

Session theme – Forum Innovation 2025

Biogas Production in Agriculture: Innovation Pathways and Ecological Transition

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Description of the theme:

The ecological crisis is prompting us to rethink our development and growth models, encouraging the shift toward a post-oil society built on the bioeconomy (Debref et al., 2022). Promoted as a vector of promise and circularity by major institutions such as the European Commission, which has introduced roadmaps influencing innovation trajectories (European Commission, 2018), the bioeconomy gives rise to diverse and sometimes conflicting visions (Vivien et al., 2019). These tensions are particularly salient in the agricultural sector.

Anaerobic digestion (AD) has emerged since the 2000s as a key artifact of this transition. Unlike large-scale biorefineries—which require centralized infrastructures and reflect the convergence of energy, (bio)chemical, and agricultural regimes (Bauer, 2018; Schieb et al., 2015)—AD is implemented directly on farms, offering additional income while reshaping agricultural production systems (Berthe et al., 2022). However, its deployment reveals strong asymmetries and evolving tensions between farmers and industrial players: conflicting objectives, divergent governance structures, and differing visions of what constitutes a sustainable energy model.

Public policies and incentive schemes have strongly shaped the development of the sector, often encouraging a productivist logic while raising questions about long-term resilience. Although AD is now embedded within ecological transition narratives and promoted as a decarbonization strategy (Bourdin et al., 2024; D’Adamo et al., 2021; Lindfors et al., 2020), it operates along a broad spectrum—from energy sobriety models to industrial energy production—while its actual environmental and social impacts remain unevenly documented and are still evolving (Dziebowski et al., 2023).

This special session aims to:

- Analyze the socio-economic, ecological, and political challenges of anaerobic digestion deployment;
- Identify the diversity of business models at play (e.g., agroecology, productivism, hybrid approaches);

- Investigate the transformation of sectoral innovation systems;
- Examine the evolving relationships between farmers, industrial actors, and institutions;
- Question whether anaerobic digestion supports a true ecological transition or merely facilitates an energy transition;
- Reflect on the long-term viability of the biogas sector in the context of shifting public policies and farmer autonomy.

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