funded by Circutebio.

Partners

INRAE division	INRAE research units	Expertise and contributions
AQUA	UR ETBX	Sociology, urban waste policy
ECOSOCIO	UR ETBX	Institutional economics of bioeconomic sectors, sociology, environmental justice, political science, political economy of the forest, geography, analysis of socio-technical systems, economics, network analysis, etc.
MATHNUM	UR LISC	Simulation of social systems
TRANSFORM	UR OPAALE	Technical, environmental and spatial optimisation of residual biomass, recovery processes
Partner	**Research team**	**Expertise and contributions**
NEOMA BS	Chair of Industrial Bioeconomy	Economics, study of transitions
Paris 8 University	Ladyss	Economy, bioeconomy
URCA		Economics, bioeconomics, sociology

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