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Land ownership and land use development : the integration of past, present, and future in spatial planning and land management policies

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Introduction

This publication is based upon the peer-reviewed papers presented at two symposia of the European Academy of Land Use and Development (EALD). The first of the symposia was held in 2014 at the University of Agriculture in Kraków with a broad theme of "Cultural Landscapes in Rural and Urban Areas: The Integration of Past, Present, and Future in Spatial Planning and Land Management Policies". The second symposium was held in 2015 at the Norwegian University of Life Sciences of Oslo based about the theme of "Land Ownership and Land Use Patterns". The papers generated by these symposia are true to the inter-disciplinary nature of the EALD but all have the common theme of the land in which we live.

Land is finite whether in urban or rural areas and it is the responsibility of all who work in the many disciplines relating to land that the land is used in the most responsible way. The land we have is shrinking in area due to a multitude of reasons, many of which are directly related to climate change but also to migration. Across Europe, land is constantly the subject of enormous and very varied pressures: the need for living space in the face of societal changes, the infrastructural needs to satisfy the requirements for an increasingly urbanised region, the needs of producing food, and the needs for 'green energy' – whilst balancing the needs for the environmental protection of habitats and cultural landscapes. As long ago as 1999 these pressures were recognized in the Bathurst Declaration (Grant & Williamson, 1999) in that "the challenge is not only to meet world population needs for food, shelter and quality of life, but also to ensure that future generations can also have their needs met".

All disciplines that have responsibilities for the husbandry, use, management, and administration of the land need to address the problems of how to plan and how to utilise this increasingly valuable resource, which is truly a multi-disciplinary task (Bryan, 2003).

The papers contained within this publication have been arranged along general themes that reflect the multi-disciplinary nature of the disciplines concerned with land. The first section of the book is dedicated to the interpretation of key terms in the land sector. *Mattsson and Mansberger* explore the conceptual nature of land governance, land policy, land (use) management, land administration, land development, and land use planning. The paper sets the scene for many subsequent papers insomuch as it provides an explanation of terms, possible areas of overlap (often between different disciplines), and non-standard approaches. This is followed by a discussion by *Gammelmo,* who assesses the role of land registration systems in modern society, in particular their role in providing a valuable source of information concerning the land. Gammelmo also provides useful keys to the interpretation of terms, typology, components, and the benefits of land registration systems. The final paper of this section by *Hernik et al.* assesses the modern concept of national parks and, as an example,

explores the widely differing concepts of national parks in the jurisdictions of England and Wales, and that of Poland. It concludes that whilst the designation of a national park is international, the ways in which this term is translated into the governance of different states has different meanings and contexts with respect to the cultural landscape.

From defining some of the challenges concerning land comes the next stage in identifying the process of decision-taking: how to organize and co-operate. This section is introduced by *Røsnes* who poses the question of who governs? This is taken in the context of the Norwegian spatial planning system and addresses the difficult problems related to the landscape between space, place, and buildings and how the current system relates to nature, cultural environment conservation, and spatial planning. Afterwards, *Vilmin and Llorente* consider the organisational modes of urban development through a new institutional economic analysis. They analyse the correspondence between the attributes of transactions and governance structure and advises that if this correspondence is not established malfunctions and failures are likely. In contrast to urban developments, *Seher and Löschner* suggest supplementary research activities in land policies in a rural environment through anticipatory flood risk management. The main emphasis of their paper is an examination of the role of land-policy-issues in flood risk management that until now has been too often neglected. Turning once more to the urban environment, *Nordahl and Eika* provide an examination of urban development and the mixed blessings of multiple ownership and land ownership. One of the suggestions they make as a supplementary strategy is for a process of organic redevelopment to be managed by the landowners themselves.

Demographic change is one of the most fundamental forces to influence all spatial planning policies and may be alluded to in the majority of the papers contained within this publication. *Treskow and Linke* concentrate upon an evaluation of the aspects influencing the predicted process of demographic change in selected cities in Germany. Their paper contains an analysis of those aspects that have an influence on demographic change through a survey of 9 large German cities. Whilst traditional approaches to demographic change are linear and fail to take into consideration unpredictable future developments, the authors suggest the importance of addressing alternative options, monitoring and considering the "human side" of demographic change. The following paper by *Jeschke and Weitkamp* also concentrates on the urban environment by addressing stakeholders' behaviour and interaction in urban development processes. This provides an analysis of decision making processes through the aid of game theory. Finally, *Auziņš* presents an evaluation of land use for the justification a decision making process through a study on experiences and tools in the implementation of spatial development plans. In so doing, the author explains the processes of land use in Latvia from the perspective of efficiency. Auziņš suggests a systematic efficiency-evaluation to improve the spatial planning process accompanied by an appropriate methodological framework.

The next theme covered in this volume relates to the identification of land pattern changes and the reason for them. All land has a history of use and that use has shaped the land that can be viewed. Sometimes it is possible to unravel the historic patterns of land use. This

facet of land management and spatial planning, whereby consideration must be given to the historical, present, and future use of the land, is becoming increasingly important. *Dixon-Gough et al.* take the evolution of land use as their theme and, by concentrating on a relatively small and isolated valley in north west England, they discuss the evidence of former land use patterns that are embedded in the landscape and the reasons for them. This article is followed by a study related to land cover changes in northern Germany over a much shorter time span. *Schaffert and Steenson* make a comparison between the patterns of land in Northern Germany covering the border areas between the former Western and Eastern Germany, with respect to the size and intensity of the change.

One of the major issues facing Europe and, indeed much of the world, is the transition of power generation to renewable energies. This will involve fundamental changes to habitats, agriculture and, inevitably, changes to land patterns – visually if not physically. *Hendricks and Thiemann* address this issue through an analysis of land requirements for the generation of power from renewable energy sources. They conclude that political targets should be achievable through increasing use of renewable energies providing that the population in Germany diminishes, changes their eating habits, and accepts changes in agricultural productivity.

A major input into land pattern changes comes through data modelling, now an indispensable tool for spatial planning. *Katona et al.* evaluate the role of geoinformatics in land consolidation and introduced a software module developed in Hungary, which has been improved to support complex land consolidation in a country that has many small parcels and a need for rural regeneration. In a similar context, this theme is continued by *Salata and Prus,* who consider the role of geodata modelling when applied to the planning of land use in rural areas of Poland in conjunction with the Polish spatial information infrastructure. They present the effects of model elaboration by using data on the level of communes in connection with improvements to life quality and the necessary planning studies. In an urban context, *Litwin et al.* discuss means of improving the users' perception in urban planning through 3D modelling and 3D visualisation. Their paper illustrates the possibilities of using geospatial data and GIS software for the visualisation of existing and future terrain conditions.

At a more thematic nature, *Mengi et al.* examine the impact of the transformation of rural land into urban land use upon the environmental assets of Turkey. This is a situation replicated across the world and is a common form of conflict in the rural/urban interface. Agricultural land has deceased and deteriorated rapidly in Turkey over the last decade largely as the result of top-down legislation. This has significantly increased the number of metropolitan municipalities that support building activities. On a very similar theme, both thematically and geographically, *Yilmiz* addresses the human aspects of urban transformation by means of a comparison between projects in Ankara and in Bogota to upgrade slums and squatter house-areas. The location of Ankara is the subject of a further paper by *Yılmaz and Keleş*, who examine the role of local authorities and of the public in protecting natural assets in the case of Lake Eymir. The development in Ankara continues in an unbalanced,

unhealthy and unplanned urban sprawl, supported by the city authorities to promote the construction sector. Even unique natural areas are destroyed which contradicts both the Constitution and international treaties. The authors consider that the duties and responsibilities of protecting the environment should not be left solely to the local authorities but also to the urban communities.

In the final paper in this section *Volovich* considers land and property rights and the regulation of the property market through an examination of the situation in the Crimea following its connection with Russia. Given that the land policies of Ukraine and Russia developed quite different after 1989, the development of a land policy transition model is more difficult than the politicians have thought!

The final selection of papers within this volume fall into the general theme of strategies and measures used to steer future evolution in land policies. The first paper, by *Hendricks et al.*, provides an overview of the public value capture of increased property values and questions the concept of 'unearned increments'. This is a comparative study of the methodologies employed in France, Germany, and Sweden. Following on from this international theme, *Auziņš and Geipele* examine the resource distribution in Latvia in order to promote a sustainable development of housing sector. This is placed in the context of an evolving residential real estate market in Latvia where opportunities to create a solvent demand are limited. In a similar manner, *Otkay* considers a strategy for sustainable urbanism in Turkey, which combines ecological sustainability and socio-cultural sustainability.

One of the problems of urbanisation is that patterns of urbanisation evolve and as some areas prosper others decline. *Maliene et al.* introduce the challenges retail centres in the north west of England. Many British centres suffer from varying degrees of decline and this paper highlights some of the challenges found in this region. A centre's culture and identity can provide a successful foundation to attract people back into town centres. Ways in which identity and culture have been incorporated into the urban design of Liverpool to enhance the retail experience on offer in the city centre are discussed. This general theme of industrial decline is continued by *Petrakovska and Tregub,* who review the current state of industrial land use in the Ukraine. In so doing, they provide a definition and a systematic approach to the formation of industrial regions, districts, metropolitan areas and historically developed units in the Ukraine and make suggestions concerning the direction of further developments for industrial sites based on the current situation and development trends.

The final three papers of this publication concern future strategies. *Weitkamp et al.* examine the strategies for developing building land in growing cities. Cities with pressure on the housing market in Germany have initiated so-called 'Baulandmodelle' – standardized building land strategies in areas where a binding land use plan is needed for the development. Within the decision of the building land strategies, the individual form of the process is regulated as well. Three models in Stuttgart, Munich and Cologne are compared with regard to the criteria costs, social housing and urban quality. In conclusion, a standardized building land strategy provides more transparency, predictability and security of planning. It enables

an equal treatment of all beneficiaries of planning and ensures certainty in action for the authority. This concept is also covered by *Stankiewicz and Treskow,* who consider land development models in the context of the challenges of climate change through the integration of climate concerns into a land development model in combination with plans. They suggest that the provision of a land model is an effective mean to safeguard the interests of climate protection and climate adaptation in cities. The models have to take into consideration the setting of minimum requirements and adopting a degree of standardization, which may cause restrictions.

The final paper is also concerned with climate change and remediation methods, but this time in a rural context. *Hendricks* examines the future reduction of agricultural land for non-agricultural purposes through the increasing use of renewable energies. He also considers growing settlements and traffic areas – all of which causes a reduction of agricultural land uses for non-agricultural purposes. As a conclusion he presents a catalogue of measures, methods and tools to handle this situation.

Robert Dixon-Gough
Erwin Hepperle
Reinfried Mansberger
Jenny Paulsson

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Hans Mattsson* and Reinfried Mansberger**

Land Governance / Management Systems

A Conceptual Discussion

1. Introduction

There are a lot of concepts related to *land* and sometimes it can be difficult to understand how they are used. Land can be linked with *governance*, *policy*, *management*, *administration*, *development*, and *planning*. Other words like public, urban, peri-urban or rural can be added. Often the attribute sustainable is enclosed, which can make it even more confusing. At the same time all the concepts in a way describe parts of a consistent system for controlling of land use or what Magel (2013:137–145) characterises as the *land sector*.

This article intends to go through those concepts and then in relations to each other. It tries to find a lowest common denominator for each concept with the purpose of proposing short definitions and in this way promote systematic discussions about the concepts' relation to each other.

The proposed definitions and explanations of concepts are from different publications. The article, however, makes no claim to include everything written about the mentioned terminology. To some extent, the starting points for each concept are descriptions from Wikipedia. It has to be noted that most of the terminology in Wikipedia concerning the land sector is marked with the following sentence: *The examples and perspective in this article may not represent a worldwide view of the subject. Please improve this article and discuss the issue on the talk page.* This can be seen as an indication that definitions on land related issues are fuzzy and need to be discussed. It also has to be said that it is probably people with interests in different parts of the land sector that are promoting their interests in the Wikipedia notes. Another interesting observation that can be drawn from the current survey is that definitions of each concept are very complex and so wide that they often are difficult to understand and even more difficult to remember.

2. Definitions

Rights to Land

All land is divided into rights and someone is the right holder (Figure 1). This aspect of land is fundamental for all concepts discussed below. The land in a country can completely belong to the State (only one owner) or it can be distributed to a lot of different owners. If distributed, the owners can be the State, municipalities, the Church, companies, trusts,

* KTH Royal Institute of Technology, Stockholm / Sweden.

** BOKU University of Natural Resources and Life Sciences, Vienna / Austria.

private people, etc. We get the relation owner (right holder), ownership right (a right) and land area. It shall be remarked that rights to land are normally more or less regulated.

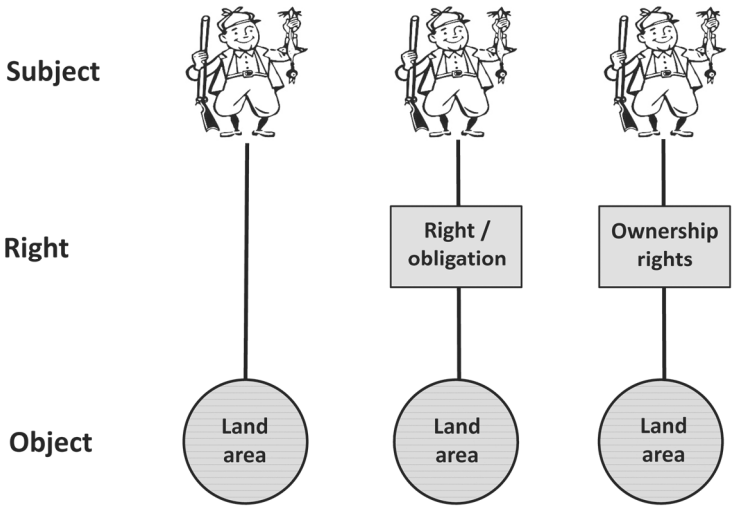

Figure 1: Legal land relations. The left relation is often called open access. All types of land rights nearly always include obligations and restrictions (Source: Mattsson 2004).

In a situation with a lot of owners, their rights must be delimited in space. The smallest delimited unit of land often is called real property (real estate in American English) or parcel. Within the property, the land is used in one or another way. Such land use can be traditional, permitted, illegal etc. Land is a physical object that cannot be moved, but at the same time it is an abstract thing that is manifested as a set of rights – sometimes called a bundle of rights – to its use. In many countries land has a value and can be traded (Dale and McLaughlin 1999; Zevenbergen 2002; Mattsson 2003).

There are countries where ownership to land is not accepted. Land will then instead be distributed to different users under lease or other types of use rights. We have also in this situation legal distinctions with rights and land areas distributed to right holders, e.g. governments, private organizations, and private people.

It shall be mentioned that water areas have a lot of similarities with land. Below the water is ground (a type of land) and we have water rights and delimited areas for these rights. Rights even exist in the open sea within negotiated economic zones. In those zones, the ground below the water, as well as fishing rights are normally regulated. There is, however, in reality a lack of enforced rights to deep water outside the zones and this is what can be called open access to water and land (ground).

The market can take care of a lot of land management questions as well as of needed changes in land use. But at the same time there are market failures. The market can have difficulties in supplying public goods and in handling externalities. It shall be said that there are also

governmental failures as the government has limited control over market activities. It has also lack of information and can have severe problems with bureaucracy preferences. Therefore, it can be good to find a balance between market and government. For this, we use politics by creating policy and steering instruments based on law and economy, and by creating organizations for handling the complex regulating systems that are built up. Such State governance is oriented to land policy, land management, land administration, and land development.

Land policy, land management, and land administration can be seen from a static point of view. The static view is that conditions for land use shall not change, so that the land users can be sure of their rights to use the land. It can also be important for the government and society in a broad sense to stop misuse of land by prioritizing current use. But also the dynamic perspective has to be considered. Today the society is constantly changing from economic and social points of view. The consequence is that there can be a need to change land use. Such changes can be called land development. Instruments like land law, spatial planning and land use planning are needed to take care of this. All such interventions in land rights are related to the creation of what Foxon (2013) and Shrestha et al. (2014) call actors' *action space*. That is what defines the legal limits of the actors' action possibilities.

Land Governance

Governance refers to *all processes of governing, whether undertaken by a government, market or network, whether over a family, tribe, formal or informal organization or territory and whether through laws, norms, power or language* (Wikipedia, based on Bevir 2013). Governance relates to *the processes of interaction and decision-making among the actors involved in a collective problem that lead to the creation, reinforcement, or reproduction of social norms and institutions*.

However, there is a problem with this definition as it is nearly completely overlapping with some policy definitions. The goal for governance is perhaps easier to formulate. *Good governance defines – amongst others – the ideal status of using sparse resources efficiently* (UNESCAP 2010). Such good governance is necessary in order to promote social, economic and environmental development in a sustainable manner. It is also essential for avoiding poverty.

FIG (2009) stipulates that *Land governance is about the policies, processes and institutions by which land, property and natural resources are managed. This includes decisions on access to land, land rights, land use, and land development. Land governance is basically about determining and implementing sustainable land policies and establishing a strong relationship between people and land.* FIG also mentions that sound land governance is fundamental in achieving sustainable development.

FIG (2009) continues: *All countries have to deal with governing their land. They have to deal with the governance of land tenure, land value, land use and land development in some way or another. A country's capacity may be advanced and combine all the activities in one conceptual framework supported by sophisticated ICT models or, more likely, capacity will be involved in very fragmented and basically analogue approaches*.

FAO has written guidelines about governance of tenure to introduce principles of standards for use and control of land, fisheries and forests with the aim to support improvement of policy, legal and organizational frameworks that regulate tenure rights. But the publication has not clearly defined what it means with governance. It is only expressed indirectly as *governance of tenure is a crucial element in determining if and how people, communities and others are able to acquire rights, and associated duties, to use and control land, fisheries and forests* (FAO 2012). The guidelines also mention that there are different models and systems of governance of natural resources under national contexts, without mentioning such models and systems.

Actually, the content of the concept governance of the land sector, as referred to above, can more or less everything be included, that land policy, land management and land administration deal with. To clarify the differences and relations between these three concepts is a complicated task as many authors and organizations have different definitions. In some context all activities and processes of land governance are summarized as land management. If land management is used in this way as a synonym for land governance, then it is probably good also to introduce a more specific concept *land use management* (see chapter "Land (Use) Management").

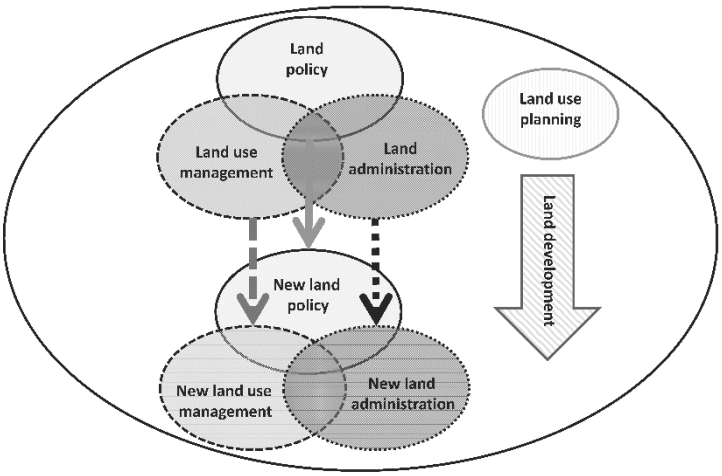

Figure 2: Land governance system. The influence from the system's environment is not demonstrated in the figure.

Figure 2 is showing a land governance system with interconnection between its three components, namely *land policy*, *land (use) management*, and *land administration*. The dynamic part related to changes of one or more of those three interconnected components can be caught in the concept *land development*. The consequences of *land development* are new conditions for *land policy*, *land (use) management* and *land administration*. To handle the whole system in a good way, land governance is needed. The governance, thus, can be said to create, stimulate, regulate and eliminate action space for actors within the land sector.

Each component in Figure 2 will be explained and also be defined in the following chapters. As said before, the definitions documented below do not aspire to be the only relevant definitions covering everything. Their function is to support future discussions about the concepts in relation to each other.

