

Human-Environment Interactions 6

Jörg Niewöhner · Antje Bruns
Patrick Hostert · Tobias Krueger
Jonas Ø. Nielsen · Helmut Haberl
Christian Lauk · Juliana Lutz
Daniel Müller *Editors*

Land Use Competition

Ecological, Economic
and Social Perspectives

 Springer

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Human-Environment Interactions

VOLUME 6

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Cover Illustration: Steep terrace farming at the Yangtze River, China. Photo taken by Zhanli “Jerry” Sun

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Preface

The basis for this volume has been a two-week workshop at Humboldt-Universität zu Berlin in September 2014: the KOSMOS Summer University FutureLand, supported by Humboldt-Universität through funds from the German government's Excellence Initiative. Graduate students and postdocs from physical and human geography, agricultural economics, anthropology and sociology brought their thick knowledge and experience of particular cases, regions and phenomena to Humboldt's Anthropology Department Integrative Research Institute THESys (www.iri-thesys.org) to enter into conceptual debate with a series of renowned international keynote speakers. Conceptual sessions, keynote lectures and debates around empirical material made for busy and productive two weeks. I thank everyone who took part in this endeavour through input, organisation, advice or any other form of support. We hope that everyone learned at least as much as we did from the experience.

The graduate students and postdocs took the results of the debate back to their home departments and produced, over the course of a year and often in co-authorship with colleagues from their departments and their study regions, the series of chapters that you have in front of you. Reading through the volume as a whole, you will notice how far lead authors shifted from their original disciplinary speciality into a broader understanding and contextualisation of their respective cases. We hope that processes and texts like this will help to shape a new generation of scientists who insist on and develop their focused expertise while staying mindful and respectful of other perspectives and developing boundary concepts between different thought styles.

We also thank Wiebke Hampel for producing the typeset manuscript under severe time constraints and everyone involved at the Springer Publishing Company, particularly Fritz Schmuhl and Human-Environment Interactions series editor Emilio F. Moran, for their patient support.

Berlin, January 2016

Jörg Niewöhner

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Chapter 1

Land Use Competition: Ecological, Economic and Social Perspectives

Jörg Niewöhner, Antje Bruns, Helmut Haberl, Patrick Hostert, Tobias Krueger, Christian Lauk, Juliana Lutz, Daniel Müller and Jonas Ø. Nielsen

Abstract This chapter introduces competition as a heuristic concept to analyse how specific land use practices establish themselves against possible alternatives. We briefly outline the global importance of land use practices as the material and symbolic basis for people's livelihoods, particularly the provision of food security

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and well-being. We chart the development over time from research on land cover towards research on drivers of land use practices as part of an integrated land systems science. The increasingly spatially, temporally and functionally distributed nature of these drivers poses multiple challenges to research on land use practices. We propose the notion of ‘competition’ to respond to some of these challenges and to better understand how alternative land use practices are negotiated. We conceive of competition as a relational concept. Competition asks about agents in relation to each other, about the mode or the logic in which these relations are produced and about the material environments, practices and societal institutions through which they are mediated. While this has centrally to do with markets and prices, we deliberately open the concept to embrace more than economic perspectives. As such competition complements a broadening of analytical attention from the ‘who’, ‘what’ and ‘when’ to include prominently the ‘how’ and ‘why’ of particular land use practices and the question to whom this matters and ought to matter. We suggest that competition is an analytically productive concept, because it does not commit the analyst to a particular epistemological stance. It addresses reflexivity and feed-back, emergence and downward causation, history and response rates—concepts that all carry very different conceptual and analytical connotations in different disciplines. We propose to make these differences productive by putting them alongside each other through the notion of competition. Last not least, the heuristic lens of competition affords the combination of empirical and normative aspects, thus addressing land use practices in material, social and ethical terms.

Keywords Relational perspective · Land cover · Global change · Scaling · Interdisciplinarity

1.1 The Global Relevance of Land Use Practices

Land is essential for sustaining human existence and development on Earth. People’s livelihoods are largely land-based or are affected by land-based activities. People live on land and land provides them with food, energy and the material and symbolic basis for social–ecological development and welfare. Yet this utility derived from land and land use is highly unevenly distributed across the Earth’s surface—an uneven distribution that leads to ethically and ecologically untenable effects: human starvation and disease, irreversible damage to ecosystems and biodiversity, the permanent lack of energy to sustain a dignified everyday life.

