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Analysis

Prospects for sustainable land-use policy in Germany: Experimenting with a sustainability heuristic

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ABSTRACT

Land is an essential yet limited natural resource. Its current unsustainable use highlights the need for sustainability policies. In order to explore potential policy strategies, we use the concepts of stocks and durable institutions as tools for analysing temporal structures in nature and society. These concepts are incorporated into a heuristic aimed at reducing complexity and finding windows of opportunity for policy action. The heuristic is applied to current German land-use policy. We show that the German government is highly unlikely to achieve its declared sustainability goal to reduce the rate of land conversion to 30 ha/day by 2020. Analysis of the inherent dynamics of major stocks and institutions reveals that, even in a situation with stagnating or declining population, the inertia of institutions such as local municipal self-administration and the municipal financial system prevents the government's sustainability goals from being achieved.

1. Land Conversion as a Sustainability Policy Issue

We are currently witnessing a period of rapid transformation of natural and agricultural land into urbanised areas all over the world that is historically unprecedented. The environmental impacts of this process include widespread soil degradation, the disruption of water and material cycles, the fragmentation of habitats and, less directly, the detrimental consequences of a steep increase in motorised transport (Nortcliff, 2009). Overall, then, the problem of land use can be regarded as one of the key problems encountered in the quest for sustainability (MA, 2005).

Growing awareness of the potentially adverse environmental effects of land conversion has resulted in significant political efforts to develop sustainable land-use strategies. At the European level, for example, sustainable land use is notionally promoted by measures such as the Directive on Strategic Environmental Assessment, the European Landscape Convention, and the INSPIRE initiative (INfrastructure for SPatial InfoRmation in Europe). At the national level, the Federal government in Germany, for instance, resolved in 2002 to drastically reduce the rate of urbanisation of undeveloped land: The stated aim of its 'National Sustainability Strategy' is to reduce the rate of land transformation from its current rate of about 100 ha/day to just 30 ha/day by 2020 (Federal Government, 2002, 2008). Although not legally binding, this so-called '30-hectare goal' expresses a political intent of the Federal government to take steps towards more sustainable land use. It is not at all clear, however, how this goal can be achieved, given the current dynamics of economic activities and the inertia of the institutional framework in Germany.

The factors driving land conversion as well as its environmental impacts are multifarious, complex, and largely contingent on the specific circumstances and characteristics of the piece of land in question. Furthermore, there is no general agreement within the scientific community about the extent to which land conversion is desirable or undesirable (Johnson, 2001). This contingency makes it difficult to scientifically assess the problems associated with land conversion in general terms and on a large scale.[1] A thorough analysis of the problems associated with land conversion needs to take into account the dynamics and interactions of many different factors such as demography, legal regulations, economic interests and incentives. Scientific approaches typically concentrate on just one or a few of these factors and investigate their function, impact and temporal dynamics in detail (Bell, 2005). What is needed for

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[1] At any rate, there seem to be a consensus in Germany that the current rate of conversion is not sustainable.

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a macro-analysis of the 30-hectare goal in Germany, however, is an approach that focuses on the broader trends and provides an overall picture of land transformation over a period of, say, 10 to 50 years.

2. A Heuristic Approach to Analyse Land Conversion

Against this background, we investigate in this paper the prospects of the German government for achieving its ambitious 30-hectare goal, and what obstacles it is likely to encounter along the way. We argue that the success (or otherwise) of such sustainable development policies depends to a large extent on the feasibility of overcoming the durable structures that exist in both nature and society which may impede the realisation of sustainability goals. To create an overall picture of the problem we use a heuristic framework developed elsewhere by the authors (Klauer et al., 2013a, 2013b). This sustainability heuristic has been developed as a means to generate an overview of any set of diffuse problems for which a long-term perspective is necessary.

In Klauer et al. (2013b), we have argued on the basis of Kant (2000) that there exists a fundamental difference in the structure of arguing between practical action and decision making in politics on the one hand and scientific reasoning on the other hand. Practical action makes it necessary to put abstract and general scientific knowledge into the context of its contingent circumstances. Such knowledge transformation processes, which for example take place in a scientific consultation, need power of judgement. Kant defines power of judgement as the capacity of a person to apply general rules to specific situations. As a consequence of its nature as a personal ability, decisions in practical action cannot be logically deduced from general postulates. Therefore, they are never without ambiguity and can always be debated. In addition, Klauer et al. (2013b) discuss that power of judgement proceeds heuristically, i.e., makes use of general procedural rules to guide decisions.

It follows from this that the application of the sustainability heuristics of Klauer et al. to the problem of land conversion in Germany in this essay differs from a conventional, purely scientific analysis. With it, we provide a broad overview of the problem of unsustainable land-use conversion in Germany. It may guide deeper problem analysis and practical decision-making, but its results can never be completely free of ambiguity and keep a certain "softness" (Klauer et al., 2013a: p. 80).