Proposal for a concise definition: *Land governance is the government's complex task to guide, overlook and steer the land sector by the creation of action space for promoted activities.*

Land Policy

A *policy* can be seen as a principle to guide decisions and to achieve rational outcomes. Policy is a statement of intent, and it is implemented as a procedure. The term *policy* may apply to government, private sector organizations, groups, and individuals. *Public policy* can then be seen as an administrative guide to actions taken by the State's executive branches. Some define policy as a system of courses of action, regulatory measures, laws, and funding priorities concerning a given topic promulgated by a governmental entity or its representatives (Wikipedia).

In accordance with this, land policy is guiding the use of land in a broad sense. This is expressed quite clear in the document *EU Land Policy Guidelines* (EU 2004), where it is said that *land policy aims to achieve certain objectives relating to the security and distribution of land rights, land use and land management, and access to land, including the forms of tenure under which it is held. It defines the principles and rules governing property rights over land and the natural resources it bears as well as the legal methods of access and use, and validation and transfer of these rights. It details the conditions under which land use and development can take place, its administration, i.e. how the rules and procedures are defined and put into practice, the means by which these rights are ratified and administered, and how information about land holdings is managed. It also specifies the structures in charge of implementing legislation, land management and arbitration of conflicts.*

With this definition land policy can deal with all guiding principles for land use that are important for rational outcomes. It can be applied to prevent changed land use as well as to promote changes. Land policy requires different approaches, depending on case, to develop measures and activities, which can be implemented by land managers. Guiding principles can be public as well as private. Public authorities can use compulsory tools for implementation, whereas private managers have to act within the legal framework of land rights and regulations.

Proposal for a concise definition: *Land policy is the creation of guiding principles for land use.*

Land (Use) Management

Land management is the process of managing the use and development (in both urban and rural settings) of land resources (Wikipedia). UN-Habitat (2010) expresses it in the following way. *Land management is about putting land resources into efficient use for producing food, providing shelter and other forms of real estate or preserving valuable resources for environmental or cultural reasons. In order to manage land properly, land professionals have developed policies*

and tools to implement policies. This includes urban planning, land readjustment, land taxation, land administration, and management of public spaces. It is thus concerned with making informed decisions on the allocation, use and development related to natural and built resources. The problem with this approach is that it totally or partly includes policy, management, administration, and development concepts.

Today there are also discussions on sustainable land management, which is often based on the *Rio declaration on environment and development* (UN 1992). In short, it declares that sustainable development shall be based on economic, social and environmental demands and those demands shall be balanced in a long term perspective (often referred to as the three pillars of sustainability). Those acts of balancing in principle shall affect all activities like agriculture, forestry, water use, urban expansion, construction and property management. Actually, the goal is that sustainability shall be applied to land policy, land management, and land development.

One of the problems with use of the land management concept is that a lot of authors, for example UN-Habitat (2010) and Larsson (2010), use land management for more or less the same activities as other use land governance. This is creating confusion and if both concepts shall be used, it can be good to reduce the land management concept to pure management of a resource.

In our understanding, land management includes cultivation and use of land (e.g. for agriculture, forestry, natural resources, and urban purposes). That is why we propose that the concept can be expanded, at least sometimes, to *land use management* to make it more precise and to avoid misinterpretations.

Proposal for a concise definition: *Land (use) management is the work related to the use of land resources within current policy guidelines taking into consideration the legal framework for a specific land area.*

Land Administration

According to the United Nations the definition of good governance in the field of land administration includes an existing formal system for the registration of land and property rights. Such a system has to secure the ownership of land, the investments and other private and public interests in real estate (UN 2005). There is also a need to map the land units and with it the boundaries around the rights. Sometimes also the valuation of land / rights is required.

UN/ECE (1996) defines land administration as *the process of determining, processing and disseminating information regarding the ownership, value and use of land, when implementing land management*. FIG (2009) has the same approach. It says *Effective systems for recording various kind of land tenure, assessing land values and controlling the use of land are the foundation of efficient land markets and sustainable and productive management of land resources. Such systems should be based on an overall land policy framework and supported by comprehensive land information and positioning infrastructures*. Land administration can be seen as public

sector activities required to support the alienation, development, use, valuation and transfer of land. (Dale & McLaughlin 1999).

The importance of land administration is stressed further in the Bathurst Declaration on Land Management for Sustainable Development (FIG 1999). It points to the need of land administration institutions in the meaning of *rules of the game*. This includes laws and regulations necessary for creating property rights, for registering and subsequently transferring them, for resolving disputes, for taxation purposes, and the equitable resumption of these rights. There must be a sufficiently robust infrastructure to, amongst other things, effectively supporting the goal of enhancing security and access to credit, while at the same time being sufficiently simple and efficient so as to promote and sustain widespread participation.

UN/ECE and FIG definitions seem to be more or less static if they are applied. They focus on providing information about land. Some, however, make the definition of land administration more dynamic like Dale & McLaughlin (1999) and Williamson et al. (2010). They look at land administration as an instrument for implementing and monitoring specific land policies. Williamson et al. also include changes of land rights in a broad sense, and even development.

At Wikipedia we can also find this dynamic view of land administration. It is written that land administration is the way in which the rules of land tenure are applied and made operational. Land administration, whether formal or informal, comprises an extensive range of systems and processes to administer. The processes of land administration include

- the transfer of rights in land from one party to another through sale, lease, loan, gift and inheritance;
- the regulating of land and property development; the use and conservation of the land;
- the gathering of revenues from the land through sales, leasing, and taxation; and
- the resolving of conflicts concerning the ownership and the use of land.

Land administration functions may be divided into four components: Juridical, regulatory, fiscal, and information management. These functions of land administration may be organized in terms of agencies responsible for surveying and mapping, for land registration, and for land valuation (Wikipedia).

Perhaps it would be good to go back to the ancient Latin word Ad ministere. Its meaning is *to serve for something* (Stowasser 1938). This would include also all activities concerning the documentation of land use rights as well as to control and monitor that the people follow the rules.

Proposal for a concise definition: *Land administration embraces legal rules for land use related to a certain area. As information (site, value, etc.) about such an area is essential, the tools for assessing, documenting and mapping this information are parts of land administration.*

Land Development

A conclusion from our discussions about land administration is that we need methods to regulate ownership and other rights to land. Such other types of rights can be easements, leases, and mortgages. We need to know permitted land use and information on how the land belonging to a right holder is formed in space (on the surface, but also considering the vertical dimension) and/or in time. The right holders ought to be secure in their rights and they must dare to invest. Nevertheless, we also need methods for changing the following three aspects of land: right holders, land use rights, and land areas. We need stabilizing and dynamic approaches to all three aspects. The stabilizing factors promote investments and the dynamic factors promote changes (Figure 3).

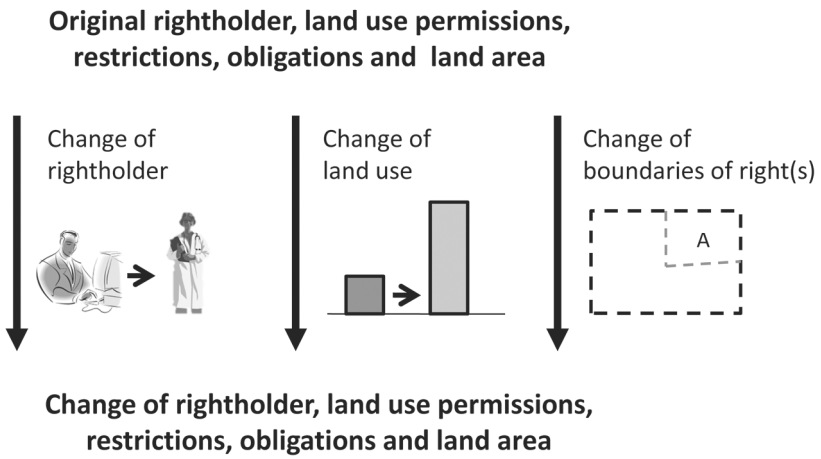

Figure 3: Need of dynamism in land law (Source: Based on Mattsson 1997).

Land development is the dynamic factor in the land sector including executive components. This can include the change of land rights and the implementation of activities needed for the new land use. One example could be a change from agriculture to housing. Actually, preservation like creation of national parks, nature reserves and cultural heritage areas can also be seen as land development as it can be assumed that it is a change to a better use.

At least two types of land development can be observed. One is to develop land within current (existing) land rights and permitted use (e.g. change of crop rotation, develop permitted constructions). The other type is the changes of land rights. Development is in this situation close to land administration and a prerequisite for new land use management. The first one can also be said to be mainly about physical changes, the other about abstract changes related to rights.

In Wikipedia, land development refers to altering the landscape in any number of ways such as changing landforms from a natural or semi-natural state for a purpose such as agriculture or housing, subdividing real estate into lots, typically for the purpose of building homes,

and developing property or changing its purpose, for example by converting an unused factory complex into condominia (Wikipedia).

Proposal for a concise definition: *Land development is the bundle of methods to change land use including land rights. To bring about changes, there can be a need to minor and/or radical changes in land policy, land use management and/or land administration.*

Land Use Planning

Planning is a concept not comparable with the other concepts in this article as planning is a needed tool for taking care of more or less all parts of the land sector activities. Especially for the dynamic part, what we here call land use planning, is important. That is why *planning* and *land use planning* are also discussed.

Planning (also called forethought) is the process of thinking about and organizing the activities required to achieve desired goals. It combines forecasting of developments with the preparation of scenarios of how to react to them. An important, albeit often ignored aspect of planning, is the relationship it holds with forecasting. Forecasting can be described as predicting what the future will look like, whereas planning predicts what the future should look like. It helps with coping with complexities. The counterpart to planning is spontaneous order (Wikipedia).

Planning is a supporting tool for national and local governments to regulate land use and development in an efficient way. Planning without implementation tools is, however, in principle, often wasted time. So, the land sector needs both planning and implementation tools to be efficient. It shall be observed that one part of land governance, as well as land policy, is to develop such tools. One of the strongest implementation tools is to make planning results legally binding for land users. It shall also be noticed that different types of planning are needed for land governance, policy, management, administration and development. Planning documents related to land use can be found in policy documents, blue-print plans, etc. and even in legislation.

Planning approaches can, for example, be divided into three main types: urban, peri-urban and rural. Of course, there are a lot of "subtypes" of these planning types.

Urban planning (urban, city, and town planning) is a technical and political process concerned with the use of land and design of the urban environment, including transportation networks, to guide and ensure the orderly development of urban areas. It concerns itself with research and analysis, strategic thinking, architecture, urban design, public consultation, policy recommendations, implementation and management. A plan can take a variety of forms including strategic plans, comprehensive plans, renewal plans, neighbourhood plans, regulatory and incentive strategies, or *historic preservation* plans. (Wikipedia)

Peri-urban areas are defined by the structure resulting from the process of peri-urbanisation. It can be described as the landscape interface between town and country or also as the rural-urban transition zone, where urban and rural uses mix and often clash. It can thus be viewed

as a landscape type in its own right, one forged from an interaction of urban and rural land use (Wikipedia). Here we can talk about *peri-urban planning*.

In general *rural* areas are geographic areas outside urban areas. Some main land uses are agriculture, forestry, pastoralism and pastoral farming, water use and nature conservation. A lot of infrastructure is also located to rural areas like water and nuclear power plants with power lines, roads, railways, and rivers for shipping. Mines can also have great impact on land use. To handle and promote all those activities and also to avoid conflicts between the different users, rural planning and implementation tools are needed.

Proposal for a concise definition: *Land use planning is the process to predict and to decide future land use or to formulate a proper sequence for the implementation of a plan.*

3. Summary of possible definitions for land governance concepts

From the discussions above it is clear that it is impossible to define land governance, land policy, land (use) management, land administration, land development and land use planning in such a way that they are strictly separated. The boundaries between the definitions are fuzzy and perhaps especially between land governance and land management. Each of the concepts has some unique functions, but in general they are connected and partly overlapping (Figure 2). The current article has tried to emphasize unique functions with the aim to get a system of the concepts and put them in relation to each other.

A comprehensive overview over the proposed definitions based on what we judge as the lowest common denominator is:

1. Land governance is the government's complex task to guide, overlook and steer the land sector by creation of action space for promoted activities.
2. Land policy is the creation of guiding principles for land use.
3. Land (use) management is the work related to use of land resources within current policy guidelines taking into consideration the legal framework for a specific land area.
4. Land administration embraces legal rules for land use related to a certain area. As information (site, value, etc.) about such an area is essential, the tools for assessing, documenting and mapping this information are parts of land administration.
5. Land development is the bundle of methods to change land use including land rights. To bring about changes, there can be a need to minor and/or radical changes in land policy, land use management and/or land administration.
6. Land use planning is the process to predict and decide future land use or to formulate a proper sequence for implementation of a plan.

However, it can be impossible to develop one accepted, unique structure for all mentioned concepts as they are used today in so many different ways by different authors. But to avoid

all confusions, a debate must at least start for the development of a congruent system. Otherwise there is a risk for confused discussions in the academic world and also within all other international land related organisations. As the situation with terminology is so unclear, we recommend authors of land-related articles always to define shortly what they mean with land related concepts so that it is clear for the reader.

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Leikny Gammelmo*

Land Registration Systems

Their Role in Modern Society

1. Introduction

1.1 The key role of land

Land registration systems provide us with information about real property. This information is important for the property and credit markets, land administration, land management, land policy and mortgages. *Millions of people around the world face difficulties related to the land where they live, work (…). Even though they or their families may have lived on the land for many years, it is a serious obstacle that they have no formal relationship to it* (UN 2012b). Security of land and property rights for everyone is important. Many people still do not have legal rights, and even if they have legal rights, they may not have formal documents to prove it (UN 2012a) or their country may not have a formal land registration system.

It is a problem that not all people have legal rights in land. The FIG Workshop in 1999 broadened its focus to include the role of land administration in serving the changing humankind-land relationship and recognize the imperative to achieve sustainable development. The Bathurst Declaration on Land Administration for Sustainable Development points out that in every continent there are people whose customary rights to land and natural resources are ignored (FIG 1999). The declaration provides us with a list of the most serious problems with respect to the relationship between land and people. Among them are lack of land for suitable urban development; lack of security of tenure; lack of access to land, especially for women; and lack of adequate planning and effective land administration. Land and real property is a key to household wealth (Deininger and Feder 2009). This problem remains the subject of debate, e.g. UN (2005) and Williamson et al. (2010), and the solutions are not obvious. As we will see, land registers can provide information about land rights and ownership, but the same land registration system will not be effective in all jurisdictions.

Where we live affects property formation, access to land, and planning. Statistics and forecasts for the growth of humankind say that most people will live in cities and urban areas. It has been said that *half of humanity now lives in cities and by the middle of this century, 70 per cent of the world's people will live in urban areas. (…) Pressure on land is increasing because of a rising world population* (UN 2012b:1–2). One of the planning tools for dealing with this situation is the land registration system, used in combination with other information like population forecasts.

* Norwegian University of Life Sciences, Department of Landscape Architecture and Spatial Planning, Ås / Norway.

In relation to economics, making money available, and the transfer of money, de Soto (2001) pointed out the benefit of registration systems in terms of facilitating access to capital and making people accountable. Real property gives people the ability to fulfil their dreams and allows the national economy to function. Trade in land rights depends, among other things, on the type of land registration system. A formal land registration system enables impersonal exchange. According to Arruñada (2012), opportunities for economic development are greater when trade is impersonal rather than being limited to known people. This is related to uncertainty. The more complex and unique the issues are, the more uncertain the outcome is. Institutions can reduce this uncertainty (North 1990). The relevant information can be found in the land registration system.

1.2 Aim and structure

In literature and research, you find different terms used to discuss real property and property formation. Terms seem to differ around the world and even within a country. It can be a problem that we do not use terms consistently and give them different meanings. This paper therefore starts by examining the literature and defining the terms so they can be useful and increase our understanding of the subject. It mainly bases itself on Williamson et al. (2010) and literature from the UN. This has become a smaller part of the review as the newer literature refers to much of the same older literature, and the terminology appears less inconsistent than initially anticipated. Nevertheless, it is always necessary to interpret the terms in their contexts.

The purpose of this paper is to review some of the literature concerning land registration systems and their possible role in modern society. In this way, the paper aims to create a framework for future work and to give a platform for understanding international literature and studies. It will provide an understanding of the land registration system as an important information source for public administration and land policy, land administration and land management, and land use (see figure 2). This is done by providing an overview of the building blocks of land registration systems, the different types of registration systems, and possible uses and users.

1.3 Method

The method used is a literature study. The literature is *a body of information existing in a wide variety of stored formats that has conceptual relevance for a particular topic of inquiry* (Groat and Wang 2002). In a literature study, we have to use this body of information to get an overview of the topic of inquiry according to key sources, key theories, and the major issues and debates about the topic. The paper should be presented in a form which is appropriate, and report the research accurately and in an accessible manner (Oliver 2010:168). Reviewing previous research can help to develop sharper and more insightful questions about the topic (Yin 2014:14–15). The study is limited to literature written in English and in the Nordic languages. This might mean that relevant literature is overlooked.

2. Land registration systems

2.1 Land information in registers and cadastres

If we want other people to recognise real property and property rights, they need to be found in a register. There are different types of land registration systems. According to Henssen (1995), land registers and cadastres usually complement each other, and operate as interactive systems. In principle, land registers focus on the subject-right relationship, whereas cadastres focus on the right-object relationship (see figure 1). This connection between the different parts is often used when describing land registration systems (see also Sevatdal and Sky 2003; Hegstad 2003:51).

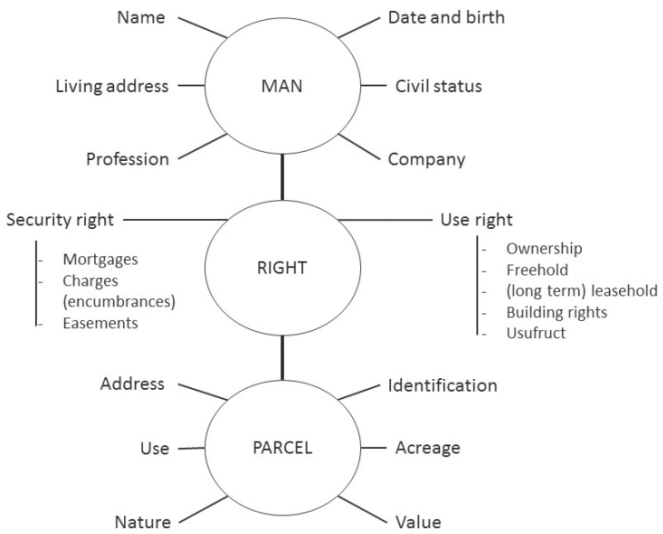

Figure 1: The building blocks of a land registration system includes information about objects and subjects, and the relationship between them (Henssen 1995).

According to FIG (1999), a land register is a public inventory used to record the existence of deeds or title documents, and a land information system (LIS) is a system for acquiring, processing, storing and distributing information about land. The function of a land registration system is said to be providing *a safe and certain foundation for the acquisition, enjoyment and disposal of rights in land* (UN 1996:11; 2005:18). Larsson (1991:18) points out that there is not always a clear distinction between the cadastre and the legal land registration system. However, in many countries, courts or special land registry agencies carry out land registration and separate organizations are responsible for the cadastre.

A cadastre is a register of land information (Williamson et al. 2010:449). It is normally a parcel-based and up-to-date system containing a record of interests in land (rights, restrictions, and responsibilities). It usually includes a geometric description of land parcels linked to other records describing the nature of the interests, the ownership or control of

those interests, and often the value of the parcel and its improvements. It may be established for fiscal purposes, legal purposes, to assist in the management of land and land use, and to facilitate sustainable development and environmental protection. *The cadastral map is an official map showing the boundaries of land parcels, often buildings on land, the parcel identifier, and sometimes references to boundary markers. Cadastral maps may also show limited topographic features* (Williamson et al. 2010:449). This is the same definition that can be used for the land registration system: a land register is said to be *a set of records of rights in land. It is the result of a process known as land registration in which the evidence of ownership of rights to the land is recorded and in many countries guaranteed* (UN 2005:18).

