

Sustainable land use under different institutional settings

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Abstract

This paper serves three purposes. First, it gives a short introduction to the concept of sustainability in relation to land use. Since the Brundtland report it has become clear that sustainability is a dynamic concept that changes when conditions in society change. Moreover, it is easier to assess what is 'unsustainable' than what is 'sustainable'. But that will not suppress the demand for sustainable developments. Second, it elucidates a classification of different concepts developed within New Institutional Economics and applies these concepts to a number of typical problem areas in relation to land ownership and land use. Institutions change slowly and that holds most for informal rules, which are classified by Williamson as 'social embeddedness'. Land ownership and land use often function partly under informal rules. But formal rules and institutional arrangements are also crucial: together with the informal rules they go here under the name 'institutional setting'. Because the landowner – or the present user of land – is often not the best user from the perspective of the society, the relationship between 'owner' and 'user' has raised a lot of attention. Efficient exchange at the land rental market, but also contracts that are adjusted to the characteristics of owners and renters or to the specifics of multifunctional land use contribute to sustainable land use. Third, this paper provides the connection between the different papers of this special issue and shows where they fit into the basic theoretical framework. Most attention goes to ownership (including property rights), the land rental market and contract choice. Different functions of land use, however, are also covered with a clear link to informal rules.

Additional keywords: institutional change, land ownership, land rental market, multifunctional land use, property rights

Introduction

Land has always been an intriguing production factor, in economics as well as in many other scientific areas. It is remarkable how different scientific disciplines – but also different groups in society – have studied land during the course of time. To take only

one early perspective in economics: ‘physiocrats’ and ‘georgists’ considered land as the only production factor that would generate value (i.e., surplus above production costs) and could therefore be taxed. Such insights have changed; value creation takes place by different processes and by any resource, whether physical, human, social or cultural. Still, land is important for production, location of activities, landscape, biodiversity, living space, and hence wealth in societies. In many societies, land ownership or permanent use rights contribute to social security and status.

Sustainability is a more recent concept. Since the Brundtland report (Anon., 1987) sustainability has drawn a lot of attention in the scientific community and also in society. In this report, sustainability is described as “the ability of Humanity (...) to ensure that it meets the needs of the present generation without compromising the ability of future generations to meet their own needs”. This makes it essentially a dynamic and uncertain concept, where needs of present generations and uncertain or unknown needs of future generations have to be balanced. Moreover, it is easier to characterize what is ‘unsustainable’ than what is ‘sustainable’. It is possible to identify an ‘unsustainable’ development by comparing it with a development possessing more preferred characteristics: to define *one* is already sufficient. ‘Sustainable’ also requires such a comparison – but then with a *bunch* of less preferred alternatives. Three aspects of ‘unsustainability’ come to the fore: ecological, economic, and social. They are often called the three dimensions of sustainability. Each has in fact its own dimensions and bringing them together in one framework – together with man-made capital – requires the valuation of ecological and social capital by economic standards (Pearce & Atkinson, 1995; Pezzey, 1997). This is a typical economics solution, which is not always accepted by other disciplines, which do not appreciate the integration of the different dimensions into one valuation concept.

Many books and articles have been dedicated to unsustainable land use caused by erosion, salinity, depletion of minerals, and pollution, but also by reducing the natural biodiversity or spoiling the landscape. One cannot deny that these are mainly aspects of ecologically unsustainable developments. They capture the attention. But economic and social conditions play an equally important role because if land use generates no income or if nobody cares about cultural landscapes – due to a lack of people or a social infrastructure – then irreversible and unintended developments (from a societal perspective) take place at the cost of future generations, and such developments are characterized as *unsustainable*. Still, society is demanding sustainable developments. Moreover, it is useful to observe that unsustainable land use like severe erosion (e.g., the Badlands in South Dakota) or digging out peat and creating lakes (e.g., in the Netherlands) can be highly valuable if tourism becomes more important than agriculture. So under different conditions a previously unsustainable development can become very attractive. This is another illustration that sustainability is a dynamic concept.

In literature, less attention has been given to institutional causes of unsustainable land use. Here we consider institutions as general characteristics of societies, which have a much wider relevance than simply with respect to land use. Institutions are defined as the informal and formal rules that govern societies. Institutions change slowly, which implies that when conditions are changing, the institutions are often not in line with the new conditions. It is crucial for institutions to fit present and future

needs of society under the (then) ruling ecological conditions.

A special issue like this one cannot cover the whole area of sustainable land use in relation to institutional settings. We are limited to the size of such an issue and the new papers available. Still, we tried to have a rather wide perspective with contributions focusing on western Europe, eastern Europe, North America (USA), South America (Peru), and Asia (China). This represents a very wide range of institutional settings (geographically and institutionally).