The conceptual basis for the sustainability heuristic of Klauer et al. (2013a, 2013b) is the notion of stocks as introduced to Ecological Economics by Georgescu-Roegen (1971, Chap. 9) and taken up for the analysis of long-term dynamics by Schiller (2002) and Faber et al. (2005). The latter define a *stock* as a set of (usually material) entities that is *durable* in the sense that it is never empty over a certain period of time (Faber et al., 2005, p. 159). Their concept of stocks is motivated by their conviction that for an understanding of "environmental problems and their formation […], we need to take into account, not only the momentum of the individual systems in isolation, but also the dynamics of interaction between ecological and economic systems, especially the dynamics induced by human activities" (p. 156). Faber and his co-authors regard the concept of stocks as "universally applicable" in that the notions *stocks* and *durability* do not "specifically refer to individual scientific disciplines" (pp. 170–171).[2]

However, also institutions such as laws, habits and consumption patterns are important immaterial factors whose analysis is crucial for the design of sustainability strategies. This is because they are – just as material stocks – often durable and build the framework for human behaviour. Sustainability policy has to take into account the institutional setting in which it seeks to be effective. Because the set-theoretical definition by Faber et al. (2005) has difficulties subsuming institutions as stocks, in this paper, we combine an analysis of material stocks with an analysis of institutions based on Klauer et al. (2013a, Chaps. 5 and 6, 2013b). In conceptualising institutions as "rules which govern human interactions and which are also humanly devised" (Kingston and Caballero, 2009, p. 154, see also North, 1990, p. 3), standard economics has difficulty explaining "why inefficient institutions often persist, or why less successful societies often fail to adopt the institutional structure of successful ones" (Kingston and Caballero, 2009, p. 161). However, if one considers the interactions between these rules and underlying human habits of thought, beliefs, expectations and preferences, it becomes clear why institutions often display such a high degree of inertia. Williamson (2000, pp. 596–597), for example, distinguishes different levels of institutions: those at the highest level (e.g., cultural norms) typically change only on a timescale of the order of centuries, while institutions at intermediate levels (e.g., laws and governance structures) may experience change on time scales ranging from years to decades, and institutions at the lowest level (e.g., prices and quantities traded on markets) are continuously subject to change (Kingston and Caballero, 2009, p. 167). In analogy to the definition of durability for material stocks, we consider an institution as durable if it remains essentially unchanged over a certain period of time, where the context determines the length of that period. German philosopher Gehlen (2004a, 2004b) explicitly stresses that durability is a typical feature of many institutions, insofar as institutions – even if they are inefficient – nevertheless satisfy the human desire for stability and hence exhibit a strong tendency towards self-stabilisation.

The idea of the heuristic framework is to create a simplified (in terms of the level of detail) and yet comprehensive (in terms of the range of factors incorporated into the analysis) overview for practical policy making by focusing on stocks and durable institutions. The heuristic comprises three general steps (Klauer et al., 2013b):

1. *Identify relevant stocks and durable institutions*: Gather previous knowledge about material stocks and institutions that might be relevant for the problem at hand. A stock may be relevant because it is to be sustained in order to achieve sustainability (this includes desirable stocks such as endangered species, forests or arable land) or because it needs to be reduced (undesirable stocks such as pollutants, toxic substances and an area of sealed soil). A stock or institution may also be relevant insofar as it influences the growth or diminishment of desirable or undesirable stocks.
2. *Work out the inherent time and dynamics of stocks and durable institutions*: Crucial to the analysis of policy options for sustainability is getting an idea of the dynamics of the relevant factors. Statistical data and history can be evaluated alongside insights from scientific theories and expert knowledge in order to generate statements about the *inherent time and dynamics* of the stocks and institutions. For how long has the institution existed? Is it durable? How has it changed over time? Have there been previous efforts to change the institution? In order to deal with omnipresent uncertainty, methods such as developing likely scenarios can be used.
3. *Integrate the dynamics of stocks and durable institutions to form an overall picture*: Knowledge about individual stocks and durable institutions as well as their inherent times and dynamics has to be integrated into a comprehensive but not overly complex aggregate picture. Interrelations between different material stocks and immaterial institutions also need to be recognised and researched where necessary. This integrated representation of the problem then may make it possible to identify the range of options available for policy action as well as the right moment to act. The discovery of a window of opportunity is a creative undertaking. The decision maker's power of judgement is especially important in this process.

A key benefit of the heuristic is its problem-oriented and holistic approach. Focusing on material stocks and durable institutions makes it possible to reduce complexity to a manageable level; the temporal mode of analysis enables heterogeneous issues to be integrated into a consistent view. At the same time, this heuristic is driven by the desire to obtain the information needed to devise

[2] The concept of stocks developed by Faber et al. (2005) has been used in the analysis of ecological–economic systems by e.g., Quaas et al. (2007) and Quaas and Baumgärtner (2008).