Chapter 18

Conclusions and Research Perspectives

**Thomas Weith, Tim Barkmann, Nadin Gaasch, Sebastian Rogga,
Christian Strauß, and Jana Zscheischler**

18.1 Problems and Challenges

The previous chapters and articles in this book present not only a wide variety of challenges with regard to the sustainable use of land, but also a vast array of possible solutions. Without claiming to give an exhaustive overview, these possibilities are pooled and further developed by the editors in this concluding chapter. On the whole, emphasis is given to the aspiration described in the introduction for further developing current forms of land management as governance of land in the European context,

T. Weith (✉)

Institute of Environmental Science and Geography, University of Potsdam, Campus-Golm,
Karl-Liebknecht-Str. 24-25, 14476 Potsdam, Germany

e-mail: Thomas.Weith@zalf.de

T. Barkmann · C. Strauß

Research Area 'Land Use and Governance', Leibniz Centre for Agricultural Landscape Research,
Eberswalder Str. 84, 15374 Müncheberg, Germany

e-mail: timbarkmann@gmx.de

C. Strauß

e-mail: Christian_Strauss@gmx.de

N. Gaasch

Science Management and Transfer, Potsdam Institute for Climate Impact Research,
Telegraphenberg A31, 14473 Potsdam, Germany

e-mail: nadin.gaasch@pik-potsdam.de

S. Rogga

Leibniz Centre for Agricultural Landscape Research, Eberswalder Str. 84, 15374 Müncheberg,
Germany

e-mail: Sebastian.Rogga@zalf.de

T. Weith · J. Zscheischler

Working Group "Co-Design of Change and Innovation", Leibniz Centre for Agricultural
Landscape Research, Eberswalder Str. 84, 15374 Müncheberg, Germany

e-mail: Jana.Zscheischler@zalf.de

simultaneously taking up and implementing the conceptual approach of co-design formulated at the start of the book in a variety of forms.

All of the authors who contributed to this volume stress that the current use of land, and combined functions and ecosystem services, cannot be described as sustainable. The limited space and the services provided by land for society are being handled in a way that will make it difficult for future generations in particular to use them sustainably in a better way (García-Martín et al.). As urbanisation processes progress, more and more land is used for settlement and infrastructure, leading to an irreversible loss of soils (Haber). In addition, agricultural and forestry land is also being damaged by erosion and leaching (Haber; Nuissl & Siedentop). At the same time, there is a large-scale loss of biodiversity, and landscapes lose their character as multifunctional cultural landscapes, due in part to fragmentation and to focusing on a one-sided use of land (García-Martín et al.).

Yet changes and burdens do not occur consistently across the whole area. Rather, they are characterised by a patchwork of the considerable intensification of use in the context of agricultural intensification, urbanisation and a strong demand for land in specific places, with a simultaneous abandonment of land and extensification elsewhere (García-Martín et al.; Doernberg & Weith.) It is not only this concurrence of opposing developments that makes it so difficult to develop suitable responses. There are also diverse functional and spatial linkages (see also “telecoupling”) that have an impact beyond the regional, national and European context, up to the international scale. These interrelations show connections to global developments such as economic globalisation processes and digitalisation. Added to this are often unforeseeable impacts of urbanisation, as well as shrinking processes, which cannot be represented by means of simple cause-and-effect relationships (Nuissl & Siedentop). The previously and currently emerging competition for land use and land use conflicts are therefore often very difficult to analyse fully due to their complexity, and it is difficult to draw distinctions between them, particularly with regard to spatial designation (e.g. urban, rural) (Kanning et al.).

While single conflicts such as between settlement development and protection of open space appear to be obvious, it is more difficult to identify interconnections in the case of agricultural biodiversity conservation (agriculture versus nature conservation?) or the promotion of sustainable energy use (Kirschke et al., Nuissl & Siedentop). In heterogeneous fields of impact such as demographic change, in fact, they are sometimes even impossible to determine (Hoffmann).

This is also the case because various contemporary governance activities that influence land use are responsible for creating land use conflicts to a large extent in the first place. For example, besides mitigating climate change, current energy transition policies also cause land use conflicts to a considerable extent, whether between different forms of use (wind energy) or within a particular use such as agriculture (food versus fuel) (García-Martín et al.). Often, these conflicts are only recognised early on in part due to the limited knowledge in connection with a lack of impact assessment (processes relating to land use conflicts). This is compounded by the fact that integrative perspectives reflecting the complexity of the matter are rarely implemented due to persistent interest-led perspectives focusing on specific sectors

(agricultural production, housing, optimising transport connections). For instance, there is a lack of adequate governance approaches for land that take into account the complexity of the challenges as given specific expression in Sustainable Development Goals such as Life on Land (15), and that integrate the diversity of the ecosystem services to be observed. For agricultural practices, for example, this would mean no longer prioritising particular economic products (commodity outputs), but simultaneously taking adequate account of the demand for additional ecosystem services (non-commodity outputs), taking full consideration of the diversity of the demand for land.