In principle, the Earth’s surface provides enough land to sustain current and future generations. However, land is a limited resource and considered a planetary boundary. While most studies suggest that this boundary has not been reached (Rockström et al. 2009; Steffen et al. 2015), the pressure to use land efficiently and effectively is mounting. Yet what is considered efficient and effective use of land, what suitable, feasible or just, and for whom and on the basis of what kind of

evidence, experience or belief system, is anything but trivial. Alternative land uses therefore constantly compete with each other. The dynamics of these processes are increasing in speed, interconnectedness and complexity and are shifting for a number of reasons.

The demand for land is increasing as the world's population grows. The United Nations Department of Economic and Social Affairs has revised its median global demographic projection for 2100 to 11.2 billion people. Africa will likely exceed 4 billion people, thus almost catching up with Asia, and accounting for more than half of the population growth between 2015 and 2050 (United Nations 2015). Food consumption increasingly shifts to more livestock-based diets with higher resource demands (Kastner et al. 2012) New non-food uses have entered the arena, e.g. bioenergy, carbon storage, biodiversity conservation. And land has rapidly become a significant asset class for major investors such as pension and sovereign wealth funds. As a result, the number of actors competing for land and particular land uses has increased and land use competition has become part of global ecological, trade, finance, information and people flows. These flows are rapidly increasing in speed and number of participating agents and sites. Land use competition has thus become one of *the* central arenas within which the effects of global change on human–environment systems are negotiated.

Actual land use practices and their drivers are key to better understanding the dynamics in these arenas. Land use practices are highly local and for many people on this planet they are the very site of existential struggles to make a living (Martinez-Alier 2002). Yet they are at the same time highly embedded in a complex global network of driving forces, reaching from climate dynamics through financial flows to transnational trade networks or diasporic relations. It is in the everyday practices of competing over how land and land-based resources may—or should (not)—be used that the complex dynamics of human–environment relations crystallize. These changing practices in turn drive global environmental changes, e.g. in climate, biodiversity, and other realms, that again feedback on people and their livelihoods. Understanding these dynamics is a key challenge for science and governance alike.

1.2 Land: Matter, Markets and Meaning

Land is a biophysical entity. It has an Euclidian extent and biophysical properties. It can be categorized into types of land cover and mapped with different resolutions. Yet land is also used, owned and traded. It is territory and it is a good that can be commodified in various ways. It is a material resource and the basis for all kinds of productive activities and housing. It is often allocated to people, regulated and administered, but it is also often an open access resource or used in a variety of customary ways by individuals or groups without formal property rights. Last not least, land is a source of meaning. It is home, it is part of landscapes and it is symbolically loaded. It is an element of belief systems, religious or otherwise, and it

is an anchor for memories and heritage as well as for hopes and aspirations. Competing over the use of land thus takes many different forms.

1.2.1 From Land Cover to Global Change: The Loss of Innocence

The biophysical characteristics of the Earth's surface are classified into land cover classes. Increasingly fine-grained analyses of high-resolution remote sensing data deliver information about types of cover as well as the spatial and temporal dynamics of change (e.g. Hostert et al. 2015). These studies raise questions of land use that cannot be answered from data on land cover alone. Instead, land system science expands the research agenda integrating several natural sciences from physical geography to ecology, supported by a number of international research platforms (Gutman 2004; Verburg et al. 2013; Verburg et al. *in press*).

Land use dynamics, however, are shaped simultaneously by biophysical, ecological, economic and sociocultural drivers. Data and knowledge is needed on the actors involved in land use, their reasons for using land in particular ways and the rationales for decision-making. Large-scale changes in land use patterns over time are now linked to global trade and financial flows to demonstrate the increasingly complex interactions across the globe between changing demands, modes of production and distribution as well as land and resource use (Garrett et al. 2013; Lambin et al. 2001; Meyfroidt et al. 2013). Questions of governance of land use competition, i.e. of the mechanisms of achieving an efficient, legitimate and just distribution of access to and resources from land across people and time, have gained substantial attention (Verburg et al. *in press*). Increasingly, the role of environmental social sciences and humanities is considered to better contextualize biophysical and economic development within the relevant social and moral orders.

Land system science in this broad sense has become an integral part of global change research (Turner et al. 2007). This raises two major new challenges. Firstly, global change is fundamentally a societal issue. At its heart lies the question how people live together on this planet, how they organize production and consumption and the related resource flows (Fischer-Kowalski and Haberl 2007), how that affects land use (Krausmann et al. 2003; Kastner et al. 2012) and how all of this is changing. This question is fundamentally about the manifold entanglement of nature and culture and about the dynamics of human–environment relations (Palsson et al. 2013). The very framing of relevant research problems in this context already requires a multitude of disciplinary perspectives rooted in very different epistemological and ontological assumptions (O'Brien 2010). Conducting research in this area then requires a portfolio of methods operating on different spatial and temporal scales (Young et al. 2006). Yet knowledge from such vastly different methods and thought styles does not simply add up to an integrated whole. Instead, much research will be required on the intersections of these different approaches. The challenge is as much empirical as it is conceptual.

