



**AgEcon** SEARCH  
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search  
<http://ageconsearch.umn.edu>  
[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

CONTESTING BIOECONOMIC IMAGINATIONS OF  
“MANURE FUTURES”: PRESERVATION, MODERNIZATION,  
AND TRANSFORMATION

Jonathan Friedrich & Jana Zscheischler

jonathan.friedrich@zalf.de

Leibniz Centre for Agricultural Landscape Research (ZALF), Müncheberg,  
Germany



2021

*Posterpräsentation anlässlich der 61. Jahrestagung der GEWISOLA  
(Gesellschaft für Wirtschafts- und Sozialwissenschaften des Landbaues e.V.)*

*1. „Transformationsprozesse im Agrar- und Ernährungssystem:  
Herausforderungen für die Wirtschafts- und Sozialwissenschaften,  
22. bis 24. September 2021*

Copyright 2021 by authors. All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies.

# CONTESTING BIOECONOMIC IMAGINATIONS OF “MANURE FUTURES”: PRESERVATION, MODERNIZATION, AND TRANSFORMATION

## Abstract

The current agricultural production systems with their multiple negative impacts on socio-ecological systems led to multiple crises, specifying the need for change. The German livestock production is one exemplary sector that heavily contributes to these negative effects by amongst others producing a surplus of manure that can lead to the eutrophication of water bodies. Thus, actors are seeking for innovative solutions to this issue, which differ in terms of their underlying conceptualizations and involved imaginations of a desirable future. Based on semi-structured interviews with twelve different actors, this study explores the imaginations of the future that shape contesting ideas out of the nitrous surplus. Results show three different development trajectories, namely “preservation”, “modernization” and, “transformation”, including different and often antagonistic imaginations that need to be discussed and moderated as drivers for change.

## Keywords

Sustainability, livestock system, socio-technical innovation, conflicts

## 1 Introduction

Sustainability is a normative concept and orientation for development (SCHNEIDER ET AL. 2019). However, what sustainability means and what current and future states of ecologic, economic and social development are included in this concept are under dispute as the future is uncertain and can only be imagined. Thus, these imaginations of the future are playing a key role in shaping current social practices and sociomaterial structures of sustainability (ADLOFF and NECKEL 2019; BECKERT 2018; JASANOFF 2015). ADLOFF and NECKEL (2019) developed a theoretical framework to grasp different trajectories of present and future sustainable development in relation to social practices and mutually dependent sociomaterial structures. Still, their framework has to be substantiated with empirical case studies, proving the trajectories “modernization”, “transformation”, and “control”. The aim of this study is to use the German livestock system and its manure surplus as a case study in which these trajectories including their imaginations, practices and dependent structures become tangible. The current livestock system is characterized by manifold unsustainable practices, including high emissions of methane and nitrous oxides contributing to climate change, nitrate surpluses polluting water bodies and leading to eutrophication, precarious working conditions in the meat processing industry and poor animal welfare raising questions on ethical responsibility, as well as tele-coupled effects of land-use change for fodder production are undermining indigenous land rights (FRIEDRICH ET AL. 2021a; 2021b; TILMAN and CLARK, 2014). Among these complex entanglements, manure and nutrient surpluses are the most perceptible symptom of this unsustainable system as odour is well known to neighbours and eutrophication threatens biodiversity and drinking water quality leading to high costs of denitrification among water suppliers. Recently, bioeconomic innovations have been and are being developed that aim in contributing to a more sustainable manure usage (FRIEDRICH ET AL. 2021a). However, not only these, but also other actors are constituting the contemporary system, thereby (re-)producing practices and structures. This study engages with both these actor groups by asking which imagined (sustainable) manure future shapes which practices and mutually dependent structures. This allows to uncover how future imaginations of manure shape present practices

and structures in the agrifood-system, and thus exemplarily, how societies deal with specific environmental issues.

## 2 Empirical Methods and Results

To answer these questions, we chose a qualitative approach that combines deductive and inductive category development among twelve problem-centred interviews. Our attempt was to identify contesting imaginations of how manure is dealt with. We thus identified bioeconomic innovation actors using online research and further actors building on the idea of the multi-level-perspective and the socio-technical regime, which is described by amongst others, consumers, policy actors and NGOs (cf. GEELS and SCHOT 2007). Further actors were identified using snowball sampling (REED ET AL. 2009). Interviews have been analysed using software (MAXQDA) and applying type-building qualitative content analysis (KUCKARTZ 2018). We followed the proposed trajectories of ADLOFF and NECKEL (2019) by building our types. Additional types/trajectories have been identified using “polythetic type building” (KUCKARTZ 2018; see Table 1 for results and attribute space). Table 1 briefly describes the ideal-types “preservation”, “modernization” and “transformation”, their framing of manure and the manure problem, the consecutive imaginations and therein embedded social practices and sociomaterial structures of how different actors ought to deal with manure in the present and future.