The degree of formality of the land registration system can differ between jurisdictions. Informal systems depend on people, their relationships, and institutions, like rules about legitimacy and authority. These systems provide less security of tenure and do not allow property owners to obtain a mortgage. Formal systems build on the relevant institutions of the country. The UN guidelines (1996:7) are based on the assumption that a formal system is necessary for registering land and property and providing secure ownership. Formal systems can be improved to provide security for the owner and several other stakeholders, like a potential buyer or the public administration in their handling of an application for property formation.

2.2 Recording rights in land

With respect to recording rights in land, the UN report from 2005 divides this into three categories: *(a) private land transfer; (b) the registration of deeds; and (c) the registration of title* (UN 2005:32). A deed is a legal document by which one person conveys land, tenements, or hereditaments to another, *when the requirements of the contract are met* (UN 2005:97). Title is *the evidence of a person's right to property* (UN 2005:102). Registering deeds is a system for tracking changes of ownership or the transfer of rights in land, and registering title is a system whereby a register of ownership confers and protects the title (Williamson et al. 2010). In the case of registering title, the Torrens system is based upon the principle *that the registered proprietor has indefeasible title* (Wu 2008:672). Indefeasible title means that the registered proprietor's title is paramount; a prior unregistered interest, except in certain categories prescribed by statute, cannot defeat it. The system is said to enshrine the mirror principle: the register effectively reflects all interests affecting the land (Wu 2008:673). The opposite of this type of register is a register of voluntary agreements. This system does not have the same mirror effect and it is possible that there exist rights or agreements not officially registered. Registers today are often a mixture of deed and title registers.

To implement a formal registration system there is a need for laws, regulations and other institutions. Institutions are the rules of the game – the rules for human behaviour (North 1990). According to North the *major role of institutions in a society is to reduce uncertainty by establishing a stable structure to human interaction* (1990:6). Institutions provide the structure for exchange that determines the cost of transacting and the cost of finding information (North 1990:34). Institutions may be created, or they can evolve over time. Rules can tell

you what you must not do, what you must do and what you may do. In this way they make the *framework within which human interaction takes place* (North 1990:4). Institutions can differ between countries. There is a need for institutional diversity, reflecting the fact that people create institutions to establish the rules they need to get the best outcomes for themselves and others (discussed in Ostrom 2005 and 2012). There are different laws in different jurisdictions. Some types of laws can be set up that particularly affect the land administrator. This can be laws dealing with: land reforms; restitution of former private land and land consolidation; and the conduct of land administration such as the regulations that control the operation of the cadastre (UN 1996:42).

2.3 Choosing a system

Before choosing a land registration system, it is important to know the purpose of the system. Unlike people, the system does not have a value in itself. In this context, the system's value lies in information about real property, ownership and boundaries. Simpson (1976) says that *land registration is only a means to an end. It is not an end in itself.* Much time, money, and effort can be wasted if that elementary truth is forgotten (Feder and Nishio 1999:25). Therefore, the land registration system itself is not a magical tool that will automatically ensure appropriate development and use of land resources (Hegstad 2007:237).

According to Williamson et al. (2010:15–16), informal systems are the most common ones. They also say that there is a global trend towards managing land through formal systems driven by the traditional benefits of land administration systems. The important question to ask is why we want to build a land administration system (Williamson et al. 2010). The answer is to satisfy human needs or, more specifically, to reduce insecurity of tenure. The benefits of a land administration system include support for governance and the rule of law, security of tenure, support for formal land markets, security for credit, support for land and property taxation, management of land disputes, improvement of land planning, development of infrastructure, and management of information and statistical data (Williamson et al. 2010:15).

Arruñada (2014:3) points out that some people see registries as unnecessary barriers rather than as facilitators of transactions. If the registers are too complicated, like the ones shown in the examples in de Soto (2001), the system creates transaction costs and barriers. When it takes years to go through a legal process, some people will always take shortcuts. If a legal register adequately meets the needs of the jurisdiction it will provide security and the transaction costs will fall (Arruñada ,2012). It is also argued that the benefits and costs cannot always be quantified in cash terms (UN 1996:15).

Steudler et al. (2004) say that land administration systems, and in particular their central cadastral components, are essential elements of countries' national infrastructures. These systems are concerned with the administration of land as a natural resource, to ensure its sustainable use and development, and are as such concerned with the social, legal, economic and technical framework within which land managers and administrators must operate.

In the search for a system or a model for reviewing an evolving system like a land registration system, Steudler et al. (2004) argued that currently there are no internationally accepted methodologies for evaluating and comparing the performance of land administration systems. This is because land administration systems are constantly being reformed, and because they represent societies' different perceptions of land. They provide a model, which links the operational aspects of land administration with land policy. Hanstad *considers the relative importance of land registration and asks when a formal land registration system should be established, what type of land registration system is preferable, and how to establish and maintain the system* (Hanstad 1998:649). It appears that each jurisdiction needs to find its own solution to its needs. You cannot take one system and think it will work everywhere (Steudler et al. 2004).

2.4 Public administration

Public administration is connected to leadership of public affairs, democracy, concepts of justice, liberty, and full economic opportunity for human beings. Public administration is concerned with people, ideas, and things. It has been said that research on public administration builds on four parent disciplines: law; economics; political science; and sociology (Thiel 2014:1). Public administration deals with many different tasks and it is necessary to define which elements of these are relevant in this context. The public administration in the context of land registration systems is those parts of government that deal with real property such as the planning authority, the reviewer of applications for alteration of real property, the land surveyor, and the registrar of the land register and cadastral map. The role of the public administration depends on the particular jurisdiction under investigation. The following quotation from the UN summarises this perspective and role of public administration: *In a market economy it is the actors in the market that play the main role. The task of the public administration must, to a varying degree, be to take away the market imperfections, redistribute resources, and to put in place the legal framework to regulate the market's behaviour. This is done through rules and laws with different objectives* (UN 1996:22).

The work of the public administration can be of great importance, among others things to overcome various social traps and dilemmas, and can be described as a bridge builder. The public administration can *build bridges between two worlds: between the formal and the informal, between statutory and customary, between professionals and the community, between formal cadastres and the real situation on the ground* (UN 2010:139).

2.5 Examples from Nordic countries

In the Nordic countries the public administration can be divided into two categories: the decision-making authority and the inspectors. Three examples are discussed below. In these examples the land registration system is used in the process of property formation, more specifically in the subdivision of one real property into two (or more). The examples are taken from a study of the practice and systems in the Nordic countries, put together by Kort & Matrikelstyrelsen (2006) and they deal with the context of property formation.

In Denmark land surveyors do not belong to the public administration; they are employed by private surveying companies. The public administration consists of the cadastral authority, the official registration authority, and the municipality. Briefly explained, the cadastral authority provides cadastral information, checks applications, and updates the cadastral register. The official registration authority provides information about property rights, updates the register ("tingboken"), and allocates servitudes. The municipality provides information about the owners, neighbours and land use plans, makes a statement on the case, and provides the new property identification number (Kristiansen 2006).

In Sweden there are national and municipal surveying authorities within the public administration, as well as a registration authority. The surveying authorities check that all formalities are in order and ask the municipality for its consent if necessary. Then they perform the survey, settle the boundaries and agreements needed for the new real property, and update the register. The registration authority within the national survey authority updates the register of owners (Julstad 2006).

In Norway the public administration is mostly represented through the municipality. The municipality checks that all formalities are in order and provides permission for subdivision, performs land surveying, updates the cadastre, provides the new property identification number, and informs the registration authority (Sevatdal and Hegstad 2006).

2.6 Land policy

The political process leads to a land policy, which is defined as *the result of the choices and actions of policymakers, who contemplate land use, public interests, and rights. From a contractarian perspective, land policy is a manifestation of the social contract with regard to land use. Planners and other policymakers let their version of the social contract guide them whenever they promote or deny certain land use* (Davy 2012:31). Further, he says that there are a variety of solutions that the policymakers have come up with as responses to social, economic, environmental, or political challenges. According to Kovac (2009) land policy instruments in a country are directly connected to the relationship between the role of the private property and the use of governmental means to attain certain aims. In order to manage land properly, land professionals have developed policies and tools to implement policies.

2.7 Land administration

The information in the land registration systems is used for land administration. Land administration is referred to as the *processes of recording and disseminating information about ownership, value and use of land and its associated resources* (UN 1996:14). The land administration system should then produce benefits like a guarantee of ownership and security of tenure, support for land and property taxation, provide security for credit, reduce land disputes, improve urban planning and infrastructure development and support environmental management (UN 1996; 2005). A good land administration system is said to *permit the integration of records of land ownership, land value and land use with sociological, economic and environmental data in support of physical planning* (UN 1996:17).

2.8 Land management

Land management is described by FIG (1999) as the activities associated with the management of land as a resource from both an environmental and an economic perspective towards sustainable development. The UN guidelines (1996:13) also describe land management as a process, a process by which land resources are put to good effect. It covers all activities concerned with the management of land such as property conveyancing, including decisions on mortgages and investment, property assessment and valuation, the formulation and implementation of land-use policies, and the monitoring of all activities on land that affect the best use of that land. Land management is also described as putting *land resources into efficient use for producing food, providing shelter and other forms of real estate or preserving valuable resources for environmental or cultural reasons* (UN 2010:151). Land management systems in Europe are reported to be highly diverse. Studies presented at the Symposiums by the European Academy of Land Use and Development shows that there are *a great variety of procedures, institutional settings and stakeholders, caused and influenced by historical, legal, social, economic and ecological factors* (Hepperle et al. 2013:5).

2.9 Land use

Land use is *the manner in which land is used* (Williamson et al. 2010:454). Davy describes the connections between land policy and the use of the land by referring to causality. Causality is about one thing causing something else to happen, often written as C→E, where C is one or several cause(s) and E is an effect or a number of effects (Davy 2012:39). This matters to planners and to policy makers. *Policy makers base their land policy proposals on their conviction – or at least, hope – that the implementation of their proposal will improve the use of land* (Davy 2012:59). In this way a good land policy should cause good land use. Land policy must deal with land as relational space and planning as the reshaping of a social situation (Davy 2012:63). Policy makers do not necessarily believe that one best use actually exists and they cannot be successful if they insist that only one reading of the land is correct (Davy 2012:65). Figure 2 illustrates the connection and effects. The basis for the figure is a linear version provided by FIG in 1999.

3. Discussion

A land registration system can provide information necessary for land use planning and land policy. The development of land tenure and the land registration system is closely related to the history, climate, and other characteristics of the country. *The result has been the development of a system of land tenure and laws peculiar to each country* (Hessen 1976:184). This could also be said to apply to research on land-related questions. Land registration systems have not developed in the same everywhere. They include some of the same parts, such as the physical object and the rights in this object, but in other ways, they differ. If the legal register is to guarantee rights in land, these rights must be clearly defined. Nevertheless, land rights can be ambiguous and may vary even from region to region. Registration can help to clarify this situation (Larsson 1991:85).

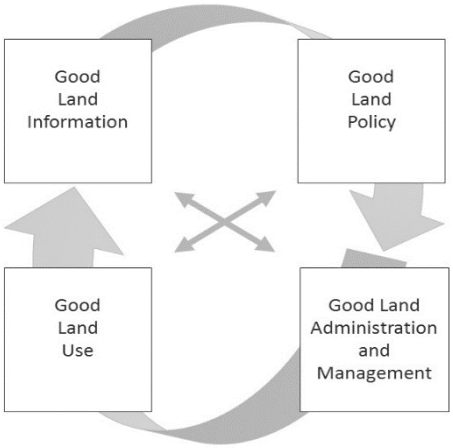

Figure 2: This figure illustrates the positive effects of providing good land information, in the sense of trustworthy and up-to date data in the land register.

Information in a land registration system is of importance to transaction costs. Of particular interest are transaction costs that are hard to measure. Musole refers to the works of North from 1987 and 1990 in which he divided transaction costs into two categories: market costs and the cost of the time that each party must devote to gathering information. North identified a type of non-market transaction costs. This type of transaction cost includes the high cost of searching where information is not easily available. These costs are hard to measure and complicate the assessment of total transaction costs associated with a particular institution (Musole 2009:47). Land registration systems can be needed for reducing transaction cost, selling and buying property, and security for mortgage.

Another benefit of having a land registration system is that there will be less litigation and less work for courts. According to Larsson, all of society has *much to gain by clarifying boundaries and rights in land. Undoubtedly, the best way to do so is by establishing an efficient and comprehensive system of land registration. It can practically eliminate all uncertainty concerning the extent and content of rights in land. The essence of such a system is to define both the concepts of different rights and their objects* (1991:69). Even so, countries with a legal land registration system can have boundary disputes, partly because of the poor quality of the information. As an example, Norway has more boundary disputes than the other Nordic countries (Mjøs 2016).

Knowing possible land uses helps owners to store and increase their wealth (Davy 2012:69). Landowners will make investments if they can be certain of their reward. This corresponds with what Williamson et al. (2010:40) have written about the land as capital, and with de Soto (2001), whose main argument for having land registration systems is to release capital. We thus need a formal system that includes, as a minimum requirement, a cadastral map and register of rights, like ownership, to provide security. Having a more complex system

which gives information about areas such as possible land use and land policy, like a land administration system, provides an even better foundation for taking good or at least well-founded decisions. Williamson et al. (2010) focus on using systems to build land markets.

4. Final remarks

The purpose of this paper was to review literature concerning land registration systems and their role in modern society. This has been done by seeking the original sources through newer literature. The systems' possible roles in modern society are seen in processes including planning, property formation, land administration, management and land policy.

The paper provides an overview of the building blocks of the information in the land registration systems, before discussing different registration systems. Land registration systems can be complex or more simple. To achieve the benefits mentioned above they need to be public registers that are open to all, with up-to-date information. According to Arruñada (2012:7) there are three attributes that summarise the organisational requirements of public registers: efficiency, independence, and effective access. The need for information related to areas such as the environment, economy and natural resources, is leading to the need for land registration systems to evolve into land administration systems. The connection between land registration system, land use and land policy is described in figure 2, which gives a visualisation of the connection between the topics discussed in this paper.

The UN (2012c:2) *states that the urban environment needs relevant data to function efficiently, now and in the future, which land information systems such as cadastre and land records can provide. In other words, governments at local and central levels need to provide an institutional setup, including policy, legislation and organization, for the implementation of sustainable land information*. Property rights are fundamental to the conceptualisation and implementation of land policies (Ingram and Hong 2009:xi). The UN (2012b:ix) points out that secure land tenure and property rights are fundamental to a wide range of development issues like housing, human rights, economic prosperity and sustainable urban and rural development. The land registration system can provide the necessary information. The cadastre can play a key role in connecting information from other registries (Hegstad 2014); it is a multipurpose register.

Land registration systems give a basis for making changes, and can greatly help with making good land policy decisions. Land registration systems can be an important tool for the public administration in its work with land administration. Having an up-to-date and a trustworthy land registration system is important to reducing the transaction costs involved in obtaining information. This applies both to people selling and buying land, and to banks and others that use land as security. The UN goes as far as to say that *Policy goals can not be achieved unless there is an effective land administration infrastructure with modern information technology providing effective citizen access to information* (UN 2005:iii). The overall discourse in this field seems to agree that the information contained in land registration systems is fundamental to land administration and management, and plays an important role in modern society.

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Józef Hernik*, Robert Dixon-Gough**, Krzysztof Gawroński** and Barbara Czesak**

Contrasting Approaches to the Conservation of Cultural Landscapes of National Parks in England, Wales and Poland

1. Introduction

Over the past two centuries the functions of industrialisation, the economy and society have wrought significant changes to the evolving landscapes of Europe. However, despite those changes, the majority of Europe is still essentially rural and many mountain regions are still farmed using practices that are recognisable to those used in the early nineteenth century (Curry & Ravenscroft 2001).

The modern concept of a national park is defined by the International Union for the Conservation of Nature (IUCN) followed the model developed in the USA and later used throughout the world, which declared in 1969 that they should cover a relatively large area (Selman 2009). Furthermore, the ecosystems within that area should be largely unaltered by the action of humankind and the area should be of special scientific, educational and encompass a natural landscape of great beauty. The national park should be protected by legislation and visitors permitted to enter under special conditions (Shafer 2015).

Such concepts, whilst being admirable in land areas that have relatively low population densities are virtually unworkable in most parts of a densely populated Europe. Whilst the designation of national park is international, the ways in which this term is translated into the governance of different states has different meanings and contexts with respect to the cultural landscape.

The aim of this paper is to examine the models of national parks in the respective jurisdictions of England and Wales, and Poland.

2. The Geography of the States

Firstly, the population densities differ between the two countries. In England and Wales, the population density measured in 2013 was 413 per km^2, although when London is excluded from those figures the population density is reduced to about 149 per km2 (ONS 2015). This is in contrast to the last measured average population in Poland of 122 per km2. England, in particular, is one of the most densely populated countries in Europe, whilst Poland is one of the least densely populated (EUROSTAT 2015). Furthermore, the major

* University of Agriculture in Kraków, Faculty of Environmental Engineering and Land Surveying / Poland, Corresponding Author (rmhernik@cyf-kr.edu.pl).

** University of Agriculture in Kraków, Faculty of Environmental Engineering and Land Surveying / Poland.

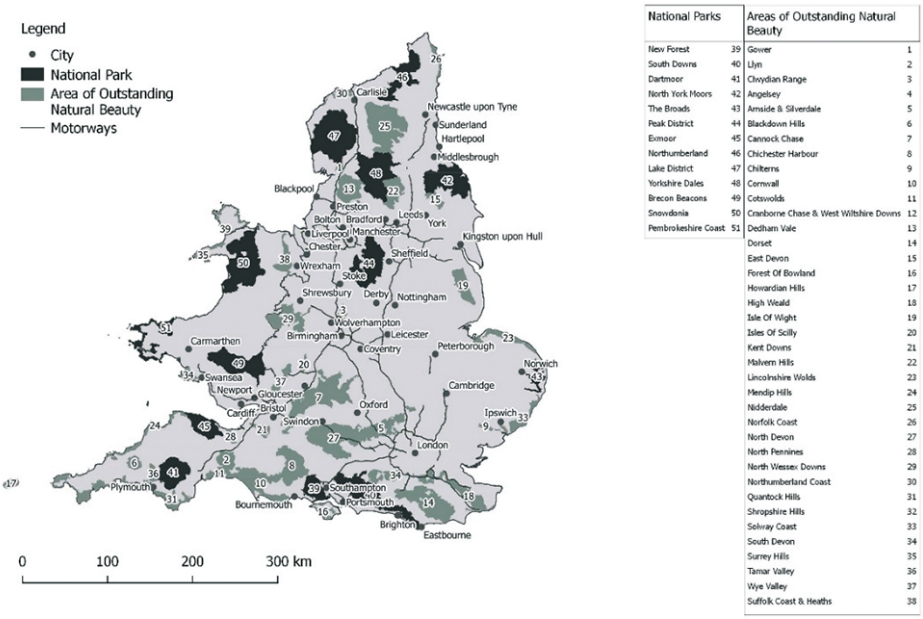

Figure 1: National Parks and Areas of Outstanding Natural Beauty in England and Wales. Based upon the open data from: Open Street Map, Ordnance Survey, Natural England and Lle – National Geo-Portal for Wales.