18.2 Sustainable Land Management—New Approaches

According to the authors who contributed to this book, previous paths have so far been unable to provide an adequate solution to the multitude of challenges and problems occurring in land use. For this reason, they propose new approaches that can be translated into a concept of sustainable land management that specifically integrates science and practice.

A central starting point in this regard is the early and comprehensive recognition of land use competition and conflicts, enabling synergetic solutions (in particular) to be found. The approaches developed in the process represent modules of sustainable land management as a conceptual idea that should relate to each other and be further elaborated. In spatial terms, both developments in urban and rural areas need to be considered (Kanning et al.). Such consideration often deeply contests how actors have managed land in the past.

In concrete terms, six linked approaches can be detected

- (1) Refining the focuses of analysis
- (2) Enhancing process and knowledge orientation
- (3) Redesigning processes of implementation
- (4) Naming and implementing concrete objectives
- (5) Defining institutional frameworks and, in particular, governance approaches
- (6) Further developing research activities in the interdisciplinary and transdisciplinary context

Refining the focuses of analysis

According to the contributors to this book, the first step to sustainable land management requires problem analysis that does sufficient justice to the complex challenges. Such analysis must particularly capture the wide variety of drivers behind land use demands and land use conflicts (García-Martín et al.). Besides general and supraregional factors such as the general demand for settlement areas, regional contexts must also be captured adequately. Place-based analysis (García-Martín et al.) is specifically requested. Such analysis should also include the views of local stakeholders

from the outset (Kanning et al., Zscheischler & Rogga), enabling the co-production of knowledge. Moreover, greater attention should be paid to indirect effects (Kirschke et al., Nuissl & Siedentop). For instance, the effects of urbanisation processes go far beyond urban areas, due to the induced traffic, the consumption of resources and the demographic/spatial pull effects, and can often only be recognised and detected after a considerable time lag (Hoffmann). For this reason, analyses should, if possible, be undertaken also empirically for prolonged periods of time, comparing regions (Hoffmann). In some cases, researchers are totally uncertain as to the key factors driving these developments, owing to the complexity of the cause-and-effect relationships. Long-term analyses would then at least enable the uncovering of blind spots, e.g. concerning the consequences of the impact of demographic change on land use that often cannot yet be assessed (Hoffmann).

In combination with follow-up activities undertaken in science and practice, this would also lead to an overall improvement of knowledge in the medium term. In general, however, there are often complaints about a lack of basic statistical data, as well as a lack of data on current land use and land use change (Hoffmann). Although geodata inventories and infrastructures have improved considerably in recent years, recording and monitoring options should be further improved in this area (Nuissl). At the same time, there is still, on the one hand, a lack of key basic data such as comprehensible surveys on ownership of land and property (Kirschke et al.), while, on the other, there is also a greater need for the stronger aggregation of empirical knowledge, culminating in enhanced impact models and concepts, also in combination with socio-economic analyses (e.g. lifestyle analysis: Hoffmann, Doernberg & Weith).

Enhancing process and knowledge orientation

The authors note that the development and implementation of sustainable land management should consider the specific design of change processes, paying particular attention to the generation and provision of different knowledge bases (co-production of knowledge).

Transdisciplinary processes in particular have a high potential for dealing with complex land use issues, where normative discourses, conflicting interests, sectoral as well as disciplinary viewpoints and different knowledge types are to be increasingly integrated in the search for co-designed sustainable solutions (Zscheischler; Zscheischler & Rogga). Such transdisciplinary processes can be supported by various conceptual and methodological approaches. The real world labs (as a research concept) and serious games (as a method) addressed in this book are just two possible approaches for generating better informed conclusions (Maaß, Kanning et al.). It is particularly important to enable practitioners to gain access to knowledge sharing processes and to view matters from the viewpoint of other stakeholders (Kanning et al.).

Since the demand for knowledge related to land use diverges, the forms of knowledge provision and sharing should also be diverse, but also manageable for the stakeholders involved (Pütz & Brassel). In particular, knowledge sharing in a

common problem area is often described as a great benefit in research and development processes. In this case, digitalisation may create possibilities for generating and sharing knowledge, and promote multiperspectivity (Schulz et al.). The development of digital infrastructures and learning formats enables this to take place anywhere (Schulz et al.).