**Table 1: Ideal types of “preservation”, “modernization” and “transformation”, and characteristics of attribute space**

Attribute space/ Trajectory	Preservation	Modernization	Transformation
Manure problem frame	Legal rules of application; other actors are responsible; no manure problem (anymore)	Stakeholder interest; deregulation, globalization, nitrogen cycle, legal rules of application	Integrative: usage of manure; environmental issues; nitrogen cycle and planetary boundaries; deregulation; globalization; social consumption
Manure frame	Resource, fertilizer	Recyclable material, resource, fertilizer	Resource; fertilizer; “environmental disaster”
Imaginations	(Economic) growth, preservation of status quo	Green growth, technological fix/faith in technological progress, sustainability through spatial decoupling and closing the loop	Fundamental transformation; changed human-nature relationship; challenging economic growth (dystopia)
Practices	Free market; innovations: transport and recycling; politics that are reliable for farmers	Innovations: recycling, circularity; free market; labels of sustainability; political support for innovations; science-based practices	Innovations: circular, recycling; consumption practices (sufficiency); cultural change; regulations/laws
Structures	Preservation of existing structures	Adaptation of existing structures; structural support for innovations	Structural change to preserve the value of nature; small-scale agriculture

## 3 Discussion and Conclusion

Results show that different ideas of how to deal with the manure issue among different actors exist. The identified imaginations are closely intertwined with the manure problem frame, as e.g., an integrative framing of the origins of the issue leads to a more diverse set of imaginations accordingly. This also determines the way of how actors define and imagine what practices and mutually dependent structures need to be changed. In contrast to ADLOFF and NECKEL (2019), we identified the additional trajectory “preservation” for the case of manure while a “control” trajectory such as presented in their conceptual framework has not been identified. Table 1 presents ideal-types, which means that the individual imaginations, practices and structures of interviewees are consequently overlapping and complementing each other in practice. Still, currently developed bioeconomic innovations and their potential to solve the issues attributed to the case of manure are under dispute in society and may even be viewed as competing with

already established innovations. As the introduction of bioeconomic innovations could lead to new goal conflicts or path dependencies (FRIEDRICH ET AL. 2021a), it appears promising to further investigate competing imaginations in society and to moderate these imaginations as drivers for change towards a sustainable agrifood-system.

## References

- ADLOFF, F., and NECKEL, S. (2019): Futures of Sustainability as modernization, transformation, and control: a conceptual framework. *Sustainability Science* 14(4): 1015-1025.
- BECKERT, J. (2018): Imaginierte Zukunft: Fiktionale Erwartungen und die Dynamik des Kapitalismus. *Suhrkamp*.
- FRIEDRICH, J., BUNKER, I., UTHES, S., ZSCHEISCHLER, J. (2021a): The Potential of bioeconomic innovations to contribute to a social- ecological Transformation – A case study in the livestock system. *Journal of Agricultural and Environmental Ethics* 34 (24).
- FRIEDRICH, J., ZSCHEISCHLER, J., FAUST, H. (2021b): Social-ecological transformation and Covid-19: the need to revisit working-class environmentalism. *GAIA – Ecologic Perspectives for Science and Society* 30(1): 18-22.
- GEELS, F.W., and SCHOT, J. (2007): Typology of sociotechnical transition pathways. *Research Policy* 36(3): 399–417.
- JASANOFF, S. (2015): Future Imperfect: Science, technology, and the Imaginations of Modernity. In: Jasanoff (ed.) *Dreamscapes of Modernity. Sociotechnical imaginaries and the fabrication of power*. *University of Chicago Press*.
- KUCKARTZ, U. (2018): Qualitative Inhaltsanalyse. Methoden, Praxis, Computerunterstützung. *Beltz Juventa*.
- REED, M.S., GRAVES, A., DANDY, N., POSTHUMUS, H., HUBACEK, K., MORRIS, J., PRELL, C., QUINN, C.H., STRINGER, L.C. (2009): Who's in and why? A typology of stakeholder analysis methods for natural resource management. *Journal of environmental management* 90(5): 1933–1949.
- SCHNEIDER, F., KLÄY, A., ZIMMERMANN, A.B., BUSER, T., INGHALLS, M., MESSERLI, P. (2019): How can science support the 2030 Agenda for Sustainable Development? Four tasks to tackle the normative dimension of sustainability. *Sustainability Science* 14(6): 1593-1604.
- TILMAN, D., and CLARK, M. (2014): Global diets link environmental sustainability and human health. *Nature* 515(7528): 518–522.