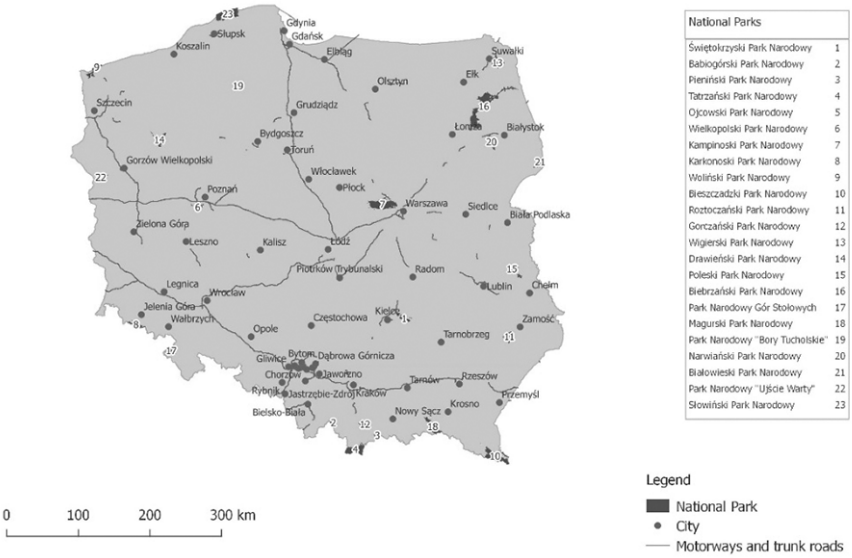

Figure 2: National Parks in Poland. Based upon the open data from: Open Street Map, Polish General Directorate for Environmental Protection (pol. Generalna Dyrekcja Ochrony Środowiska) and Main Centre of Geodetic and Cartographic Documentation (pol. Centralny Ośrodek Dokumentacji Geodezyjnej i Kartograficznej).

urban areas in England and Wales are more concentrated than in Poland, although those in Wales are concentrated along the southern coastal fringe. As a result, the communication networks are more developed in both England and Wales and few large communities are any distance from the motorway network (See Fig. 1 NPs and AONBs in E&W and Fig. 2 NPs in Poland). This is quite the reverse in Poland since urban areas are greater distances apart and, consequently, the motorway network less extensive.

The location of the national parks in the respective study areas are also defined by the geography of the state. In England and Wales, the national parks can be broadly grouped into those on or near to coastal regions and those in mountainous regions. Because of the nature and intensive way in which land is utilised in England and Wales, the most likely candidates for national parks were in such areas where the influences of urbanisation were less pronounced. The situation in Poland is that the majority of the national parks are situated around the periphery of the country and some distance from intensive urban developments. Based upon this, the visitor impact upon the national parks of England and Wales is likely to be far greater than that of Poland. The relative merits of the national parks in England and Wales is that they are never far from major industrial and holiday centres and are, thus, easily visited by large numbers of people, many of whom now travel independently by car. In contrast, however, most of the national parks in Poland are located in sparsely populated and poorly developed, remote areas.

3. The Origin of the National Parks of England and Wales

The original concept for a national park in England grew from the romanticism with 'wildscapes' during the early part of the nineteenth century. The region that attracted the most attention was the Lake District of northwest England, which was portrayed as a paragon of sublime and picturesque scenery (Scott 2010).

Long before the national parks were established in England and Wales, various organisations expressed an interest in the conservation of the Lake District. Plans to extend the railway network into the unspoilt, mountainous parts of the region gave impetus to this and led to the formation of an English Lake District Association. Support for this support came from diverse interest groups who banded together as the English Lake District Association (Berry & Beard 1980). One of the fundamental aims of this body was to maintain existing roads and footpaths in good order to encourage visitors to walk throughout the region. In 1879 the English Lake District Association amalgamated with the Lake District Advertising Association to publicize and open out the Lake District, with all that it involved. In 1895, under the influence of Canon H.D. Rawnsley, the National Trust was founded. In its early days the Trust was largely a Lake District institution and in 1902 it acquired its first Lake District property. Further property was gifted to the Trust through individuals such as Beatrix Potter, G.M. Trevelyan and Sir Samuel Scott and now it is the largest single landowner in the national park, controlling nearly a quarter of its area. During the 1930s a Lake District Safeguarding Association was formed and, fortunately, changed its name to become the Friends of the Lake District, a vocal and active pressure group.

Following the creation of national parks in America and Africa, there were proposals during the early part of the twentieth century to create one or more parks in Scotland. Although smaller than the Yellowstone national park of Wyoming, they were comparable in size to the Yosemite Valley (Sheail 1975). The national park movement in Britain, originated in 1929 when the Council for the Preservation of Rural England (CPRE) launched the campaign for their establishment. The Addison Committee was formed to consider the feasibility of such parks in the combined contexts of preserving the natural landscape and wildlife, and improving facilities for recreation, two divergent aims. The 1931 Addison report came out in favour of national parks on both counts but, in practical terms, nothing immediate was done.

When the Standing Committee on National Parks was set up by the voluntary bodies on 5 May 1936, it attempted to co-ordinate all interests – recreation, amenity, and nature conservation – in a concerted effort to force the hands of the politicians. One of its leading lights was John Dower who believed that all the outdoor interests should combine to campaign for the national parks and that recreation and conservation (and education) must come together for the common good.

The national parks of England and Wales were born out of conflict, largely between those who viewed the landscape in terms of culture, beauty, and tranquillity, and those who considered the landscape as a means of escaping the oppression of an industrialised society. Between those two extremes were the landowners, many of whom lived some distance away, whilst tenant farmers struggled to make a living from the inhospitable mountains and valleys. It is natural, therefore, that conflicts emerged between the main two contrasting groups that was eventually to be fuelled by two World Wars, and the consequential change of social and economic attitudes. Whilst this 'conflict' was experienced throughout the mountain landscapes of Great Britain, it was perhaps best synthesised through the region that became known as the 'Lake District,' which later gave its name to the Lake District National Park.

In July 1938, the Standing Committee published The Case for National Parks in Great Britain (SCNP 1938). It defined a national park as:

(...) an extensive district of beautiful wilder landscape, strictly preserved in its natural aspect and kept or made widely accessible for public enjoyment and open-air recreation, including particularly cross-country walking, while continued in its traditional farming use.

The Second World War was the catalyst for the 'State Control' of the landscape. During the war years there was a conviction that pre-war Britain would be replaced by the concept of a brave new world: a land fit for heroes in which the landscape would be enjoyed by all. But one of the greatest problems laid in who owns the land. Since nationalization of the land was not considered to be a viable option, even though landowners and their tenant farmers received significant subsidies from the government, some form of compromise had to be reached. In the case of land owned by the National Trust, the public has enjoyed access over that land because the Trust chose to welcome the public on to it. One of the initial aims of the National Trust, particularly in the upland areas of the Lake District was, through

National Trust Act of 1907, to keep all the commons it owned 'unenclosed and unbuilt on as open spaces for the recreation and enjoyment of the public' (Shoad 1999). This relationship between National Trust ownership and public access was further enhanced through the establishment of the National Land Fund in 1946. Through this fund, surplus wartime supplies were sold off to pay the Inland Revenue for land or historic buildings offered to it in lieu of inheritance taxes. One of the beneficiaries of this was the National Trust, to whom property acquired through the Fund was given, even though the organisation remained independent from central government.

As a result of deliberations taken during the course of the Second World War and immediately afterwards (the Scott Committee on planning in rural areas, by John Dower on National Parks areas, and by the Hobhouse Committee on National Parks and Access) the National Parks and Access to the Countryside Act of 1949 provided for the introduction of national parks to England and Wales in which access was to be granted over wide areas of great natural beauty. Other regions of similar landscape value could be designated as Areas of Outstanding Natural Beauty (AONB). In the formation of national parks in England and

Table 1: National parks in England and Wales (Source: http://www.nationalparks.gov.uk/learningabout/whatisanationalpark/factsandfigures, 2016)

National park	Year Designated	Area (km^2)	Population	Visitor days per Year (million)
Lake District	1951	2292	40800	24.0
Dartmoor	1951	953	34000	3.1
Peak District	1951	1437	37905	11.75
Snowdonia	1951	2176	25482	10.4
Pembrokeshire Coast	1952	621	22800	13.0
North York Moors	1952	1434	23380	10.8
Exmoor	1954	694	10600	2.0
Yorkshire Dales	1954	1769	19654	12.6
Northumberland	1956	1048	2200	1.7
Brecon Beacons	1957	1344	32000	5.0
Norfolk Broads	1989	303	6271	15.5
New Forest	2005	570	34922	13.5
South Downs	2010	1624	120000	39.0

Wales, there was a preponderance of upland moorland landscapes perhaps reflecting the northern roots of many of the activists close to the levers of power (Smout 2000:162). The distribution of the AONBs demonstrated a more even geographical spread. The northern emphasis as, to some small extent by the more recent designation of three southern national parks (Table1).

In the context of IUCN designations, the national parks are defined as 'protected landscapes' in which the land is primarily owned by private individuals who live and work within the landscape, over whom special planning controls are exercised.

4. The Origin of National Parks in Poland

Poland has a long tradition of nature conservation that may be dated back as far as the 14th century (Zawilińska and Mika 2013). Primarily nature was protected from religious and economic reasons. As in the case of England and Wales, the impetus for the founding of the parks came from the 1930s. The idea of the Polish national parks was proposed by Władysław Szefer who considered that the most ideal national park is an area in which all possible features of nature are protected and human influence is strictly limited. The only rule of rationalisation that should be assumed is that a national park should, above all, emphasise the primeval nature of the region, where plants, animals and the natural landscape should have absolute protection to ensure that those elements are not changed. Therefore the first Polish national park was created in the primeval area of Białowieski Forests where there were no human settlements in 1932 (Goetel 1959). At the same time Władysław Szafer assumed that traditional pastures should be maintained, for example, in the Tatra Mountains but such actions as introducing foreign plants is unacceptable.

Soon after the first national parks (Pieniny NP and Białowieża NP) were created, in 1934 Polish government introduced the first act on environmental protection. Gradually new national parks were created. Some of them required international cooperation as naturally valuable areas do not respect boarders. Such was the case with Tatra National Park and already in 1924 a necessary agreement facilitating tourism in both countries was made between Poland and neighbouring Czechoslovakia (Radecki 2014).

Nowadays, the formal definition of a Polish national park is provided by the 2004 Act on Nature Conservation. This Act pronounces that a national park covers an area featured by unique natural, scientific, social, cultural and educational values and, furthermore has an area not smaller than 1000 ha. Both nature and landscape are protected under this Act, which defines that a national park:

covers an area of outstanding value for the environmental, scientific, social, cultural and educational, with an area of not less than 1000 ha, which is the protection of the whole nature and qualities of landscape. The national park created to preserve biodiversity, resources, objects and elements of inanimate nature and landscape values, restoring proper state of natural resources and components and reconstruct distorted nature habitats, plants, habitats of animals and habitats of fungi.

Apart from the Pieniny National Park (founded in 1932) and the Tatra National Park (founded in 1947) the majority of the national parks founded in Poland were created between 1950 and 1990. This was the result of national decisions made by central government based upon environmental criteria that failed to take into account the interests of the local community. National parks were not meant to meet the needs of people living around them. They were meant for the pure protection of the nature. Local communities gained an influence on national parks first in 2004 when the current act on Nature Conservation was introduced (Hibszer 2013). This is similar in many respects to the ways in which the national parks were established in England and Wales. A major difference lay with the ownership of the land to which the legal protection of the national park was applied. In the case of England and Wales, none of the land was owned by the state whereas in Poland 15.9% of the total land area of the national parks is presently in private ownership.

Until 2004, the responsibility for the national parks in Poland rested with the Polish Board of National Parks (*Krajowy Zarząd Parków Narodowych*), but this was transferred to the Ministry of the Environment. Most of the national parks are divided into zones in which the land and the ecology is strictly or partially protected and usually surrounded by a protective buffer zone. There is no free access to national parks in Poland and no 'right to roam'. Visitors are confined to designated areas, trails, roads, paths and entrance fees may be charged.

Nine of Polish national parks are part of the international network of UNESCO biosphere reserves.

Table 2: National parks in Poland (Source: Ochrona 2015; Zawilińska and Mika 2013)

National park	Year of establishment	Area [km2]	Number of tourists [thousands]	Landscape zone
Słowiński NP	1967	215.73	304.0	seashores
Wolin NP	1960	81.99	1500.0	
Bory Tucholskie NP	1996	46.13	33.0	lakes
Drawa NP	1990	113.42	18.2	
Warta River Mouth NP	2001	80.74	50.6	
Wielkopolska NP	1957	75.97	1200.0	
Wigry NP	1989	150.79	115.0	
Białowieża NP	1932	105.17	120.0	lowlands
Biebrza NP	1993	592.23	32.0	
Kampinos NP	1959	385.44	1000.0	
Narew NP	1996	73.50	15.3	

Polesie NP	1990	97.60	28.0	
Ojców NP	1956	21.46	400.0	uplands
Roztocze NP	1974	84.83	120.0	
Swiętokrzyski NP	1950	76.26	135.0	
Babia Góra NP	1954	33.94	76.0	mountains
Bieszczady NP	1973	292.02	355.0	
Gorce NP	1981	70.29	80.0	
Table Mountains NP	1993	63.44	367.0	
Karkonosze NP	1959	55.80	2000.0	
Magura NP	1995	194.38	40.0	
Pieniny NP	1932	23.72	719.0	
Tatra NP	1947	211.97	3091.6	
TOTAL		3146.84	11799.5	

5. Conclusion

In both England and Wales, and Poland the national parks are located in less densely populated parts of the country. In England and Wales they are perceived as ideal places to retire to and, as a consequence, the price of property reflects that degree of popularity. There are indications that the same is true in Poland (Hernik et al. 2013). This factor is reflected in the demographics of the national parks and closely surrounding areas. For example, over 40% of the population of the Norfolk Boards and Exmoor National Parks in England are aged 60 or over, thereby emphasising the, already unbalanced demographic structure of rural areas in both countries.

In England and Wales, the restrictive planning legislation in national parks places enormous stresses upon the infrastructure and natural landscapes, whilst the high cost of property creates a division between the wealthy incomers and those who have lived and worked in the area for many generations. No taxes are paid by visitors in England and Wales, although income from tourism is significant albeit, seasonal. The system in Poland is far more controlled with relatively little risk by the visiting of damaging the nature of the national parks.

The final differences are that in Poland the area of national parks cover a mere 1% of Poland's territory. In England, the 10 national parks cover 9.3% of the land cover, whilst in Wales almost 20% of the land cover is occupied by national parks – all of which places extra stress on both those areas not covered by national parks, which provide the room for future developments and the national parks themselves which act as recreational buffers for the surrounding regions. These statements give rise to two questions. Firstly why there is such a big difference between percentage coverage of national parks in Poland, England and

Wales? Secondly, how is this difference related to the respective aims, functions, and definitions of national parks in the respective jurisdictions? Furthermore, it also has to be accepted that the total area of Poland is significantly greater than that of England and Wales combined.

Finally, it is worth considering that a landowner in one of the English or Welsh national parks may have to tolerate public access, may be restricted from making changes not just to buildings but even methods of ploughing and grazing. He may need permission to drain boggy ground or to flood dry land (Jessel 2011:186–187). In Poland any activities in national parks are strictly limited by law (Act 2004). Agriculture in national parks is ruled by the protection strategies of national parks. Picking berries or camping out is banned. Ownership is limited as Polish government has a pre-emption right.

One of the problems encountered in dealing with a title or description that apparently mean the same but when analysed are quite different. This is so in the definitions of 'national' 'parks' described above – both in the ways in which they are defined in the respective jurisdictions but also in the ways in which controls are implemented.

The authors of this preliminary work wish to explore these concepts in more detail and across a wider range of jurisdictions.

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August E. Røsnes*

"Who governs?"

The Landscape between Space, Place and Buildings in Norwegian Spatial Planning

Abstract

The purpose of this paper is to present how the systems dealing with nature and cultural environment conservation, on the one hand, and spatial planning, on the other, work together in Norway. Based on the assumption that the resolution of conflicts between landscape protection and land development interests is influenced by the territorial organisation and the division of responsibilities between the authorities involved, this contribution addresses the following research questions: Is there a functional division of labour between these authorities or will decisions across administrative tiers or territories require coordination to achieve conformity in protection and planning decisions? How is the planning system designed in terms of its structure and instruments for meeting these challenges? How might ambitions to integrate different aspects of protection in spatial planning affect planning processes and the interests involved? The brief answers to these questions are that the organisation of authorities is partially splintered and the responsibilities are overlapping resulting in extensive need for coordination. This coordination will have to take place on a case-by-case basis given that the regulatory instruments for spatial planning at the local level seem to be designed for achieving conformity both with central state protection policies and higher level planning.

1. Introduction

In the context of spatial planning and land management, landscape can be understood as a composite of natural and man-made elements that constitute visible landforms. The landscape that we observe includes elements like mountains, plains, water bodies, vegetation, buildings and other kinds of built structures as well as human uses of all these elements. How we perceive and use the landscape, trying to retain or transform existing elements and produce new ones, is embedded in culture, and related to traditions and technology. Landscape as a cultural phenomenon therefore needs to be regarded in the light of art, customs, beliefs, and all other products of human thought made by people at a particular time (Kunzmann 2004:383). Accordingly, our understanding of the landscape's visual features is not only determined by its pure physical outlines, as emphasised by Meinig (1976), but also by what lies within our heads (Morin 2009). In consequence, our understanding of landscape affects our stance towards the uses of land, how we protect landscape characteristics we wish

* Department of Landscape Architecture and Spatial Planning, Norwegian University of Life Sciences, Oslo / Norway.

to retain, how we plan for new development, and not least, how we create public and private institutions for preserving landscapes and spatial planning.

In Norway, as in other comparable countries, public efforts to retain landscape characteristics and plan for future development are based on the application of institutional instruments of a legal character dealing with spatial planning. Various transnational legislations constitute the overall frameworks for retaining valuable natural and cultural landscape elements. These include the Venice Charter for the Restoration of Monuments and Sites as well as the European Union Directive on Environmental Impact Assessments (the EIA Directive) which aims to ensure sound spatial planning practice. The institutions responsible for environmental and cultural heritage conservation, as well as for spatial planning, are still under national rule, operating in accordance with environmental, cultural heritage, and planning and building legislation.

Whether dealing with natural areas, natural elements or buildings, policies aiming to protect the physical environment will always be rooted in the past and its possible values or significance for the future (Lowenthal 1985). If spatial planning should threaten values or ideas of historical importance, not to mention protected spaces or elements, conflicts between development and conservation interests will arise. Traditionally, different strategies, instruments and methods have been used in order to prioritise actions or resolve disputes between conflicting interests, both in Norway and in its close neighbours. This applies to strategic landscape studies of rural areas as well as planning for the management of natural areas in general (Berntsen 1994; DN and RA 2011; Turner 1998; Hernik 2009). The longstanding tradition of protecting cultural heritage in the built landscape has over the years resulted in a variety of approaches to including the protection of urban elements in the planning and building agenda (Reinar et al. 2009; Larkham 1999).

In view of the fact that tensions and opportunities for conflict resolution between conservation and development interests are influenced by the territorial organisation and division of responsibilities between the authorities involved, three questions are essential: First, the public systems for landscape protection and planning are institutions, which according to North (1991:97) represent humanly devised constraints that structure political, economic, and social interactions. As such, they engender transaction costs, i.e. costs that according to Coase (1960) are needed for acquiring and presenting relevant information, contracting, adjudication and enforcement. In consequence, such costs will affect the organisation and governance structure (Williamson 1996), the planning and landscape management systems and the process efficiency of these systems (Lai 1997:181; Webster 1998). Second, how the tensions and conflicts between the different parties are handled in the planning and management processes is somehow dependent on how the disagreeing parties are brought into these processes and how the contradictions are dealt with. Throughout Europe and comparable countries the public systems, and planning and landscape management as a part of these, have faced demands for individual responsibility, self-help and even small government (Sorensen 1994:198). The response to such demands has been to encourage more committed public participation, to devolve or deregulate public authority and to outsource

public responsibilities (EC 1997; Brownill and Carpenter 2007; Swyngedouw et al. 2002). If individuals, local authorities or potential market actors are to involve themselves in planning processes or in activities that otherwise would involve governmental systems, they need knowledge about how these systems work and skills to present their interests to the authorities. In this context public systems for both planning and landscape management can, in line with Buitelaar's (2003) line of argument, be understood as user rights regimes. Third, the planning and landscape management systems will work in coordination. The organisation of authorities, the different administrative tiers or planning levels, and the division of labour between authorities, territories and levels will affect how these systems operate, and how authorities, individuals and market actors can coordinate their interests under existing regulations. Government is hierarchical. Acting within a hierarchy implies that transactions and transaction costs are specifically related to each level (Alexander 1991). Accordingly, the institutional conditions encountered by users of these regimes will differ from one level to another.

How well are the planning and landscape management systems designed for meeting these challenges? How might ambitions to integrate different aspects of protection in spatial planning affect planning processes and the interests involved? These questions are discussed under the following headings: landscape protection and planning organisation; the sectorial or comprehensive approach – a question of purposes or instruments; and coordination of interests – the demand for coherence.