Good theoretical and empirical approaches to institutions of land use can be found in Hayami & Otsuka (1993), Otsuka & Place (2001), Allen & Lueck (2003), and Otsuka (2007). This special issue contributes to the available literature by presenting new approaches and results. This paper gives the framework for positioning the results of this ongoing and widening area of scientific research.

Institutions and sustainable land use

Institutions in relation to land use

Although the word ‘institutions’ is well known, its definition is often problematic. As can be imagined, institutions are defined in different ways. According to North (1991), institutions are “the humanly devised constraints that structure policy, economic and social interaction. They consist of both informal constraints (sanctions, taboos, customs, traditions, and codes of conduct), and formal rules (constitutions, laws and property rights)”. Over time, people have developed institutions in order to create order and regularity.

As indicated by North (1991), rules can be formal and informal and this led Williamson (2000) to distinguishing informal and formal rules (see Table 1). The informal rules (= social embeddedness) are most consistent, because they belong to the common knowledge and habit formation of people and are often passed down from one generation to the next: informal land use rights are typical examples in the literature. If informal rules allow existing footpaths over land, then ownership rights are restricted. The same applies with respect to groundwater under the land: informal (or formal) rights to use that water affect opportunities of land use.

Another distinction within institutions that deserves attention is the difference between the institutional environment (which are the formal rules of a society) and the institutional arrangements (also known as governance structures). Institutional arrangements or governance structures rule the co-ordination mechanisms (Slangen *et al.*, 2008) that are crucial for the way in which processes take place in society. Let us provide a typical example in relation to land use. If both land ownership and land tenancy are allowed, then the way contracts are arranged between landowners and tenants is called an institutional arrangement or governance structure. Several such arrangements exist: markets, contracts, vertical integration (which implies full co-ordination within a hierarchy) and a whole range of hybrids between markets and hierarchies. Each of them has its own characteristics, and it depends on the institutional environment which of them functions best. Williamson (2000) considers

Table 1. Four levels of structuring human decision-making with an application to land.

Level	Time horizon (years)	Core elements	Examples in relation to land use
I. Social embeddedness	100–1000	Informal rules of society, traditions, norms, religion.	Whether land property is acknowledged; whether individual or common property rights hold; whether civilians have access to land.
II. Institutional environment	10–100	Formal rules in the constitution, laws, formal organization of society.	Land property rights; inheritance; land tenure law; enforcement of laws and regulations.
III. Institutional arrangements	1–10	Governance structures that rule processes and provide co-ordination.	Land markets; rental markets; land redistribution; contracts for the provision of landscape and nature.
IV. Resource allocation	Continuous	Choice of input and output levels by agents.	Selling or buying land; renting and leasing land; crop choice; fertilization.

Source: Partly based on Williamson (2000).

institutional arrangements as more flexible than the institutional environment. Governance structures often develop in a more incremental way.

Given the presence of *informal* rules with respect to land use, it is virtually impossible to apply a governance structure (= institutional arrangement) that is contrary to basic informal rules. Moreover, changing *formal* rules of society (e.g., concerning land ownership or lease regulation) often takes many years. This implies that social embeddedness and the institutional environment are determining factors for the institutional arrangements. There is also a feedback effect of particular institutional arrangements being allowed via laws and regulations. If governance structures seem to function quite well then they influence the institutional environment (e.g., by being included in the law) and gradually also social embeddedness: the informal rules. We summarize a typical combination of social embeddedness (Table 1, level I), institutional environment (level II) and governance structure (level III) with the name ‘institutional setting’.

Institutional settings lead to the actual resource allocation and exchange processes that take place in society (level IV). It is the subject area covered by e.g. neoclassical economics: resource use, the exchange of goods and services, price formation, income generation, and investment decisions. Neoclassical economics suggests that inefficient institutions are rapidly replaced by more efficient institutions (North, 1994). This idea, however, is challenged by New Institutional Economics. Still it is useful to realize that the results of processes at level IV influence again the institutional setting (Sterman, 2000).

It is obvious that when there is no water available, it will be difficult to irrigate land. But it seems to be more difficult to grasp the idea that certain types of land use are unsustainable if property rights are not clearly defined and if embeddedness in societies will not occur. For social scientists, however, that is or becomes increasingly obvious.

Elaborating institutional settings and their effect on sustainable land use

Institutions are very important for sustainable land use. Here we summarize land use under two stylized patterns of institutional settings that are typical for a low and a high level of development (Table 2). Of course, such patterns could be further detailed or adapted.