Secondly, research on the dynamics of human–environment relations under conditions of global change cannot be entirely disentangled from normative questions about how researchers think people *ought* to live together. This holds true for natural and social sciences alike and it has at least three consequences: (1) In order to understand each other, the empirical sciences need to work closely with the normative sciences, namely philosophy and law, particularly environmental ethics and political philosophy as well as international and environmental law. (2) Such collaborative research must not be a sequential endeavour, where a reality described by the natural sciences in a first step is evaluated in ethical terms thereafter. Rather a more symmetrical approach must entail an opening up and analysis of the normative and social theoretical assumptions inherent in empirical work. (3) Research on global change is seeking to intervene explicitly in the governance of the very change it is trying to understand and explain. This seems appropriate to many given that global change is a paradigmatic example of a “wicked problem” (Rittel and Webber 1973). The notion of transformation has been suggested to cover this duality of research to understand transformation and research to affect transformation (WBGU 2011). Such transformative research is explicitly working towards particular futures. Choosing one path towards a particular future over another can be informed by different kinds of empirical data and predictive models. Yet it is never determined by data. Value-laden choices abound in transformative research. They need to be explicated and assessed in their consequences with the help of the normative disciplines as well as through an opening up of the scientific community and its knowledge practices to civil society and policy-making. The co-production of knowledge between science and society to legitimate transformative research and ideally arrive at a shared ownership for a common world is the continuation of a long-standing critique of the ivory tower model of scientific expertise (Krueger et al. 2016).

1.3 The Case for Land Use Competition: Going Beyond Drivers

Research on the dynamics of land systems has begun to reframe its object of research in the context of global change. Patterns of land use practices are increasingly framed as the outcome of a complex web of driving forces that operate across many spatial and temporal scales. Within the land system science community, the concept of telecoupling has been put forward as a conceptual framework to deal with this increasingly spatially distributed and interactive nature of driving forces (Eakin et al. 2014; Liu et al. 2014). It has already been put to useful effect in focusing attention on connections that emerge between hitherto seemingly independent human–environment systems. Hence, it makes the analysis sensitive to connections that were not expected within the dominant framework of governance and it draws out new spatial configurations of sending and receiving systems

particularly in the context of rapidly changing urban–rural relations (Seto et al. 2012).

Yet the challenge of reconceptualizing land use change in the context of global change goes further (see also Friis et al. 2015):

- Metabolic aspects of land use practices and lifestyles need to be articulated, localized and quantified.
- Actor networks and their complex interactions and power relations need to be understood without losing sight of the material and ecological components of the dynamics.
- Driving forces can only be disentangled when the analysis explicitly considers the institutional and infrastructural contexts through which these forces are mediated.
- Better understanding of vertical and horizontal shifts in market integration is necessary to shed light on the effects of increasingly globalized value chains particularly in agricultural trade.
- The role of power, knowledge and agency is crucial in understanding shifts in control over land use decisions.
- A highly visible discussion about social–ecological notions of equity needs to be developed.

What is required is a process that brings into dialogue different epistemological frameworks and the expertise from economic geography, institutional analysis, ecological economics, political ecology, social ecology, environmental anthropology and ethics and integrated land change science (Chap. 2 and Sect. 1.1).

We propose ‘land use competition’ (Haberl 2015; Lambin and Meyfroidt 2011; Smith et al. 2010) as one concept that holds the potential to further this agenda. We begin by defining competition in simple terms: Competition occurs when two or more agents strive for a goal that only one can attain or that not all can attain to the desired degree. Competition unfolds in constellations where an increase in one agent’s ability or desire to attain that goal brings about a decrease in other agents’ ability to do so. Thus, competition refers to the mode of solving antagonisms between agents or processes in the production of social or material order.

Competition takes the focus beyond drivers of land use because it is inherently and explicitly a relational concept. Competition asks about agents in relation to each other, about the mode or the logic in which these relations are produced and about the societal institutions through which they are mediated. As such competition complements, a broadening of analytical attention from the ‘who’, ‘what’ and ‘when’ to includes prominently the ‘how’ and ‘why’ of particular land use practices and the question to whom this matters and ought to matter (Lambin and Geist 2007). Importantly, competition is principally indifferent to the type of agents that compete. They can be human actors, but need not be restricted to humans (Law and Hassard 1999). Discourses, policies, ideologies and knowledge about land use change may also be said to compete in the context of land use (Latour 2005). The nature of the competing agents will have an impact on the nature of competition, on