The information and the analysis undertaken for this study are mainly based on an investigation of the formal institutions, i.e. the legislation that regulates planning, building and the protection of nature in the form of ecological systems and cultural heritage. All other sources used empirically for this study are secondary and will be indicated in the text.

2. Landscape protection and planning organisation

As in most other countries, conservation legislation dealing with landscape in Norway was originally, and still is, differentiated between land areas and buildings. The rather recently (2009) adopted Nature Diversity Act (NDA) regulates conservation of land areas based on particular regulatory characteristics, while the Cultural Heritage Act (CHA) from 1978 provides the legal background for protecting structures of various kinds including archaeological and heritage sites. In addition, the Planning and Building Act (PBA) adopted in 2008 contains sections that give the spatial planning authorities certain responsibilities in conservation matters as well as mandates to include justifications for conservation and protection when regulating the use of land and buildings. These three acts all operate within three separate authority structures and the decision-making organisations are somewhat different.

Both the Nature Diversity Act and the Cultural Heritage Act are managed at the central state tier, falling within the remit of Ministry of Climate and Environment, while the Ministry of Local Government and Modernisation is in charge of the Planning and Building Act. This difference in ministerial responsibilities reflects their areas of expertise and authority,

since the former ministry is supported by two directorates, the Norwegian Environment Agency and the Directorate for Cultural Heritage, in matters of nature conservation and cultural heritage. There is a directorate for building but not for planning.

Although there are certain differences in decision-making procedures at central government level, the differences at the meso/regional tier are more obvious. While responsibility for protecting natural areas still lies with the state, cultural heritage and regional planning are in the hands of the municipal level, represented by the county municipalities (cf. figure 1). However, for cultural heritage this organisational structure is not implemented throughout the country. In some of the biggest cities there are local agencies for cultural heritage. There are also cases where the local cultural heritage authority reports to the local planning and building office, which is the executive planning and building authority (Røsnes 2014; Børrud and Røsnes 2016). This territorial organisation for nature and cultural heritage conservation and planning implies that the decentralised state authority, i.e. the county governor, has executive responsibility for the protection of natural areas. Regarding cultural heritage, the authority structure for executive responsibilities is a mix of county municipal and local municipal authorities, and additionally localities have the authority to decide how their cultural heritage agencies should be organised. The executive authorities for planning and building are found at the local tier where three statutory, obligatory and legally binding types of plans exists, each one intended for different planning levels: overall, area plan and detailed zoning plan. In principle, there is no functional division in content between these types of plans at the local level or in the regulatory regime applied, since all of them are

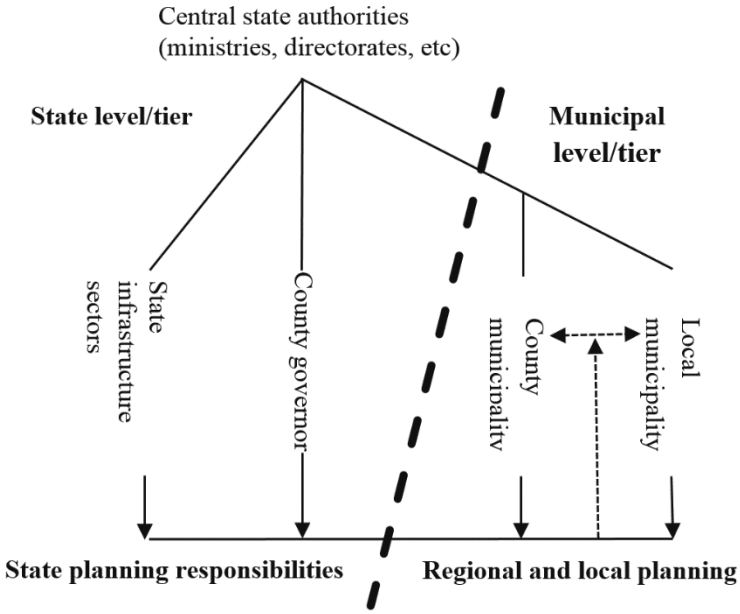

Figure 1: State and municipal authority structure for the protection of land areas or buildings and spatial planning. (Source: Røsnes, 2014)

based on rigid, legally binding land use zoning (Kule and Røsnes 2010). Regional planning is undertaken at the county tier by the county municipality. At the central state tier, spatial planning takes place in formulation of policies, provisions, guidelines and, of course, legislation.

The division between state and municipal authorities in these matters demarks important differences in the decision-making organisations. The decentralised state representative, the county governor, is a pure "prefectural" organisation where officials decide. The body of politicians that can support or overrule such meso-tier decisions is the ministry. At the municipal level, the immediate responsibility lies with the county and municipal councils respectively.

3. The sectorial versus comprehensive planning approach – a question of purposes or instruments?

3.1 What constitute differences in planning?

In terms of content, planning for conservation of nature or cultural heritage can easily be understood as a more limited or narrow approach than land use planning, including urban planning. But does that necessarily mean that the two former categories should be labelled "sectorial" and the latter a "comprehensive" approach to managing the future development of physical surroundings? Admittedly planning for conservation of the environment will have a more narrow and predetermined scope than ordinary planning. But evaluating what should be protected and in which ways will, as indicated by Børrud (2014), include assessing a variety of factors concerning nature, the built environment and society that also have to be considered in ordinary planning processes. The scope of planning in itself will therefore hardly be a valid criterion for judging what should be considered sectorial as opposed to comprehensive approaches. For that reason, the difference between conservation and land use planning could rather be a product of the legal structure of the planning instruments rather than of the separate legislations for nature and building conservation. Accordingly, the statutory instruments that initiate and direct public action might define the operational differences between different planning categories, more than the planning content as such. Consequently, the structure and content of the legal basis for protection and planning would be more determining for how these categories of planning are understood than the content of plans and scope of planning processes.

3.2 Protection of natural spaces

The Nature Diversity Act (Ch. 5) distinguishes between the following categories of areas for different kinds of protection: (1) national parks, (2) protected landscapes, (3) nature reserves, (4) habitat management areas and (5) marine protected areas. In terms of objectives the purpose of protecting these areas is to promote the conservation of:

(a) the full range of habitats and landscape types,

(b) species and genetic diversity,

(c) endangered natural environments and areas with specific ecological functions for priority species,

(d) major intact ecosystems, also making them accessible for low-impact outdoor recreation,

(e) areas of special conservation value,

(f) natural environments that reflect human use through the ages (cultural landscapes) or that are also of historical value, and facilitate forms of use that help to maintain biological, geological and landscape diversity,

(g) ecological and landscape coherence at national and international level, or

(h) reference areas where environmental trends can be monitored. (Sec. 33)

Obviously the five categories of areas for protection will require the division of land areas into zones in order to allow protection according to the specified categories. In this sense the division of areas and listing of objectives pursuant to the NDA divides planning jurisdictions into zones or districts. However, this type of zoning will not be based on particular land uses where the potential future uses necessarily follow specific land use categories. In principal, the land uses for human activities are of minor interest provided that the purpose of protection according to legal specifications or standards is achieved and the qualities of protected elements are not endangered. This implies that regulations for achieving protection objectives are primarily aimed at the consequences of the activities that take place inside the various protection areas. The methods used for the regulation of activities inside these areas will thus to some extent be based on performance criteria as outlined by Faludi (1987:202) and not on strict land use zoning techniques.

One example is the rules for formulating regulations within protected areas. Special rules may be prescribed for different parts of the area when this is compatible with the purpose of achieving protection. Regulations establishing a protected area shall not preclude the continuation of sustainable use that reinforces the purpose of such protection (NDA Sec. 34).

Another example is the rules regulating activities within protected areas. In national parks, activities can be permitted on certain conditions provided that their impact is essential to achieving the purpose of the protection (Sec. 35). In protected landscapes current activities may be continued and developed if the nature or character of the landscape is not substantially altered, while new projects shall be adapted to the landscape. Importance should be attached to the overall impact of projects implemented in the area. Regulations may therefore include provisions concerning what may substantially alter the nature or character of the landscape, requirements relating to the adaptation to the landscape, and non-pedestrian accesses or passages (Sec. 36). In nature reserves the rules are more rigorous. No activity should reduce the conservation value of the area as described in the purpose of the protection. This means that a nature reserve can be given absolute protection from all kinds of human activities (Sec. 37). A nature reserve is the only protection area in which active restoration measures can be undertaken according to a management plan in order to re-establish former or wanted states of development. In habitat management areas activities or access

that may affect or disturb the relevant species or ecological conditions are prohibited (Sec. 38). And finally, in marine protected areas human activities should not reduce the conservation value of the area as described in the protection purposes. In principle such areas may be protected from all activities subject to limitations that follow from international law. Any restrictions imposed on activities shall be proportional to the purpose of the protection (Sec. 39).

Although the protection of areas, according to the purpose of the NDA, is primarily concerned with natural elements, species and ecological characteristics, human artefacts and activities are also covered. In reality there will therefore be some overlap between regulations under the respective nature protection and the cultural heritage authorities. According to the objectives, protected areas on land shall (…) "promote the conservation of natural environments that reflect human use through ages (cultural landscapes) or that are also of historical value, and facilitation of forms of use that help to maintain biological, geological and landscape diversity." (Sec. 33)

In national parks, cultural heritage and cultural monuments are given equal importance to the natural environment and natural elements for protection (Sec. 35). In protected landscapes the cultural dimension, in terms of land use and different kinds of monuments, is equally important (Sec. 36). Even regulations for the management of nature reserves can be formulated to include the protection of cultural heritage within the reserve (Sec. 37).

3.3 Protection of artefacts, historical events and commemoratives

The main aim of cultural heritage legislation is to protect archaeological and architectural monuments and sites. Cultural environments, both as a part of the country's cultural heritage and identity, and as an element in the overall environment and resource management, are included in the scope of protection pursuant to the Cultural Heritage Act (Sec. 1). Remnants of artefacts, monuments and sites are considered historical objects for protection, defined as all traces of human activity in the physical environment. Places associated with historical events, beliefs and traditions are included. Any area where a monument or site forms part of a larger entity or context is understood as the cultural environment. Thus the purpose and scope of the CHA connects the immediate object of protection to the surrounding areas and even, in case of historical events, to the very site or area where the event took place or where the beliefs and traditions are memorialised. Monuments, sites and cultural environments that are valuable architecturally or from a cultural historical point of view are potential objects for protection under the existing Act. In the event that there is a need to protect both natural and cultural heritage elements within the same area, both authorities will be involved in the delineation of sites and surrounding areas.

Monuments and sites automatically protected, such as those dating back to before 1537, are listed in the CHA (Sec. 4). This year has been considered particularly important in Norwegian cultural heritage legislation from the first act to the existing one. In 1905, when the first Cultural Heritage Act was adopted it was decided that all cultural heritage monuments and sites from the time before the Danish-Norwegian Lutheran reformation in 1537 should

be protected (Østmo and Hedeager 2005). Today this applies to the sites of settlements and buildings with various kinds of remains, sites that demark economic or industrial activities, traces of land cultivation, transportation, logistics or water regulation facilities, defensive structures, religious sites and sites associated with historical events, archaeological finds, traditions, beliefs or legends. The same applies to rock inscriptions and rock art like carvings and paintings, as well as standing stones, crosses and burial sites of any kind. Unless otherwise decided by the competent authority, any such structures confirmed as dating from 1537–1649, a period of economic and cultural reconstruction and economic recovery in Norway, are automatically protected. Sami monuments and sites of these kinds are also automatically protected if they are more than 100 years old (Sec. 4, Litra a.-j.). The competent authority should ensure that all automatically protected structures including the security zones are officially recorded as protected property. In addition the Act contains rules on protected movable objects like tools, weapons, ship finds, etc. When it comes to areas surrounding monuments and sites the Central State Authority (i.e. the King in Council) can decide to protect such cultural environments in order to preserve their cultural historical value in general (Sec. 20). Such protection orders can regulate the private use of land as well as public activities like transport.

3.4 Spatial planning

In addition to the protection of landscapes under environmental and cultural heritage legislation, the Planning and Building Act set out rules on the protection of areas and to a lesser extent buildings. These rules partially prescribe either which areas should be directly protected or, alternatively, how the planning authorities at different tiers have to take protection measures into account when regulating future uses of land and building activities.

The Act prescribes that general protection measures should be considered in the 100-meter belt along the seashore and river systems. In these areas the main emphasis should be on allowing outdoor recreation, protecting the landscape and other elements of public interest (Sec. 1–8). The prohibition of land uses is particularly directed towards building activities in those cases where no other building restrictions, whether concerning the area or site, have been determined in the land-use part of the municipal master plan or the detailed development plans (Sec. 1–8). In practice this implies that the municipality, i.e. the local planning authority, will have a key role in deciding how the legal requirements for protection should be implemented in situations where protection of the existing situation needs to be considered in relation to future development. For the areas along river systems the regulations are somewhat different. The municipality shall in the land use part of the municipal plan determine a limit of up to 100 metres from the stream bed within which specifically defined projects shall not be permitted, excepting significant nature, cultural environment and outdoor recreation interests.

In its discussion of planning functions, the Act states that planning should safeguard land resources and landscape qualities and promote the conservation of valuable landscapes and cultural environments (Sec. 3-1, Litra b). The purpose of municipal planning responsibilities

in this regard is emphasised as being to provide favourable conditions for development through among other things management of land and natural resources within the municipal area.

This formalisation of planning purposes and functions concerning protection is reflected in the use of statutory planning instruments by state, county and municipal planning authorities. The central government (the King in Council) can issue planning guidelines for the country as a whole or for a geographically delimited area. Such planning guidelines shall serve as the basis for planning at different levels as well as individual decisions made by central government or regional and municipal bodies under the Act or other pieces of legislation. Furthermore, when necessary in order to safeguard national or regional interests, the central government can issue planning provisions in terms of prohibitions on certain specified building or installation projects being implemented without the consent of the Ministry. Central government prohibitions should not exceed a period of ten years and can be limited to certain geographical areas, or to the entire country, and under certain conditions the central government can decide that projects can only be implemented in accordance with the land-use part of the municipal master plan or a zoning plan (Sec. 6-2, 6-3). Formally, ambitions to protect nature and cultural heritage can be a valid justification for issuing planning guidelines and provisions.

Central policies for protection of the environment are first and foremost implemented in planning at a local level. To a certain extent it will therefore be up to the municipalities to decide how and to what extent central policies for protection should be realised through statutory planning instruments. The preparation phase of the overall land-use part of the municipal plan and of the area plan and detailed zoning plan establishes the key positions for the municipalities in these matters. For these categories of plans, legal requirements relating to landscape, nature and cultural heritage are mainly addressed in conjunction with defining statutory land-use objectives and the zones in which special considerations should be made, as well as the formulation of planning provisions. The map of the land-use part of a municipal master plan should show the main land-use objectives and areas requiring special consideration in relation to the use and conservation of land. Three land-use objectives are of special interest in this regard: green structures comprising nature areas, green corridors, recreation areas and parks; agricultural, nature and outdoor recreation areas; and finally areas concerning conservation of the sea and river systems, with their associated shore zones. Furthermore, there should also be land-use zones requiring special consideration for agriculture, reindeer husbandry, outdoor recreation, green structures, landscape or the protection of the natural or cultural environment, with an indication of the interest in question (Sec. 11-7, No. 3, 5 and 6; Sec. 11-8, Litra c). For both categories of land-use zones, planning provisions for regulating the use of these areas can be formulated to clarify the conditions for use and conservation of the land. With the purpose of achieving land-use objectives specifically, planning provisions can be used to regulate environmental quality, aesthetics, nature, landscapes and green structures as well as for the conservation of existing buildings and other elements of the cultural environment (Sec. 11-9, No. 6 and 7). In addition, if

zones comprising agricultural land, nature areas and sea or water areas are included, provisions can be used to regulate the use of buildings and other kinds of human activities to retain, protect or maintain border vegetation in such areas, and to secure public access to the shoreline. When protection regulations relating to zones of special consideration are made for a new protected area or when protection regulations or a management plan for already established protected areas are revised, provisions may at the same time be applied to a zone adjacent to a national park or a landscape protection area to prevent significant reduction of the conservation value of the protected area (Sec. 11-8, Litra c).

The land-use objectives and zones requiring special considerations are the same for the area and detailed zoning plans. Requirements for formulating planning provisions relating to landscapes and culture are mainly directed towards cultural heritage and hence buildings in particular. Provisions can be formulated to safeguard the conservation value of buildings, other cultural monuments, and cultural environments, including protection of frontages, the use of building material and interiors, and to safeguard habitat types and other valuable natural assets (Sec. 12-7, No. 6). This implies that the regulatory instruments of the PBA can be used actively to protect areas and buildings without involving instruments of the NDA and CHA, but not necessarily without support from the respective protecting authorities.

So, what responsibilities remain with respect to development control and issuing building permits? In general, the municipal building authority, which is normally a branch of the planning authority, shall ensure that historical, architectural or other cultural values of the buildings' exteriors are protected to the greatest possible extent when buildings are upgraded or reconstructed (Sec. 31-1). The visual qualities of new as well as reconstructed buildings should be in harmony with the surrounding built-up and natural environment (Sec. 29-3). Although such legal provisions could be of less practical value they indicate that the legislative bodies recognise the impact of building design on the town- or landscape. The Cultural Heritage Act imposes a mandatory inquiry for automatically protected monuments and sites (Sec. 9). This applies to people as well as administrative agencies in charge of projects planned for implementation. For this reason and due to a general requirement for public awareness under the PBA (CHA Sec. 9) local planning authorities are mandated to instigate investigations to record the historical, architectural and cultural values of buildings and other existing constructions.

4. Coordination of public responsibilities – demands for coherence?

4.1 Who decides what?

Planning and land management for the protection of nature and the cultural environment are regionally and to some extent locally governed by separate authorities. Regional and local spatial planning takes place at two planning levels and will regularly deal with protection of the physical environment and interests involved in the protection of landscape and building

values. Consequently, protection under the Nature Diversity Act and Cultural Heritage Act is the responsibility of the relevant state and county municipal authorities at regional level and the ministry at central state level.

Although the spatial planning authorities are organised on the same hierarchical principles, the protection of nature and cultural heritage in this case is usually incorporated into the wider scope of the regulation of land-use, development of land and building activities. The instruments are connected to specific types of plans for use at regional and local levels. In contrast to the protection of areas under the NDA, the regional planning authorities have to rely on one type of regional plan, and the local planning authorities on three types of plans for each of the different planning levels within the municipal area of responsibility. In situations without conflicts that might provoke formal intervention by the central state authorities, county municipalities or neighbouring municipalities, the local municipality is mandated to give final approval to plans under their responsibility, in the same way that the county municipality is for regional plans without conflicts with central state authorities. This applies to protection as well as to land-use, development of land and building. But what happens if conflicts with other authorities, agencies and interests occur?

In such cases, protection of the environment as well as spatial planning will face the challenge of having to coordinate the harmonisation of policies, plans and development decisions. In a hierarchy of power, authorities of higher rank will have the opportunity to overrule subordinate authorities in the event of conflicting interests in order to achieve some kinds of conformity across decision-making levels. This is normally the case in spatial planning where the ambitions for conformity according to Faludi (1989; 2000) are challenged by demands for performance connected to the particular case. In the case of protection under the Nature Diversity Act and Cultural Heritage Act, this coordination mainly takes place within the respective policy sector, without any important intervention by local authorities, except in such cases where there is a separate local cultural heritage authority. Spatial planning will usually have to include different aspects of protection and balance protection and development interests. Ordinary local planning, and in some cases regional planning, is thus far more important for the protection of landscapes and the cultural environment than the planning and management that takes place pursuant to the NDA and CHA.

Local planning will time and again frequently involve issues of protection or other issues that will provoke conflicts between local planning authorities and the state, regional authorities and other local authorities. In what ways can the latter authorities intervene in local planning and potentially overrule the local planning authority? Although both the regional planning authority and other local planning authorities constitutionally belongs to the same decision-making tier as the local planning authority, they all have certain opportunities to overrule the local authority in charge of preparing and approving the plan in question. In relation to landscape and cultural heritage this plan could be the land-use part of a municipal master plan, an area or a detailed zoning plan.