Substantial bottlenecks are currently emerging in this connection, which must be overcome specifically in science and practice. In the world of science, in particular, there are few opportunities for the development of supra-disciplinary transformative research, due to the forces of inertia in discipline-based systems of reputation and communication (Zscheischler; Rogga). By contrast, practice often lacks the possibilities to test experimentally different options for action (protected experimental space). Another important aspect in this connection is external stimulating support, not only financial and organisational, but also with regard to competencies in process management.

Redesigning processes of implementation

The early involvement of different stakeholder groups also plays a vital role in the implementation of approaches towards sustainable land management with a new direction in content. In light of this, implementation and transfer should not only be “co-planned and thought out” from the very outset (Rogga), but additional resources should also be earmarked for this purpose. This calls for a changed understanding of co-dissemination that goes beyond the conventional paradigm of the loading dock (Rogga). That is to say, in line with a transdisciplinary basic approach, the different stakeholders and their views are included in the problem-solving process from the very beginning. In this connection, digitalisation processes may be understood as the creation of enabling spaces (Schulz et al.) that not only facilitate local and regional knowledge generation, but also support—globally and flexibly—the dissemination and adoption of knowledge. Several authors believe that this will result in a greater likelihood of the use and impact of new land management approaches, without being able to guarantee this, however (Rogga, Schulz et al.).

Naming and implementing concrete objectives

As is the case with any political process, the implementation of sustainable land management requires clear objectives. One particularly important aspect in this regard is linking efficiency and sufficiency goals that additionally include regionalised sustainable development goals. In the area of settlement development, for example, it is not only important to promote more inner urban development to optimise existing settlements, but also to stop, or at least reduce, the development of further land on the outskirts of the city (Nuissl & Siedentop). Failed incentive structures must also be addressed in this connection (Nuissl & Siedentop). Another important aspect is the systematic search for synergies of supposedly different land use demands in order to achieve multifunctional land use. Rewetted peatlands, for instance, need not automatically exclude economic function. Paludiculture is a way of merging the aspects of protection and utilisation. Intensified efforts should be made to achieve such combined solutions. They are easier to achieve in co-designed processes

in which supposedly opposing stakeholder groups assume joint responsibility for the intended integrated use at an early stage.

More importantly, land use conflicts will likely be managed much more efficiently on the basis of co-designed use and development processes than conventional decision processes in which conflicts are detected at a later stage, or specifically addressed at a later stage for the public.

Defining institutional frameworks and, in particular, governance approaches

In the context of European institutional frameworks, the outlined handling of different demands to land and of land use conflicts simultaneously suggests a specific understanding of governance. Building on regional political agenda setting (Nuissl & Siedentop; Fürst), the interaction of different stakeholder groups (collaboration) plays an important role. In this connection, the early coordination of activities as co-design, the involvement of civil society stakeholders (Nuissl & Siedentop) and the nomination of persons with regional responsibility (minders) are of particular importance.

System solutions at different scales should be sought (Heck). Where possible, the approaches take up existing production and governance systems, and take into account their inherent logics and structures. Different regulatory approaches (state-driven hierarchical, market-based, cooperative) interact in the process. It is also important that the specific governance approaches are suitable for establishing and developing decentralised network systems (Heck). In the process, local stakeholders must also be able to possess or acquire the relevant skills required for decision processes.

The conceptual approaches named include nature-based solutions, focusing on green infrastructures, greater consideration of ecosystem services, and a combination of these approaches (Haase). In light of this, consideration must be taken of developments in all communities of the city, on the urban fringe, and in rural regions, including also interlinkages on the regional scale (Doernberg & Weith) as well as the global scale (telecoupling) (Haase, Schulz et al.). This then also facilitates *de facto* sharing and even fair burden-sharing (Specht et al.). In consequence, this results in much more resilient solutions (Heck). Care should be taken that the different regulatory approaches do not hinder or obstruct each other (Kirschke et al.). Each approach should be assessed for effectiveness, particularly with regard to implementation, not least because of the complexity of the challenges and the spatial differentiation (Heck).

Knowledge management processes play a significant role in this respect. In the context of co-design processes, it is not only the involvement of regional know-how that plays a major role, but also regional values and the advancement of existing practices by initiating and continuing social learning processes (Nuissl & Siedentop) that address practical recommendations (Fürst). At the same time, it is evident that solutions based purely on the development and use of information and communication technologies, while often helpful and expandable, fall short of what is required, and only take effect in the process-related interactive interplay with key players (Fürst).