Table 2 could be extended, but shows clearly that the institutional setting also determines the relevance of particular types of institutions. In the following we elaborate on each of the items in Table 2.

Ownership, use, and transfer of rights

From the perspective of societies it is a key issue that land is owned or used by those who can contribute most to the development of society. Land ownership and land use are two different concepts. The user right is a right emanating from the bundle of property rights of ownership (Slangen *et al.*, 2008). Ownership is most fundamental, and land use rights are derived from the bundle of property rights that characterize ownership. Under institutional settings where (almost) permanent user rights exist, land use rights play a more important role and ownership functions in the background. Land use rights can be transferred (partly) from owners to users. It is also possible to transfer user rights fully or partly from one user to the other. Transfers can be done via markets, but also via enforcement by law and/or by governmental organizations.

Land ownership has many variations, ranging from private ownership to state ownership, or community ownership and no-ownership (Slangen *et al.*, 2008). Private ownership is generally the most desirable institution for sustainable land use because it ties together the residual control and residual returns, provides individual landowners with economic incentives to work hard and improve land value, and eventually generates socially efficient outcomes (Milgrom & Roberts, 1992). However, sustainable land use may not be achieved when individual land use produces negative externalities and private ownership creates social inequity.

Individual land rights are restricted under community ownership. User rights are shared – often on the basis of informal rules. Tenure security and transfer rights of land are usually restricted by the informal rules in the community (Otsuka & Place,

Table 2. Land use under two stylized institutional settings.

Item	Low level of development	High level of development
Ownership rights	Incomplete and partly based on informal arrangements.	Clearly described, but often restricted by general rules of society.
Land rental market	Often poorly functioning; goes by informal rules of communities and (limited) formal rules.	Rental markets, which are sometimes adjusted to the need of specialized contracts.
Contract choice	Relatively more sharecropping.	Mainly cash rent.
Different functions of land use	Agricultural production-oriented / partly self-subsistence.	Market oriented and sometimes multifunctional land use.

2001). Individual land rights under state ownership are even more restricted unless the state grants clear property rights to individuals (Otsuka & Place, 2001). For sustainable land use it will be important that the landowner or user cares about keeping the land in good condition and preparing it for future use. Investment in soil fertility, but also keeping up irrigation systems and other infrastructure (e.g., those that control erosion) are essential for the future productivity of land. From an institutional perspective this is often guaranteed if tenure security exists. This provides a security level that allows investment demand and the provision of credit. Under such conditions the current land user is assured of the revenues of current investments and future land use (Besley, 1995). But implementing secure user rights counteracts allocating land to the most efficient user, and hence to long-term sustainability effects. One observes an interesting trade-off here.

Land rental market

Markets are the key economic mechanisms for efficient resource allocation and economic growth. Under institutional settings where imperfections exist in markets for credit and insurance (low level of development, specified in Table 2), transfers of land use rights usually take place through the land rental market. For sustainable land use it will be desirable for the land to be transferred from less productive to more productive producers. Equalizing the marginal product of land across producers with different land-labour endowments is essential for efficient and equitable land allocation and for productivity growth in agriculture. From an institutional perspective this is often guaranteed if free land transfer rights are provided (Carter & Yao, 1999).

Contract choice between landowner and tenant

The relationship between landowner (or the one who leases land) and the tenant has been one of the popular items in research. Many articles start from a principal-agent approach (Huffman & Just, 2004). Crucial assumptions are related to asymmetric information between owner and renter: they have access to different information. This makes it difficult for the landowner to select the best renter: this is often called the 'adverse selection problem'. But if the renter has been selected, then the problem arises of providing the 'right' incentives to keep land in good condition: often called the 'moral hazard problem'.

Given that farming depends on weather and market conditions, there is a lot of uncertainty involved in these two problems, and the risk-averseness of owner and renter may also differ. This leads to an interesting set of opportunities, where the optimal selection of the renter and the elements of the contract depend not only on individual characteristics of owner and renter but also on the opportunities to transfer risks to insurance markets or to share risk between owner and renter (sharecropping). From such a theoretical framework it is possible to derive the consequences of monitoring and enforceability costs, and differences in risk attitude and risk perception. It is also possible to explain the dominance of share tenancy under the institutional settings of developing countries (e.g., Otsuka & Hayami, 1988; Otsuka *et al.*, 1992; Huffman & Just, 2004) whereas fixed cash rent is the main contract in circumstances where renters have less risk, are relatively difficult to monitor, or have relatively large

farms and high wealth levels (Huffman & Fukunaga, 2008). This has also been mentioned in Table 2. Some researchers also provide theoretical explanations as to why in sharecropping contracts a 50–50 sharing is widely observed in spite of tenant and landowner heterogeneity (Otsuka *et al.*, 1992: 1969; Huffman & Just, 2004).