4.2 Formal opportunities for achieving coherence

Formally, in regional and local planning processes there are three and five possibilities respectively for other authorities to intervene if the preparation of the plan or the plan itself should not conform with certain requirements for substantial planning outcomes (cf. figure 2). These include requirements for protecting nature and cultural heritage.

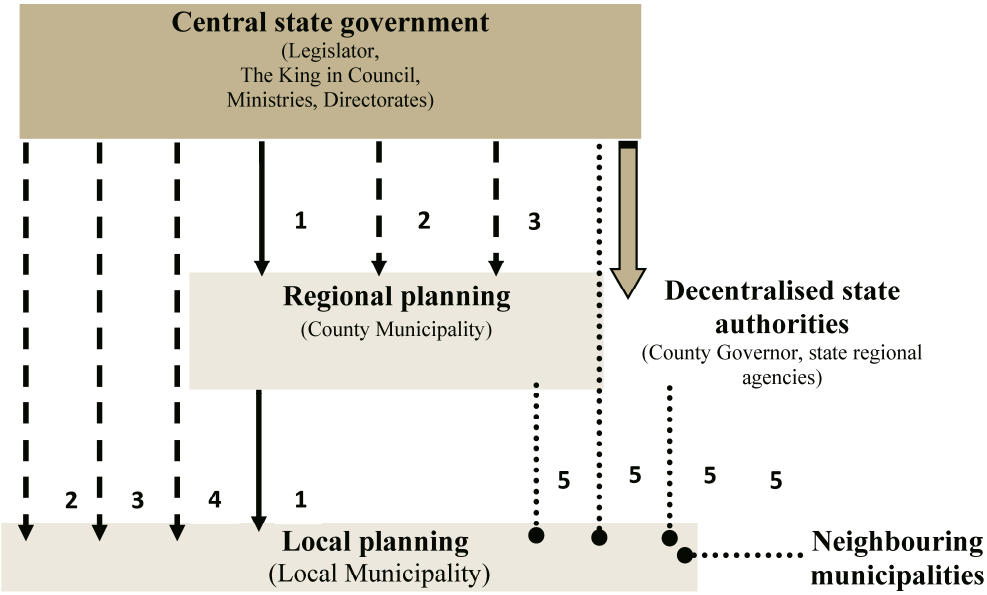

Figure 2: The legal mandates of the central state and regional and local planning authorities to intervene in regional and local spatial planning.

1 Legal rules prescribing solutions or/and processes (PBA Sec 1-8), 2 requirements for planning (PBA Sec. 6-4, Sec. 8-1), provisions and guidelines (PBA Sec. 6-2, 6-3), 3 direct central state control of regional (PBA Sec. 8-4,) and local planning and plans (PBA Sec. 11-16, 12-13), 4 ministerial responsibility for local planning (PBA Sec. 6-4), and 5 objections (PBA Sec. 5-4). Except legal rules (1) the central governments authorities can intervene in local planning without involving the regional planning authority.

Naturally, legal prescriptions in terms of rules on planning decisions, such as how the shoreline of the sea and waterways should be protected, will have to be obeyed. The central government may gain similar opportunities to regulate the protection and use of land through issuing state planning provisions and guidelines. Legal prescriptions as well as planning requirements, state planning provisions and guidelines apply both to regional and local plans. If there should be any doubt as to whether the planning process or plans will meet state requirements such as provisions, guidelines or policies, some kind of intervention is likely. If a regional plan violates such overriding requirements, state intervention in the shape of direct central government control (a ministerial review etc.) can be requested to secure coherence between state level planning requirements and regional planning. This is also an opportunity to achieve coherence with local plans. But for all categories of local plans there are far greater opportunities for state intervention.

Municipalities are obliged to prepare certain categories of plans and to review existing plans for possible up-dating. If they do not follow such requirements the ministry can replace the local planning authority and take responsibility for preparing and approving local plans. The justification is to fulfil the legal requirement for relevant and up-to-date plans. This opportunity might also be used in order to achieve coherence with central state policies and regulations. However, objections are the most common instrument used to harmonise the substantive content of local plans with state and regional policies and plans, as well as with planning processes and plans in neighbouring municipalities. In total 21 different public authorities and agencies are mandated to issue objections to local plans, whether the land-use part of a municipal plan, the area plan or detailed zoning plan, if the content of the plan(-s) should violate the policies, plans or programmes of the authority or agency in question. Of these, 19 are at the state level. The county municipality and neighbouring municipalities are the only non-state entities that can use this instrument.

4.3 Opportunities for municipal plan control

Regulatory planning systems presuppose that the local planning authorities make sure that local plans harmonise with central and regional policies, with higher level plans and with plans for adjoining areas. However, the local planning authorities' formal opportunities to control higher level policies and plans are normally limited by the right of external bodies, public or private, to initiate and prepare plans that create the legal basis for development control, i.e. for building permits. The Norwegian planning system allows just about anybody to decide where, when and how development planning should take place and grants the right to prepare detailed zoning plan proposals, provided that the entity is competent to prepare such plan (Kalbro and Røsnes 2013). In practice this implies that the local planning authority will receive development plan proposals that contradict higher level policies and plans and proposals for adjoining areas. How can the local planning authority meet this challenge and which formal opportunities are there for ensuring coherence in planning control and for harmonising plans with other kinds of requirements?

It all starts with a detailed zoning plan proposal being submitted to the municipality ((1) in figure 3). If the proposal meets the formal requirements the local planning authority is essentially obliged to accept it for consultation. The plan can be accepted, refused or, alternatively, accepted on certain conditions. In addition there are two other options. The planning authority can decide that an alternative detailed zoning plan should be prepared, under municipal responsibility (cf. (1a) in figure 3). The justification can be that the municipality disagrees with the objectives and content of the plan. But in the specific case of issues relating to nature or cultural heritage conservation, threats from state and regional authorities to issue objections to the plan will more often than not motivate the municipality prepare a municipal alternative (Børrud and Røsnes 2016). Another opportunity for the municipality to change the planning conditions is to demand preparation of an area zoning plan, and hence extend the planning area. This will however require environmental issues in the planning area to be investigated more thoroughly and handled more carefully than is possible in

a more limited detailed plan. If the proposals contained in a detailed plan may have significant impacts on the environment and society, a planning programme has to be prepared (PBA Sec. 4-1). A planning programme can only be omitted if

i) the zoned land uses of the detailed and area plans coincide with the corresponding land-use elements of the higher level plans,

ii) area zoning plans and the land-use part of the municipal master plan agree and

iii) the effects are satisfactorily described in such overall and area zoning plans.

Should that not be the case, the planning authority, i.e. the municipal council, when considering the planning programme, can decide that an area zoning plan shall be prepared (if necessary). This may, for instance, be the case if more detailed investigation is needed, when a mixed-use development is proposed, or when conservation interests require coordination with affected private and public interests. In this case the proposed detailed zoning plan will be turned into an area development plan prepared in accordance with a separate planning programme including an EIA to clarify possible impacts on the natural and cultural environment (1b).

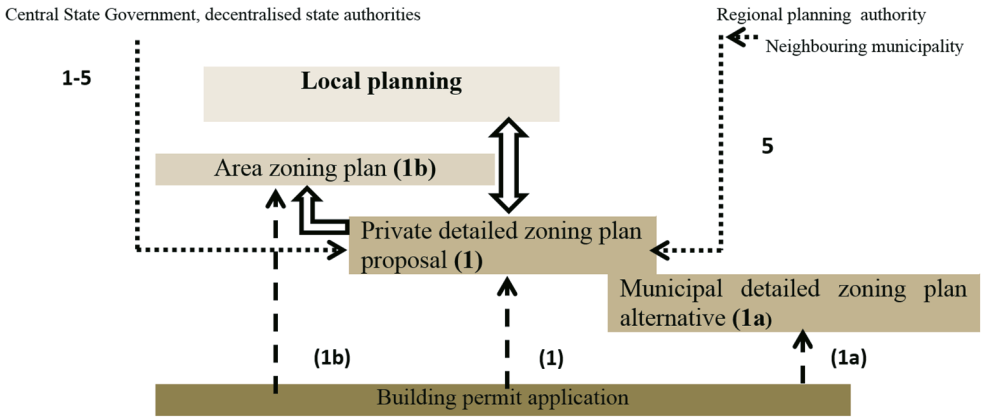

Figure 3: Possible municipal procedure for processing detailed zoning plan proposals initiated externally (outside the municipal organisation) in relation to issuing building permits.

During the procedure the municipality can, besides approving or rejecting the plan proposal directly, decide that the municipality should prepare alternative detailed zoning plans (PBA Sec. 12-11). If the proposed plan will cause substantial impacts on the environment and society a planning programme should be prepared together with EIA statements. The municipality can then require preparation of an area zoning plan without involving the initiator of the plan proposal (PBA Sec. 12-9). Furthermore, all of these planning alternatives are subject to objections from state authorities and agencies as well as from the county municipality and neighbouring municipalities. In total the initiation of external detailed zoning plan proposals gives three processing options for ((1), (1a), (1b)).

5. Final remarks

In general, the need to coordinate landscape protection with spatial planning is challenging and may obstruct aims for efficiency in spatial planning and landscape management, and for including people, stakeholders and localities in planning and management processes. The Norwegian case indicates that the organisation of the competent authorities and the decision-making bodies, as well as the structure of spatial planning instruments, represent obstacles to process efficiency and the ability to involve stakeholders.

The allocation of responsibilities between nature protection and cultural heritage authorities differs between the bodies under state and regional control. Their responsibilities overlap mainly because the protection of nature regularly encompasses areas where cultural monuments, buildings or other kinds of heritage sites are to be found. Conversely, requirements for the protection of cultural monuments, buildings and sites can include or touch upon areas of concern for natural protection. The organisation of the state bodies with respect to nature conservation may undermine the democratic ideals of public decision-making, and hence possibilities for involving stakeholders, since the decentralised state authorities at regional level do not report directly to political councils or elected bodies.

For spatial planning there is a different organisational structure where the local authorities have operational responsibility for planning and development. However, in terms of responsibilities there is potential for extensive overlap between all of these fields of policy, as spatial planning includes a concern for retaining nature and cultural environments mainly in the shape of natural elements, monuments and buildings and hence the landscape. There is consequently extensive scope for disputes between the respective authorities over areas of responsibility. This will in turn affect how the involved parties view the authorities' responsibilities and capacities to settle conflicts, and how planning and landscape management regimes work for them as users. The formal instruments for coordinating interests within all these policy fields are generally based on the same principles: tensions or conflicts can be resolved bilaterally, and in local level planning directly within democratically elected bodies. Should the nature and cultural heritage authorities become involved, official representatives will play a more prominent role in balancing interests.

Spatial planning will regularly have to consider needs for the protection of nature, cultural monuments and buildings, and hence the landscape these elements are parts of. A particular challenge for the users of the planning system is the division of local planning into three possible levels of plans based on the same regulation methods and without any functional division of content. This increases the need for coordination with other authorities' responsibilities and private interests. If more stakeholders are involved, including the public authorities, this raises the potential for conflicts, creates a more resource-intensive and time-consuming planning process, and finally may call for extensive mediation.

The existing situation calls for an improved understanding of how the relationships between the systems for nature and cultural heritage conservation and spatial planning can be changed. The majority of the present disadvantages originate from the organisation of the

responsible authorities, the division of responsibilities between them, and the instruments they use. This primarily creates challenges in spatial planning processes, mainly because the need to protect natural environments and cultural heritage is an integral part of planning as well as development control in which the relevant authorities will be involved automatically.

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Marie Llorente* and Thierry Vilmin**

The Organizational Modes of Urban Development in France

A New Institutional Economics Perspective

Preamble

Analysis of urban development forms of governance is important for the understanding of urbanization processes, which are increasingly complex. Nevertheless, in the French literature, very few economic studies are addressing this organizational dimension of "urban fabric" and its efficiency, which remains a black box. Still, local authorities and developers are interested in methodological tools that improve decision-making processes. Applying new institutional economics to urban development is an interesting way to address the question of the appropriate governance structure, from public hierarchical organization to the market, leaving aside ideological considerations. It gives very useful research concepts for rigorous empirical analysis and for the study of comparative economic organization.

1. Introduction

Urban development[1] results from complex processes, which rather interest professionals than researchers. In particular, organizational issues are poorly studied in the French economic literature, although the "market versus hierarchy" debate is common in the academic arena when it comes to public services like water and sanitation, public transport, telecommunication, etc. Researches on urban development issues are mostly sector-based, focusing on legal procedure, technical aspects, infrastructure financing, etc. But the analysis of contracting issues under uncertainty and the analysis of alternative organizational modes of urban development are quasi-inexistent. Yet, the neo-institutional framework appears particularly relevant to provide a perspective (Alexander 2001; Lai 2005; Buitelaar 2007).

Regarding the organizational modes of urban development, the French experience differs significantly from other European countries where integrated private operators, backed by pension funds, are very important in urban development processes. Compared to these integrated private operators, urban development in France has traditionally been rather sequen-

* Scientific and Technical Centre for Building (CSTB), Paris-EST University, Paris /France.

** Logiville, Sarzeau / France.

1 "Urban development" is a rough translation of the French term "*aménagement urbain*" which comprises actions that contribute to organize (planning), to purchase and prepare the land for building (development), in already built-up areas (urban renewal on brownfield) or in urban extensions (greenfield).

tial: first, a public land developer acquires and prepares the land and then real estate developers build the houses/offices/buildings bought by investors who finally lease the premises to users.

Following the deregulation movement in Europe, public-private partnerships are now becoming more frequent (Verhage 2009) and new contractual tools are being experimented (Le Corre 2015). However, it is not easy for a local authority to determine the best organizational arrangement. For example, does a local authority manage the development itself and thus bear the economic risk or is it better, at the opposite side, to leave it to market forces and let landowners and private operators freely adjust their transactions within the regulatory framework (land-use plan)? Otherwise, should a local authority explore an intermediate way between these two conventional methods, i.e. the negotiated arrangements, based on public-private cooperation and long-term contracts?

To find answers to these questions, this paper presents a range of organizational arrangements for urban development in France. Further, it discusses these modes through the new institutional economics concepts and criteria, and it concludes on possible evolutions of these governance structures[2].

2. Urban development policy and the choice of organizational arrangements

2.1 Four development modes

A local authority's planning and development policy implies, explicitly or implicitly, the choice of a development mode for each greenfield or brownfield project or neighbourhood. The following typology comprises four development modes (Vilmin 2015):

- **Spontaneous development**: it corresponds mainly to the construction of individual housing and small condominiums by households themselves or local builders in already serviced areas. Infrastructure and urban amenities are in place contrary to what happens in the other three modes. There is no substantial modification of the urban fabric. Such spontaneous development is driven by the market ("*laissez-faire*").
- **Regulated mutation**: this case include small or middle size development operations such as allotments or densification of existing urban fabric; they are executed by real estate developers according to the detailed land-use plan (which may be legally binding), while the provision of infrastructure is made by the municipality. These operations are of private initiative and are driven by the market. The role of municipality is thus limited to the enactment of the precise "rules of the game" through the land-use plan, definition of financial contribution to infrastructure, proportion of social housing, environmental requirements, etc. However, the municipality does not intervene in the transactions between landowners and builders.

2 We use indifferently organizational modes/arrangements/forms or governance structures as equivalent terms.

- **Negotiated development**: in this case, the development concerns a more important urban project, where the rules of the game are discussed and negotiated between the local authority and the operators and a medium or long-term contract then defines the commitments; it corresponds to a hybrid organizational form (between market and hierarchy).
- **Public development**: this mode applies to a complex urban project that the municipality cannot or does not want to leave to the market forces; it is therefore implemented by the municipality itself or through another public body. It is a hierarchic governance structure, in which the municipality takes the financial risk of development and acquires the land by expropriation if needed.

Each mode corresponds to one of the three governance structures of the New Institutional Economics (NIE) described by Williamson (1985; 1991): the market (spontaneous development and regulated mutation), the hybrid form (negotiated development) and hierarchy (public development). The degree of vertical integration is increasing from market to hierarchy.

2.2 The choice of the governance structure

The local authority, like any economic agent, seeks the organizational structure that minimizes the costs and ensures achievement of general interest requirements. In neo-classical approaches, attention is given only to the physical production costs, which depend on the techniques available at a given time. In this regard, the agents seek for economies of scale, which are the costs advantage that arise with increased output of a product or scale of operation. Accordingly, this search for economies of scale can lead to support large vertically integrated organizations.

The interesting point with new institutional economics framework progressively developed by Oliver E. Williamson since the early 1970's, is the focus on transaction costs, which supplants the preoccupation with technology. According to this theory, organizational and contractual choices do not depend exclusively on technology, but result mostly from the search of transaction costs savings.

Transaction costs result from the needs of coordination between economic agents, because of their bounded rationality, incomplete information, and hazards of opportunistic behaviours. According to Williamson (1981), they embrace costs of planning, adapting and monitoring task completion. He compares them as "friction" like in mechanical systems. Transaction costs can be understood in a broad sense, as all costs linked to any exchange procedure to increase the information available and reduce uncertainty. For example, in the case of a contractual relationship, they cover the costs related to the drafting of the contract (search of information, enumeration of contingencies, etc.), the costs of negotiation or renegotiation, the costs of safeguard clauses definition, the costs of monitoring the execution of contracts, the cost of litigation, etc.

A specific kind of transaction costs are bureaucratic costs. They are linked to inefficient coordination between different departments or services of the organization, the losses in time spent in inefficient power struggles, the demotivation of employees who do not realize the purpose of the organization, or fell not rewarded for their efforts. Generally, these bureaucratic costs increase with the size of the organization.

All these costs vary accordingly to the nature of the transactions and their characteristics. The most efficient governance structure is the one that minimizes overall costs by making a trade-off between them.

3. Characteristics of urban development transactions

When it comes to urban development, economies of scale are much lower than in manufactured goods production, especially if the development concerns a complex existing urban space to be restructured. Being scarcely able to play on production costs by increasing the size of the project, the local authority should rather seek to minimize its transaction costs, which depend on several characteristics.

These characteristics can be split into three categories, following the critical dimensions defined by Williamson (1985) (specificity, uncertainty, frequency):

- Specificity of the physical and property context, specificity of the infrastructure and public services program, specificity of the construction program;
- Economic, political and legal uncertainty;
- Frequency of transactions.

The level of vertical integration (from market to hierarchy) will depend on the combination of these characteristics. Schematically, the higher the specificity and uncertainty and the lower the frequency, the more integration is required for minimizing transaction costs and vice-versa. It is important to note that for NIE, there is no ideal arrangement *a priori*. Market such as hybrid forms or hierarchies are governance structures like any other. This is the concept of 'remediableness' which prescribes comparison between alternative feasible forms of governance.

Note that the integration is examined here from the perspective of the local authority. It is the least developed with spontaneous development ("*laissez-faire*") and the strongest in public development. Regulated mutation and negotiated development have intermediate integration.

However, it is important to note that the organizational integration can also be achieved by private actors. This is a way for them to adapt, in downstream to economic uncertainties and real estate cycles and in upstream to uncertainties of the land market. The actor behind the integration can be the promoter, investor, or the construction company. The promoter becomes the land developer to secure its supply of serviced plots and thus ensure a regular activity for his staff. The investor, upstream, adds to its organization a capacity for project

management in order to build itself the real estate products providing consistent financial income. Downstream, his assets management skills allow him to have direct contact with clients and tenants and thus design products more tailored to their requirements and, therefore, easier to rent. The investor has a better control of time because he can bear the financial cost of properties through the real estate cycle, keeping them during the depressive phase, taking a minimum income to rent, and selling them for cash and profit in the ascending phase. Building and public works companies may also want to integrate vertically, by diversifying upstream in property and land development, ensuring greater consistency of their order books (Llorente and Vilmin 2011).

3.1 Specificity of the urban development project

Each development site is unique. It is characterized by its geography, history, physical attributes and also by its ownership structure. The land is probably the most distinguishing asset regarding the choice of the organizational mode. The more it is fragmented, occupied, squatted, polluted, or already built, the more specific it is and the higher are the production and transaction costs. Then it requires at least a hybrid arrangement or a more hierarchical one.