In addition, it is highly important to broach the subject of power structures when seeking to achieve sustainable land management. In land management processes, it is essential to illustrate which stakeholders currently have the opportunities to significantly manage land uses at present. It is also equally important to realise which changes may be necessary to make adaptations in keeping with sustainable land use in a bid to strike a better balance between different land use interests.

Current normative values are the core foundation of this. Overarching norms and values, such as justice, are the core foundation of target setting, assessment and development in land management. They need to be disclosed and presented for debate (Doernberg & Weith; Haase). The same should also apply to the question of ownership structures. However, this issue has only been raised rarely in the past, not least because of poor data availability. Yet it is considered an increasingly important component for sustainable land management in the current literature (above all Davy 2012).

Further developing research activities in the interdisciplinary and transdisciplinary context

In addition to the aforementioned approaches for implementing and advancing sustainable land management, the authors, with research in mind, make additional recommendations for action that go beyond the approaches addressed in the individual chapters.

First and foremost, they address the generation of additional knowledge bases with change processes in mind. The development of what is referred to as transformation knowledge (Zscheischler & Rogga) should accompany the further development of models and concepts for social innovations and transition processes. In the process, the gap between theoretical requirements and practical implementation, described repeatedly in the literature (e.g. Pohl and Hirsch-Hadorn 2008), should also be addressed at an early stage. This can be achieved by linking various approaches, where possible, to concrete real-world use cases, particularly in transdisciplinary settings (Zscheischler).

To ensure the design of such an approach is feasible in practice, scientific skills should focus more strongly on this aspect, whilst also proposing potential practical applications in collaboration with the various stakeholder groups (roadshows, Heck) or actively initiating them (*Dorfkern* companies, Heck).

18.3 Final Conclusion

The approaches to sustainable land management compiled in this book provide key building blocks for a new form of land governance that

- considers the use of land resources in an integrative rather than a sectoral manner, i.e. that is derived from concrete problems with reference to land, which society recognises as a problem, formulating a need for action accordingly,

- features strong process orientation, by way of co-design, since a state of sustainability will never finally be achieved, and the frameworks and normative objectives constantly change,
- is simultaneously oriented to options for change and innovation,
- strongly requires the use and further development of interdisciplinary and transdisciplinary approaches, due to the diversity of stakeholder perspectives,
- is designed in an evidence-based manner, due to its knowledge orientation, or in an evidence-informed manner with stakeholders in society in mind.

The aspects compiled here also reflect some of the research and development activities promoted in the Global Land Programme Science Plan (GLP 2015), not least because of the activities undertaken by the authors involved, and now provide their own contribution to the debate. Rather than constituting the one and only way forward in the European context, they provide building blocks for a continuously adaptive system of responses that can—and must—be adapted, depending on the problem, the location, and the type of land use concerned. They constitute a kind of mindset that requires the capacity for individual and collective reflection and learning beyond methodological and conceptual forms of access. Only then can multiple perspectives and approaches to problem solutions be further developed into new thought styles that enable negotiation processes to be undertaken on equal terms and socially robust solutions to be supported, gradually breaking old path dependencies.

Clearly, there cannot be a single stakeholder who is solely responsible for the implementation of such an approach. Even though the need for intermediaries, change agents and integration experts remains undisputed, especially with regard to professional process design, all those who have a direct or indirect influence on land use shall take greater responsibility for the development and implementation of sustainable land management within the meaning of co-management. The editors simultaneously view this as a form of practical implementation of the imperative of responsibility, as called for, philosophically speaking, by Hans Jonas more than three decades ago, and which is ultimately reflected today in the principle of intergenerational justice.

This book discusses issues and responses in a decidedly European context. From the editors' point of view, the analyses, concepts and methods presented can—and should—be increasingly examined with regard to their relevance and implementation capacity in a non-European context in the future. The non-sustainable use of land as practiced today is by no means an exclusively European problem. A number of responses have explicitly been developed within the “Sustainable Land Management” research programme, funded by the German Federal Ministry of Education and Research (BMBF), referred to several times in this book. A promising option for the future would be to gradually develop these responses into an integrated framework for assessing sustainable land management for policies, plans and programmes.

References

- Davy, B. (2012). *Land Policy*. New York: Routledge.
- Global Land Programme (GLP). (2015). Science plan and implementation strategy 2016–2021. Online: https://glp.earth/sites/default/files/uploads/glpscienceplan_25_10_16.pdf. Last accessed on January 30, 2020
- Pohl, C., & Hirsch Hadorn, G. (2008). Methodological challenges of transdisciplinary research. *Natures Sciences Societies*, 16, 111–121.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.