As discussed previously, for sustainable land use it will be good that the landowners cultivate the land (owner–operators); or the land users enjoy long-term tenure security (e.g., permanent land users). In the case of fixed cash rent (cash-renters) or sharecropping (tenant–operators), the tenants do not enjoy long-term tenure security. Therefore, the incentives for land-related investments and sustainable land use may be weaker with fixed cash rent and sharecropping than with land ownership. However, long-term share tenancy based on personal trust gives the tenant strong incentives for land-attached investments and the landowner is involved in production decision-making so that he can incorporate his long-term interests in agricultural production. So the incentives for sustainable land use may be stronger with share tenancy than with fixed cash rent. The standard principal-agent approach assumes that it is possible to conclude complete contracts.

Different functions of land use and the related contracting

Under the institutional settings of developed countries, different functions of land use become increasingly important (e.g., Pedrolí *et al.*, 2007; Jongeneel *et al.*, 2008). Multifunctional land use means that land use can simultaneously fulfil different combinations of functions, including the traditional production function (food, feed, fuel), an ecological function (habitat for wildlife), a cultural function (typical landscapes) and a recreational function (enjoying landscape, on-farm attractions and accommodation) (Jongeneel *et al.*, 2008). This raises the question as to what institutions can best govern processes of multifunctional land use and develop solutions for sustainable land use.

In practice one can observe that contracting, either of processes or outputs, is gaining in importance. Contracting landscape services might be easier under full ownership of land. Full ownership implies that the decision-maker not only receives the revenue from the services provided, but also experiences the change in value due to multifunctional land use. Moreover, it prevents a possible costly monitoring process of the relationship between land use and land value. Also the results of investment in knowledge and reputation building in different directions come into the hands of the one who is investing. MacLeod (2003) shows that if contracts are renewable and multi-tasking is important, subjective evaluations – and hence incomplete contracts based on reputation – are frequently better than objective evaluations and very specific contracts. Such insights can be used in designing contracts for farming in combination with green services. The flexibility created within an incomplete contract approach is contrary to the rigidity of a principal-agent approach.

How the set of papers deals with sustainable land use under different institutional settings

The first paper takes a broad perspective in the number of countries and looks first at

the institutional environment. The change of formal rules implies a shift from state and co-operative ownership of farms to more individual farm ownership and land use. The paper quantifies the influence of a change of institutional environment on agricultural productivity growth (Rizov, 2008; this issue). This is done for one of the very interesting 'laboratories' of institutional reform: the former communist countries in East Europe. Just because the institutional environment changed quickly in these countries, but at different speeds, the relationship between agricultural productivity growth and the institutional environment can be tested quite well by means of a comparative analysis. The paper builds on earlier papers (Rizov, 2005; Lerman & Shagaida, 2007), but is now focused much more on institutional aspects. Rizov (2008; this issue) shows the importance of the institutional environment, but also of the institutional arrangements in achieving efficient, and consequently also a more sustainable agriculture. In countries where institutional reforms were implemented more quickly and/or were further-reaching, the productivity growth was faster, thereby contributing to sustainable land use.

Land titling programmes are generally considered as an important institutional reform for enhancing farmer's incentives to make land-attached investments and to promote sustainable land use. Based on empirical data collected in 2004 from 230 farmers distributed over five different regional domains in the coastal and Andean Regions of Peru, Fort (2008; this issue) investigates the effect of land titling programmes, mainly concentrating on the formalization of previous informal land rights, and on land-attached investments. He shows the importance of land titling programmes on the propensity to invest. On parcels with previously low levels of tenure security, the land-attached investment is higher, which often – and particularly in developing countries – implies a more sustainable land use.

The development of land rental and labour markets plays a very important role in increasing household investment incentives and increasing allocative efficiency and agricultural productivity (Deininger & Jin, 2005). Earlier literature on land and labour market development and agricultural production in rural China has focused on either the land or the labour market. However, empirical evidence shows that economic reforms in rural China have led to the emergence of land and labour markets. The increasing importance of these two markets suggests that they might be closely inter-related. Based on the data from a household survey held in 2000 in three villages in the northeast of the Jiangxi Province, Feng & Heerink (2008; this issue) examine the factors that determine the participation of farm households in land rental markets and off-farm employment, and investigate whether participation in land rental markets and off-farm employment influence each other.