By nature, urban infrastructure and services cannot be moved and redeployed in another sector, unlike the industry's production equipment (such as machinery). However, we must distinguish between ordinary infrastructure such as streets and utilities that can be used for different purposes (dwellings, offices, factories, etc.), and specific type of premises suitable for a particular use that cannot be converted for another: thus, a school or a gymnasium cannot be easily transformed into a theatre. Such level of specificity accentuates the level of interdependency between actors.

The construction program may also be more or less specific in its architecture, its variety, its technical constraints (depending on soil conditions), its energy performance and environmental and social characteristics. Note that the specificity is largely a result of the requirements (the will) of the local authority.

In general, the higher the specificity of the project is, the higher are transaction costs. This configuration leads to the choice of an integrated governance structure.

Otherwise, if the site is trivial, if urban infrastructure already exists, if the land does not require readjustment, and if the real estate products are standard and no social diversity is sought, urbanization can be left to the market in a "laissez-faire" way, as the level of uncertainty is low. The market is efficient to organize the transactions under broader rules defined by the community (pure and free market does not exist).

If urban facilities to be created are not too specific (e.g. streets and utilities, green spaces) and if the land is simple enough to be acquired entirely without expropriation by a small number of developers, who will build standard real estate products, the operational mode may be that of the negotiated development. The planning agreement between the local authority and the developers allows, inter alia, to precise the nature of the facilities and under

which the community in its public domain will take conditions for them the facilities. The agreement also indicates the proportion of social housing to be built.

Besides, if the land is too complex to acquire and to equip because it is divided into multiple owners, the local authority will have to supersede the developers and realize itself the urban facilities. The local authority will recover the costs thereafter by means of a unilateral device (tax, fees) assessed in accordance with their actual cost. However, it will take the risk of investing in such facilities without being sure that the landowners will follow its initiatives and change the use of their land. If, in addition, the specificity of the urban site is such that the local authority wants a particular urban and architectural form (e.g. a homogeneous urban facade aligned along the way), the authority will establish, still unilaterally, a detailed plan for the sector (possibly three-dimensional). Finally, if it is necessary to achieve an adequate social mix, the local authority will impose a normative quota of social housing to builders. Because of its involvement in the construction of the facilities and the enactment of ad hoc rules, it will be in the regulated mutation mode.

For a key urban site and a very specific project with prestigious buildings and emblematic public facilities (e.g., public spaces designed to give a strong attraction to the place or highlight a monument), the local authority will want to keep direct control of the development. It will try to acquire and service itself the plots. Later, it will sell them to private builders. Very specific contractual constraints (up to the commission of the architect) will be imposed to provide the right incentives and reduce the hazards linked to asymmetric information. In order to achieve this control, the development will stick to the public (hierarchic) mode.

Similarly, if the land is too specific to be mastered by professional developers, the local authority will have to invest directly, to expropriate or to require the owners to regroup and to readjust their plots before servicing them. In the latter case, it will have to redeem the parcels abandoned by owners opposed to consolidation, which will bring it in the case of expropriation. In this case, the organizational arrangement will be fully hierarchical and public.

3.2 Economic, political, and legal uncertainty

Regarding urban planning and development, uncertainty is most often linked to the duration of operations. Land developers have little "commercial visibility" (business insight): what will be the demand and the price level when serviced plots or built homes and offices arrive on the market?

In urban regeneration projects, will public upgrading investments be sufficient to generate solvent demand for housing or business premises (in other words, to bring back these areas into the market)?

An economic constraint can lead to opportunistic behaviour on the developers' side, who try to exploit advantage from asymmetric information and to adjust their costs by lowering the quality. The local authority has to prevent from this hazard through safeguard clauses.

Uncertainty is also political and institutional. Local elections and a newly elected municipality board can cause radical changes regarding previous urban projects and therefore alter planning rules applying to private actors. It is another kind of contractual hazard, but more difficult to prevent.

Urban projects changes and local institutional environment progresses may also come from residents themselves when the local authority wants them to actively participate to the decision making process (scheme, design, implementation). In existing districts, projects will have a significant impact on daily life and on the value of owners' assets. To avoid or to limit the political or the legal disputes, the local authority will seek to involve local residents in the definition of projects and in the monitoring of their implementation.

The ability of residents and landowners to take the local authority and operators to court is another form of uncertainty. Legal actions increase the transaction costs for operators (lost time and expenses for legal proceedings and advices) and in many cases this will cause them to abandon the operation even if they would win the case.

In general, uncertainty dissuades private investors and leads the local authority to invest more directly, thus moving towards a more integrated form of governance.

If basic public facilities already exist and if the planning rules are stable, private operators are able to launch quickly small and medium size operations as soon as they are able to meet a local solvent demand. The development of urbanization may then be left to the market in a "*laissez-faire*" way.

Some projects are more important and developers sell their production over a longer period. It is frequent that they require the construction of prior public facilities and changes in the local plan. This may extend the duration of realization (and therefore entail a loss of commercial visibility). In such cases, the developer seeks to secure the project by a long-term contract with the local authority. Such contract may draw particular safeguard clauses for the financial compensation of the operator, if the local authority unilaterally alters the local institutional environment with a negative effect on the project (for example, by reducing the density or increasing the quota of social housing or the environmental requirements). The governance structure will be that of negotiated development.

If the absorption capacity of the local real estate market is limited, and if no private developer is willing to launch a comprehensive development process and to achieve the necessary infrastructure, the local authority itself will have to ensure the project management of these facilities. However, through the development plan and other rules, the local authority will also seek private operators to build and bring their share to the financing of public equipment. In existing districts, the incentive may be accompanied by a significant densification so that developers recover the costs of land acquisition and preparation of soil (evictions of occupiers, demolitions, decontamination).

Finally, if the area is "off-market" because it is so physically damaged and socially difficult that no private actor is willing to invest, the local authority will have to carry out the regeneration process on its own until the site is sufficiently attractive to meet solvent demand and trigger private investment decisions[3]. Such a regeneration process typically includes a social and an educational component and leads in consultations with residents, so that they take ownership of the project. Constant feedback on achievements or the opening of investment opportunities from outside tends to destabilize long-term contracts that could be made with private developers, thus reinforcing the need for the local authority to take over the development. The organizational form of this public management will be integrated, leading the local authority to manage the regeneration process on its own or, more often, to delegate the management to a public company, though keeping the responsibility of the financial balance.

3.3 Frequency of transactions

If a developer often works with a local authority, he will probably try to maintain a good reputation in order to facilitate subsequent transactions with the local government or his neighbours. He will behave as a loyal partner and not as an opportunist. Important terms (building permits, development agreements, etc.) will allow both partners to learn how to work together resulting in lower transaction costs.

If the transaction is unique (one-off operation), the risk of a poor quality project (architecture, public spaces, etc.) is higher. In such cases, the local taxpayer might suffer its cost and the negative impacts on the urban landscape will last forever. The local authority will no longer be able to pursue remedies against the operator of a single transaction that has disappeared in the meantime. Therefore, if transactions are infrequent or unique, local authorities will certainly prefer control development in a more integrated organizational system than the regulated mutation process (framed market). The development will retain a public or negotiated process.

4. "Alignment" between characteristics of transactions and governance structure

Each development mode corresponds to a particular combination of transaction attributes (or characteristics). The theory postulates that an "alignment" is realized between those attributes and the governance structure implemented by the local authority. "The discriminating alignment hypothesis to which transaction-cost economics owes much of its predictive content holds that transactions, which differ in their attributes, are aligned with governance structures, which differ in their costs and competencies, in a discriminating (mainly, transaction-cost-economizing) way" (Williamson 1991:277).

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3 The first private investment will probably be subsidized ("gap funding") to achieve a critical mass of redevelopment and diversification sufficient to trigger a chain reaction and the tilting of the area in the market.

In the typology presented in this article, spontaneous development corresponds to a low level of uncertainty, to low assets specificity and to low transactions cost. Adaptation and coordination occur through market incentives, but still under a public regulatory framework. In contrast, public development is correlated with a high level of uncertainty (linked to the duration of the operations), with high asset specificity (linked to the nature of the land, the complexity of the project, etc.) and with high transaction costs. Hybrid modes are in an intermediate position.

Table 1 summarizes the correspondence between the attributes of transactions and the specific governance structures.

Table 1: Correspondence between attributes of transaction and governance structures
(+ + high level, …, - - low level)

Governance structure	Development modes	Asset specificity	Uncertainty	Frequency
Market	Spontaneous development	- -	- -	+ +
Market to hybrid	Regulated mutation	-	-	+
Hybrid	Negotiated development	+	+	-
Hierarchy	Public development	+ +	+ +	- -

Our empirical studies show that if this correspondence is not established at the beginning of the project, meaning that there is no "alignment" between the attributes of transactions and the governance structure, then malfunctions and failures are likely to happen.

For example, in several cases the local authority has established a regulatory incentive scheme in a detailed plan (regulated mutation) but it is not adapted to the local context. Landowners are reinforced with the idea that their property has a value of buildable land and tend, by their demands, to make the operation more difficult or even impossible. Realignment occurs later moving to a negotiated or public development. In other cases, the local authority relies on a negotiated arrangement while the characteristics of the operation plead for public development. The outcome is then often a breach of contract with the consequence that a project is delayed and more costly to the taxpayer.

We should also mention the frequent situation where urban development would require planning and programming of public facilities, but is left to the chance of spontaneous evolution ("*laissez-faire*"). The result is a messy urbanism, high land prices, and unanticipated equipment costs to be covered by the taxpayer.

Finally, it happens that a public development, not strictly justified by asset specificity (complexity), or economic uncertainty, generates an excessively orderly planning, without the

variety brought by a sufficient number of diverse actors. Such rigid development is exposed to inevitable changes and is less able to resist in a long term, as the deterioration of many monolithic social housing neighbourhoods has shown.

The issue of "alignment" is also the one of "balance" to be held by the local authority (urban development regulator), between order and variety, between differentiation and coordination. Indeed, too many regulations (hierarchical intervention of the local authority) bully the various initiatives at the expense of variety. Too few regulations (the market left to itself) results in formal and functional urban unrest, in unjustified rent granted to landowners, and finally in extra investment costs for the public who have to pay for equipment upgrading and unplanned urbanization restructuring.

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Walter Seher* and Lukas Löschner*

Anticipatory Flood Risk Management – Challenges for Land Policy

1. Introduction

"Whether it comes to structural flood protection, to flood retention or to river restoration, the decisive question is about availability of land." This quote of an Austrian water engineer during a flood-related research workshop illustrates the growing importance of land resources in flood risk management. While technical and hydrological aspects are relatively well known, the implementation of flood risk management measures on mainly private land is a challenging issue because of the related impacts on property rights and property values as well as the influences on land use patterns. Although much research has been conducted on flood risk management, land policy for floods is a barely addressed issue.

Land policy is about the decisions and actions of policymakers with regard to land uses, public interests and land use rights. Land policy is public policy because it involves collective decision making (Davy 2012). It includes a variety of public measures (e.g. spatial planning, land readjustment, taxing or financial incentives) with an influence on land use, land values and the distribution of land. Furthermore, land policy is concerned with the efficient allocation of land uses. As for flood risk management the allocation of land follows different rationalities which reflect the tension between the public interest in reducing risks at the catchment level and the private interest of maintaining local land use rights and land values with a minimum of public interference.

Against this background this contribution starts with tracing the 'spatial turn' in flood policy (Löschner et al. 2014), i.e. the increased importance of land-related issues in flood risk management, being one of the key elements in the implementation of the EU Flood Directive (Directive 2007/60/EC of the European parliament and of the council of 23 October 2007 on the assessment and management of flood risks). Claiming space for rivers results in an increasing demand for private land or in land uses being in line with flood mitigation requirements. The research project RiskAdapt (Anticipatory Flood Risk Management under Climate Change Scenarios: From Assessment to Adaptation) funded by the Austrian Climate and Energy Fund is the research background of this paper. The overall goal of RiskAdapt is to provide policy-relevant insights and conclusions regarding the current Austrian system of integrated flood risk management in the light of climate change scenarios, also pointing out the opportunities and barriers for decreasing vulnerability by means of integrated adaptation policy approaches. For this paper the adaptation measures developed for Austrian local case studies in RiskAdapt are evaluated regarding their implications on

* University of Natural Resources and Life Sciences, Department of Landscape, Spatial and Infrastructure Sciences, Institute of Spatial Planning and Rural Development (IRUB), Vienna / Austria.

land ownership and land use patterns. It becomes evident that the majority of the measures (structural, planning and coping measures) proposed by stakeholders within local workshops exert influence on property rights and property values or entail land use coordination demands. As those land policy issues were not part of research within RiskAdapt this paper does not come up with final solutions or recommendations but points out future challenges and entry points for further research activities.

2. The 'Spatial Turn' in Flood Policy

During the past decades Austria, along with other central European countries, was severely hit by a series of disastrous flood events (2002, 2005 and 2013). In particular, the severe events of 2002 and 2005 triggered a fundamental shift in Austrian flood policy away from a structural, security-based approach of flood protection towards an integrated, risk-based approach of flood risk management characterized by a preference for non-structural flood mitigation measures and an enhanced vertical and horizontal coordination, in particular between flood protection and spatial planning (Nordbeck 2014). While the 'traditional' approach was informed by a firm belief in controlling rivers via engineering solutions, flood policy today increasingly acknowledges the importance of providing 'more space for the rivers'. Accordingly, land use and land ownership in general as well as spatial planning and land policy in particular are assigned a more prominent role in the new paradigm of an integrated flood risk management (Löschner et al. 2014).

The shift towards an integrated flood risk management is prominently outlined in the EU Floods Directive (Hartmann and Jüpner 2014). The directive with its step-by-step implementation in EU member states until 2015 gave further impetus to the on-going transformations in Austrian flood policy and deepens the spatial turn in flood risk management. The process of i) determining areas of potentially significant flood risk (APSFR), ii) mapping flood hazard and flood risk and iii) drafting flood risk management plans facilitated the shift towards a risk-based approach of flood risk management. Flood risk management plans are being developed by EU member states for APSFR based on flood hazard and flood risk maps containing, inter alia, low probability flooding scenarios (Art. 6/3). Flood risk management plans shall be coordinated at the river basin level (Art. 7/1) and "address all aspects of flood risk management focusing on prevention, protection and preparedness." "They shall take into account (…) areas which have the potential to retain flood water, such as natural floodplains," and "(…) include the promotion of sustainable land use practices, improvement of water retention as well as the controlled flooding of certain areas" (Art. 7/3). They are to be periodically reviewed and updated if necessary, taking into account the likely impacts of climate change on the occurrence of floods (Art. 14).

Thus flood risk management strategies require a preventive protection of floodplains. Protecting floodplains implies on the one hand to restrict land uses which reduce the function of floodplains in terms of water retention and runoff in legally binding land use plans. On the other hand, it means that floodplains have to be made available for their functions in terms of land ownership and land use rights. Referring to the latter additional land policy

instruments are in demand. Results of applied research related to flood risk management (see among others Seher and Beutl 2004; Seher et al. 2010) as well as evidence concerning practical project implementation clearly show that the availability of land for measures of flood risk management is a challenge with increasing importance especially regarding the public claim for more space for the rivers. The effective stake of land policy in emerging flood risk management practice will become evident only in the decades to come. The first generation of flood risk management plans, however, does not address land policy as a significant issue on a river basin level (Hartmann and Jüpner 2014).

3. Materials and Methods – The Research Project RiskAdapt

This paper is based on empirical findings which were developed in the research project "RiskAdapt – Anticipatory Flood Risk Management under Climate Change Scenarios: From Assessment to Adaptation". The general objectives of RiskAdapt are to analyse flood risk and its potential spatial and temporal developments given the impacts of climate change on flooding and to develop adaptive measures for (extreme) flooding scenarios.

More specifically, RiskAdapt aims at (Nordbeck et al. 2015):

- providing a GIS based data base referring to flood hazard and vulnerability in Austria considering i) the current state; ii) anticipatory development scenarios for floods and population development on different scales that can be combined with reliable climate model results – as soon as they are available; iii) mapping of the overall flood risk in Austria under consideration of a climate change allowance for flood magnitudes and a projection concerning the population development for 2030; iv) identification of regions with high risks of flooding for v) deriving priority regions with the most immediate need for action in the context of climate change adaptation,
- analysing adaptive capacities on the national level as well as in three local case studies, specifically focusing on institutional, organizational and actor capacities that are relevant to integrated flood-risk management and
- testing community based participatory methods (scenario-based stakeholder workshops) as tools for deriving dialogue-based adaptation measures at a local to regional scale.

This paper is focused on project results from the local case study level. First the research approach for the local flood risk assessment is outlined and then setting and results of the local scenario workshops are presented.

3.1 Flood Risk Assessment

Following the risk assessment on national level and the identification of Austrian municipalities at high risk of flooding, both the current (status quo) and future levels of flood risk (until the year 2030) for three Austrian flood-prone municipalities (Altenmarkt im Pongau in the Austrian federal state Salzburg, Gleisdorf in Styria and Perg in Upper Austria) were assessed. Potential climate effects on the frequency and magnitude of future flood hazards

were considered by calculating a climate change (cc) allowance of 10% to the current peak discharges of 100-year flood events (HQ100) and 300-year flood events (HQ300). This 10% increase represents the maximum potential increase of flood intensities for Austria (APCC 2014; ZAMG and TU Vienna 2011). It was chosen to simulate worst-case flooding scenarios and to develop response measures.

The spatial extension and inundation depths of all four flooding scenarios (HQ100, HQ100cc, HQ300 and HQ300cc) were mapped and intersected with the (geo-referenced) federal building and housing register for the assessment of flood exposure in the respective scenarios using a GIS. To account for future changes in flood hazard exposure settlement development scenarios for each case study based on planning documents and interviews with local planners and policy-makers (see fig. 1) were developed and visualized. These exposure scenarios were intersected with the flood hazard areas. By allocating damage amounts to the different land uses affected, current and future flood risk were subsequently expressed in monetary terms (Löschner et al. 2016).

Figure 1: Current flood hazard exposure of buildings and expected future settlement development (until the year 2030) in an alpine floodplain (case study Altenmarkt im Pongau). (Source: IRUB)

The quantifiable results of the risk assessments for each case study were used as an input for the local stakeholder workshops to stimulate discussion and to develop adaptive measures in the participatory setting of the stakeholder workshops.

3.2 Local Stakeholder Workshops

Experience has shown that the likelihood of establishing useful and useable recommendations and adaptive policies contributing to an anticipatory flood risk management approach

increases when representatives from different institutions (stakeholders), who are responsible for the measures under consideration, participate in the design, implementation and operation of flood risk assessment (Stoll-Kleemann and Welp 2006). This was the point of departure for the local stakeholder workshops conducted in each case study. The task of the workshops was to discuss the assessment and management of current and future flood risks. The local stakeholder workshops more precisely aimed at i) reflecting determinants of risk based on different scenarios (maps), ii) identifying/verifying local context conditions and pre-existing policy processes, and iii) developing and prioritizing adaptive measures for extreme flooding scenarios (Löschner et al. 2016).

In preparation of the case study workshops, local and regional stakeholders from the field of policy-making, public administration and emergency response were interviewed to acquire further information regarding e.g. flood protection infrastructure, the level of flood preparedness, current mitigation measures or risk-awareness. These inputs of local context conditions were used to define the thematic focus and the process design for the case study workshops. The interviews were also used to sensitize and mobilize stakeholders for the workshops. The workshops were moderated, lasted for four hours and consisted of presentation, brainstorming, discussion and deliberation components. The basic communicative rule was that every stakeholder must have a say and that all opinions and perceptions must be tabled. The workshop participants consisted of fourteen stakeholders in Gleisdorf and Perg and twelve stakeholders in Altenmarkt. The representatives mostly came from the municipal political sphere, from local and regional public administration, from planning offices and from emergency services. Five researchers from the RiskAdapt team completed the group of workshop participants (Nordbeck et al. 2015).