Building on Feng & Heerink (2008; this issue), the paper of Feng (2008; this issue) goes one step further to investigate the technical efficiency in rice production and examines the effect of land rental market participation, the resulting land tenure contracts, and off-farm employment on technical efficiency in rural China. The analysis is based on a household and plot level survey held in 2000, 2001 and 2003 in three villages in the northeast of the Jiangxi Province. Feng (2008; this issue) shows the importance of land rental market participation on technical efficiency. Most plots used by farmers are the so-called contracted plots distributed directly by the village collective.

Contracted plots experience high tenure security. Rented plots have less tenure security, but the farmers who rent land might be more efficient. Empirical analysis shows that rented plots are technically as efficient as contracted plots, which shows that the two opposing effects compensate each other. Therefore the development of a land rental market contributes significantly to sustainable agricultural production and hence land use in rural China.

Cash rent and sharecropping normally co-exist under different institutional settings. As discussed in the foregoing, sharecropping is dominant in developing countries because the risk is shared between landowner and renter. But even in developed countries with less risky processes, e.g., in the USA, sharecropping still accounts for one-quarter of all leases (Huffman & Fukunaga, 2008; this issue). Earlier articles ignored the landlord's attributes as determinants of choosing either a cash rent contract or a sharecropping contract. Both Huffman & Fukunaga (2008; this issue) and Fukunaga & Huffman (2008) use a uniquely constructed data set of 44,515 landlord-tenant contracts to examine the effect of risk-related factors, transaction cost factors, and landlord's and tenant's attributes on landlord-tenant contract choice. This implies that quantitative results are available to determine the effects of variables that are typical of an institutional economics approach. Huffman & Fukunaga (2008; this issue) show the importance of sharecropping for sustainable land use, compared with cash rent.

Where Huffman & Fukunaga (2008; this issue) are focusing on landlord-tenant attributes and a limited number of different contracts, Slangen & Polman (2008; this issue) focus on different sets of property rights that are transferred from owners to tenants. Characteristics of owners and tenants do not receive special attention, but the type of contractual agreement plays an important role. The empirical analysis is directed at the perspective of the landowner. What is the value of the bundle of property rights transferred to the tenant? Empirical results confirm that the value of lease contracts for the landowners depends on the content of the bundle of property rights: the more control rights for the landowner, the less protection for the tenant, the shorter the duration of the contract, the higher the flexibility of the contract, the higher the level of property rights transferability, and the higher the value of the bundle of property rights for the landowner. The bundle of property rights transferred within a lease transaction varies with the type of contractual arrangement (Slangen & Polman, 2008; this issue).

Institutional design of agri-environmental contracts is a rather new phenomenon in the European Union. It is a step towards a more environmentally friendly way of farming. Earlier articles focused on the role of the farm and farmer characteristics as determinants of taking up agri-environmental schemes. Also Polman & Slangen (2008; this issue) include these characteristics in their analysis, but their focus is more on the institutional design and the role of trust and social capital in taking up agri-environmental schemes. The analysis is based on empirical data from an EU project comprising responses from 990 farmers in different EU countries. The data and the empirical analysis provide excellent opportunities to compare the importance of institutional settings in relation to multifunctional land use.

Positioning of the different papers in the categorization provided in Tables 1 and 2 shows clearly that a range of institutional settings and actual resource use is covered,

Table 3. Positioning of the papers ¹ in the structured level of human decision-making and the main topics in relation to land use ².

Level	Topic			
	Ownership rights	Land rental market	Contract choice	Different functions of land use
I Social embeddedness	1			7
II Institutional environment	1, 2			
III Institutional arrangements	1, 2, 6	3, 4, 5, 6	5, 6, 7	7
IV Resource allocation	1, 2	3, 4		

¹ 1: Rizov – Institutional reform; 2: Fort – Land titling; 3: Feng & Heerink – Renting and migration; 4: Feng – Rental markets; 5: Huffman & Fukunaga – Landlord–tenant contracting; 6: Slangen & Polman – Land lease contracts; 7: Polman & Slangen – Design agri-environment contracts.

² Numbers in **bold** refer to the most important class of ‘level’ and ‘topic’ for each paper.

for all the items that play a prominent role in land ownership and land use (Table 3). Most work, however, is concentrated on institutional arrangements (= governance structures) and on the ownership rights and the land rental market. ‘contract choice’ and ‘different functions of land use’ are also present. Those items will become more important in developed market economies where green services in rural areas will receive more attention (see e.g., Diakosavvas, 2004; Anon., 2008), while transition and developing countries will follow. Multifunctional land use is much more demanding with respect to institutional settings.

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