To stimulate discussion, the workshops began with a presentation of the quantifiable results of the flood risk assessment. This scientific input was delivered in an interactive setting via plotted maps and aimed at providing an impetus for the discussion and the development of adaptation measures in a World Café setting (Ruppert-Winkel et al. 2014). Based on the cycle of flood risk management, the discussion was grouped into three roundtables (with three to five representatives) each having a different focal point: structural measures of flood protection; planning measures of flood prevention; and coping measures to increase flood preparedness. The idea behind the World Café is that the participants have enough time to speak and listen in a non-hierarchical setting. Ideas and opinions should move and develop from table to table so that at the end everyone has contributed to each topic. The participants were encouraged to establish their own views and visions on the issue of anticipatory flood risk management and were asked to select elements and parts of the scenarios that seemed reasonable to them. In the end of the World Café, all adaptive measures from the roundtable discussions were presented by the moderators in the plenum. In a next step, the participants prioritized the different measures and activities according to their own preferences (Nordbeck et al. 2015).

3.3 Workshop Results: Prioritized Adaptation Measures

The key aim of the local stakeholder workshops was to develop prioritized flood adaptation measures. The following table summarizes the five top-ranked measures for the field of flood protection (i.e., structural measures), flood prevention (i.e., spatial planning measures) and flood preparedness (i.e., coping measures).

Table 1: Prioritized adaptation measures: the table lists the top five structural, planning and coping measures all over the three case studies (Source: IRUB)

Structural measures	Construct retention basins in upstream municipalities
	Enlarge retention areas, prevent the loss of existing retention areas
	Adapt buildings (e.g. raise the upper edge of flooring)
	Ensure river maintenance and remove bottlenecks to prevent debris flow and log jams
	Encourage the formation of water boards to improve upstream-downstream coordination
Planning measures	Allocate land for retention basins, flooding corridors or other protective measures in local land use plans
	Display 300-year flooding zones in local land use plans
	Consider extreme flood events in issuing building permits (building adaptations instead of building bans)
	Rezone building land in hazard areas
	Coordinate provisions in the Austrian Water Act and the State Spatial Planning Acts
Coping measures[1]	Foster individual responsibility (e.g. voluntary building adaptations, rain water infiltration, roof greening)
	Provide information material and check-lists for private adaptation measures
	Conduct thematic project days in schools
	Train fire brigades in technical flood protection measures
	Deploy a management board to coordinate flood-related decision-makers

1 Unlike in other countries (e.g. Switzerland) private flood insurance is an adaptation measure of low importance in Austria. Thus it was not mentioned in the local stakeholder workshops.

Despite different spatial contexts in the three case studies, the results of the stakeholder workshops show that preventing an increase in damage potential is a challenge common to flood-prone municipalities. The proposed measures, however, do not always exactly reflect the drivers of future flood risk, might it be the climate change induced increase in flood hazard or the increase in flood hazard exposure caused by settlement growth both in areas with low flooding probability (i.e. 300-year flooding areas) and in areas of residual risk (i.e. areas protected up to a certain degree of flooding).

4. Adaptation Measures – The Land Policy Challenges

In this section we take the catalogue of adaptation measures regarding extreme flood events (see Table 1) and evaluate them against a land policy background, especially regarding their implications on land ownership, land values and land use patterns. From a land policy viewpoint, the adaptation measures are classified and discussed along three categories:

- Land availability for flood retention and runoff
- Land use planning
- Coordination demands.

4.1 Land Availability for Flood Retention and Runoff

Many of the measures presented need to be realized on land that is currently owned by farmers, citizens or other private entities. Land availability is on the one hand relevant in terms of (private) property rights while, on the other hand, conflicting land use demands like housing and commercial development or intensive types of agriculture reduce the amount of land suitable for flood hazard mitigation. Flood polders are frequently implemented on valuable agricultural land close to rivers. They can be monofunctional in the sense that they are exclusively designed for the purpose of flood storage. Proposed adaptation measures like *constructing retention basins in upstream municipalities* or *allocating land for retention basins* refer to this monofunctional type of flood retention. Water management authorities strive for public ownership on those facilities as flood protection is considered a public task and exerting public control on retention basins is crucial for hazard mitigation. Furthermore, as flood storage usually is not a profitable land use for private land owners, land acquisition by the public is the method of choice. In Austria water legislation however does not provide any normative regulations for flood plain acquisition and dike rebuilding. Compulsory purchase of land required for flood retention is a hypothetical option. Although legally possible, it is not applied in Austrian flood protection practice. Also the EU Flood Directive remains vague on those issues and leaves precise regulations to the national law of the member states (Albrecht 2014). Given the absence of normative instruments land acquisition for flood prevention and runoff depends on the consent of the affected land owners.

This weak position of water management authorities in land acquisition results both in higher prices paid for land (affecting public households) and in the fact that the planned retention basins cannot be realised with one or several land owners opposing the project. Recent experiences indicate that (agricultural) land owners increasingly agree to provide land

for public projects only if they are allocated compensation land. In that case land consolidation or land readjustment schemes are able to facilitate land acquisition and thus enable a successful project implementation (Seher 2015). A special type of compensation model is implemented in the alpine valleys of Salzburg. For the purpose of both flood retention and river restoration river beds are widened along designated river sections. Such projects rely on the availability of private land adjacent to the rivers which, due to reasons of topography and a variety of competing land use demands, is scarce and thus valuable to the land owners. Regarding compensation the responsible water management authorities strive for the zoning of building land (with the same land owner) in 'flood-safe' areas in exchange for providing land for river restoration and flood protection. Since this practice has led to an unjustified increase in building land regional spatial planning authorities are beginning to question this type of compensation.

Adaptation measures developed in RiskAdapt stakeholder workshops like *enlarging retention areas and preventing the loss of existing retention areas* and *allocating land for flooding corridors in local land use plans* relate to a different way of flood retention where technical measures are not required to enable flood storage. These measures are multifunctional in a way that other land uses being compatible with flood retention, like extensive types of farming or forestry, are possible on the same parcel. Accordingly, there is no immediate need for the public to purchase the respective land. This does not imply, however, that there is no interference in (private) property rights. Increasing the probability of a parcel to be flooded by rebuilding dikes may be regarded as an interference into existing property rights (unlike today decades ago dikes used to also be built to protect agricultural land) and definitely reduces the property value. The same is valid for temporary emergency retention (Hartmann 2011), a measure of flood risk management with high significance for coping with extreme flood events. In case of flooding that exceeds the designed protection limit dikes are opened at defined spots resulting in 'controlled' flooding of designated areas. Providing land for those areas influences property rights (e.g. defined protection standards) as well as property values. However, whether there is a need to compensate land owners for damages expected is still subject to discussion.

Case study research confirms that providing financial incentives is the main motivator for land owner involvement into flood retention projects (McCarthy et al. 2014). There is a variety of suitable measures including funding in agri-environmental programmes, payments for ecosystem services, flood-related land use contracts and direct payments by downstream land owners who benefit from retention measures in the upstream river reaches. What compensation and financial incentives have in common is the risk of becoming a 'quasi-property right' (a right land owners think they can claim). So, such payments need to be applied carefully regarding the lock-in situations they might create (Hartmann 2014).

4.2 Land Use Planning

Adaptation measures related to both planning and structural flood protection refer to instruments of local land use planning, in particular to zoning and local development planning. Spatial planning laws in Austria impose building bans for hazard zones with a high

probability (HQ30) and in some cases with a medium probability of flooding (HQ100), but they do not provide any land use restrictions for extreme flooding zones (HQ300). The stakeholders participating in the RiskAdapt case study workshops did not go beyond these legal regulations but considered possible climate change impacts on flooding by proposing to *display 300-year flooding zones in local land use plans*. By realising this measure the local land use plan would provide additional information without any binding consequences for hazard-related zoning. In an expert survey about spatial planning in areas with a low flooding probability and in residual risk zones (Seher and Löschner 2015a) the statements concerning this measure range from "important information for raising flood risk awareness" to "danger of unnecessarily upsetting citizens". What the experts (water managers and spatial planners) did not mention is the effect of displaying 300-year flooding zones on property values. Especially after major flood events even the location of real estate in zones with low flooding probability has a considerable impact on property value.

For the same reason local politicians usually refrain from *rezoning building land in hazard areas*. Although it is very unlikely that the municipality has to compensate the land owner for reducing the land value by flood induced rezoning municipal stakeholders try to avoid rezoning as far as possible. Nevertheless, rezoning building land was regarded as an important adaptation measure in local land use planning.

Adapting buildings and *considering extreme flood events in issuing building permits* are both measures of flood-proofing. Flood-proofing aims at reducing or avoiding the impacts of floods upon buildings. Amongst other measures this may include elevating structures above certain flood levels and employing designs and building materials which make structures more resilient to flood damage (ClimateTechWiki 2016). Flood-proofing can be implemented both by issuing building permits and by applying local development planning, another instrument of local land use planning. Local development plans are able to specify the layout of building land in areas to be developed. A collaborative approach between flood protection and development planning offers possibilities to realise developments in areas with a low flooding probability (HQ300) reducing vulnerability of buildings and increasing adaptive capacities. In those areas where flood-related building bans are not in force flood-proofing in local development plans imposes additional land use restrictions thus limiting property rights. Accordingly, adaptation measures like that are also viewed critically not just by land owners but also by water management and spatial planning experts who do not see any need for action in areas with a very low probability of flooding (Seher and Löschner 2015a). Against the background of possible climate change impacts some experts, however, advocate an obligation of flood-proofing also for existing buildings (Seher and Löschner 2015a) which is regarded as a disproportionate interference in existing property rights by legal experts.

4.3 Coordination demands

A wide range of proposed adaptation options refers to coordination demands. Coordination is a cross-cutting issue relevant in all three groups of adaptation measures. *Constructing retention basins in upstream municipalities* as well as *encouraging the formation of water boards to*

improve upstream-downstream coordination addresses upstream-downstream relations characterising the one-sided dependencies typical for river catchments. Accordingly, structural flood protection measures as well as development in potential flood plains are rational decisions from an upstream municipality's point of view because economic benefits for the municipality can be expected. Potential negative consequences, such as an increased risk of flooding, are at the expense of downstream municipalities. This regional dimension of floods calls for corresponding approaches in flood risk management. A regional access in flood risk management faces overlaps of different spatial types, i.e. the catchment area and the respective area of political and administrative action. Planning in catchment areas creates a gap between this newly-defined administrative area and existing territorial institutions and stakeholders (e.g. municipalities) which are referred to as "problem of fit" (Moss 2003). Spatial misfits usually result in negative external effects (e.g. upstream-downstream conflicts) and involve a high coordination demand (Seher and Löschner 2015b). Land use is a substantial issue in upstream-downstream coordination because of the tension between public interest at catchment level and private property rights on the local scale.

Coordination between administrative stakeholders plays another important role in coordination demands addressed in the local stakeholder workshops. As flood risk management is an interdisciplinary issue it involves several authorities at different administrative levels. Coordination can be either horizontal with stakeholders at the same level (e.g. cooperation of municipalities) or vertical involving authorities with different positions in the administrative hierarchy (e.g. municipalities and regional water management authorities) (Seher and Löschner 2015b). *Coordinating provisions in the Austrian water act and the state spatial planning acts* and *deploying a management board to coordinate flood-related decision-makers* are issues of vertical coordination with indirect effects on land ownership and land use.

5. Conclusion

Land, in most cases privately owned, is a resource with increasing importance in flood risk management. Results of case study research in the project RiskAdapt reveal that land policy issues like land availability, land use planning and land use coordination are crucial for anticipatory adaptation to future flood events. Water management authorities often prefer full public ownership on land for the use of flood risk management where freehand purchase, land exchange or land consolidation are frequently implemented methods. However, interventions in private land uses can be expensive, complicated and time-consuming. Land use planning regulations, especially concerning extreme flood events, lack the necessary political support for implementation. Land use coordination in river catchments is context-dependent with the interests of municipalities and private land owners being a substantial obstacle.

Despite a high amount of research activities on flood risk management flood-related land policy so far is an issue of minor relevance. Land owners and land users are often regarded as recipients of flood risk management and not as key stakeholders (Hartmann 2014). Collaborative research on land issues in flood risk management should strive for involvement of land owners and land users in action research settings dealing with topics like adaptive land uses in flood plains (e.g. recreation, short rotation forestry or extensive agriculture), land use

contracts for flood retention, instruments of upstream-downstream trade-offs and the land owners´ individual responsibility for flood protection. As flood risk management aims to reduce the likelihood and the adverse consequences of flooding, land policy measures should be considered in order to correspond to the demand of White (1942) to "readjust land occupance and floodplain phenomena in a harmonious relationship".

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Berit Nordahl* and Anders Eika**

Urban Redevelopment and the (Mixed) Blessing of Multiple Ownership[1]

In the field of urban redevelopment, multiple landownership is usually regarded as a complicating factor involving the acquisition of land by local authorities, use of a land readjustment system or the assembly of land through the markets. This paper offers a supplementing strategy: organic redevelopment managed by the landowners themselves. The paper assesses ownership structures and landowner strategies in 22 redevelopment projects in Norway. It presents typical landownership structures and analyses landowners' behaviour under different structures. The result of the analysis gives little support for the notion that multiple ownership necessarily obstructs redevelopment processes. On the contrary, ownership structure and actors' development strategies show that multiple ownership projects work very well. The analysis also shows that owners of land may select to work with one another to increase revenue from the development. In the right circumstances, less local government involvement and greater prominence for market actors may be a recipe for successful urban redevelopment.

1. Introduction

Redeveloping urban sites is a highly complex undertaking due not least to the tangible and intangible factors arising from former use. Outdated constructions and soil pollution are two such constraining factors, but intangibles such as complex lot structures and multiple ownerships are just as complicating. In a growing city, commercial developers tend to acquire development rights to land whose current use deviates from highest and best use. When the local planning authorities come to re-zone the land and open for redevelopment, the land in question will be owned by a conglomerate of "old" and "new" property owners, including commercial developers. Mixed use and a multitude of stakeholders whose legal status varies from full ownership to leasehold and subletting, are part and parcel of this picture. The redevelopment of urban land cannot proceed therefore without considering the sites' physical, legal, and financial complexities. This paper addresses the impact of landowner structure on urban redevelopment processes. A brief introduction to the literature on urban redevelopment and is followed by an introduction to a perspective in which multiple ownership is not seen as a constraint, but a fact of life that planning and government departments have to accept as givens and build on. The perspective is presented with the help of concepts drawn from principal-agent theories. Part 3 presents findings from studies of ownership structures and actors' development strategies from 22 different redevelopment areas in Norway. The strategies range from developments run by landowners individually,

* Norwegian University of Life Sciences, Ås / Norway. Berit.Nordahl@nmbu.no. +47 99031793.

** Norwegian University of Life Sciences, Ås / Norway. Anders.Eika@nmbu.no + 47 98123798.

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to undertakings involving multiple owners working together. Part 4 discusses findings and draws conclusions on the strength of organic developments and markets' self-organizing abilities.

2. Urban redevelopment – handling complex landowner structures

There is a rich body of literature on landowner behaviour in urban environments. Much research applies an aggregated perspective and assesses the impact of landowner strategies on housing supply, land prices, and the spatial pattern of urban developments. There is clear evidence of individual landowners' tendency to obstruct developments, often in an attempt of reap greater rewards later. The impact of hold-out strategies on the supply of new houses and creation of urban sprawl is much discussed in the literature (Cunningham 2013; Miceli & Sirmans 2007; see Adams et al. 2002 for a study of the effect of a random sample landowners in blocking development projects). The free-rider problem is also addressed, for instance by Grossman & Hart (1980). Many authors have helped create an understanding of actors' choices and strategies. For example, Miceli & Segerson (2011) take an actors' perspective when assessing landowners' negotiation strategies in land assembly processes. Cunningham (2013) analyses developers' strategies, identifying for instance disguised land purchases of redevelopment-ready sites as means of preventing speculative land price hikes. Much of the literature that discusses land assembly also explores landowners' selling preferences. One example is Menezes & Pitchford (2004a) and their discussion of selling decisions. They identify high levels of uncertainty related to the development decision and found landowners' to have ill-founded expectations of rising land prices. In another study, they introduced the concept of strategic delay. This is where landowners' selling choices are affected by the way the purchaser approaches them. A sequential approach tends to encourage delays while a simultaneous approach has the opposite effect. Transparency in the negotiation process can also affect landowners' willingness to sell because transparent protocols tend to reduce strategic delays (Menezes & Pitchford 2004b).

Alberini et al. (2005) discuss incentives intended to promote re-use of urban brownfields. Based on a questionnaire identifying developers' investment choices, they found that land contamination and liability problems constitute the most significant obstacles. If liability issues were solved, fast track regulation and finance incentives were identified as the second most important factor in expediting investment. De Sousa (2006), who points at pollution and liability as explanations of low and piecemeal urban redevelopment, supports these findings. Major obstacles to redevelopment De Sousa found were polluted ground, high clear-up costs, and problems financing the redevelopment. Studies by Hutchison & Disberry (2015) found poor market conditions to be the most frequent cause redevelopment delays, surpassing problems with (outdated) existing infrastructure and landownership (page 279). Complexity, high risk, and long-time-horizons have led researchers to focus on financial mechanisms, and financial incentives to get urban redevelopment started are offered in many European countries (Adams & Hutchison 2000; Thornthon et al. 2006; Adair et al. 2007; Hutchison & Disberry 2015; Hutchison et al. 2016).

The many problems affecting urban redevelopment sites go hand in hand with the search for successful models. The Netherlands have long tradition of municipal land acquisition as a means to accommodate redevelopments. Once the land is put under municipal control, it is rezoned, serviced and sold to developers (Louw et al. 2003). A model with the local authority in the driving seat was also evident in Norway in the post-WW2 reconstruction years (Nordahl 2012). The high financial risk facing local authorities, along with the possible negative impact on land market competition caused local authorities to back out in the late 1990s. Also Netherlands' model is under constraint, for more or less the same reasons (Louw et al. 2003; Louw 2008). Land readjustment is often portrayed as an alternative to local authorities buying land and the zone-service-sell model (van der Krabben & Needham 2008). This legal instrument allows governments to solve problems arising from incongruence between lot structures and planning schemes, and may also be used to extract land for public services. Urban land readjustment was provided for in the 2008 Planning and Building Act, but the institutional arrangements seem inadequate for projects involving multiple ownership on high-value land (Holth 2015).

The 'acquire-zone-service-sell' model and the land readjustment model are alternatives to developers' own land assembling efforts. In the next sections we set out the rudiments of an additional model that allows redevelopments to move ahead organically, following the pace and decisions of individual landowners. The model involves local governments who want to see an area redeveloped but lack the legal authority to compel landowners and developers to take action, and the economic muscle to finance large-scale land purchases. The heart of this working model consists of carefully drafted planning schemes avoiding dependency on marginal landowners, and with local governments advancing the cost of infrastructure, including schemes to ensure that (all) developers contribute (Nordahl 2015). However, avoiding dependency on diverse individual landowners does not in itself induce them to act in the interest of the local authority. The redevelopment site will still owned by a conglomerate of "old" and "new" property owners, with different ideas on how to utilize their land. The model is based on the resilience of the development scheme but depends in addition on individual landowners' decisions and actions, and their effect on adjacent landowners.

2.1 Conflicts of interest, uncoordinated time horizons, imperfect information perspectives, and landowners' self-organizing

A brownfield site 'mature' for redevelopment might be viewed as a system consisting of diverse actors with varying approaches to the future utilization of their land. In a complex system like this, one actor's actions are affected by, and are consequential for, the other actors within the system (Page 2015). Significant actors in brownfield redevelopments are landowners including lessors and lessees, tenants; developers; planning authorities and public service providers; and existing citizens. Either physical adjacency, contracts, friendship or all three may interlink these actors. They are to some extent mutually bound: the planning authority depends on the willingness of landowners to sell their land and of developers to invest money and expertise in renewing the structures; the developers (and thus the landowners) in turn are dependent on the planning authority for permission to develop. Mutual

dependency is also evident among landowners and tenants. Brownfield and grey-field sites tend to consist of a mix of vacant land, leased land, sublet premises and premises serving as owners' sites of production.

In our discussion of the micro-mechanisms operating in specific sites earmarked for redevelopment, we draw on the concepts of principal-agent theory (henceforth PA theory). The rich literature on the theory primarily address theories of firms, and, more precisely, the relationship between the firm's board of directors and its CEOs (Jensen & Meckling 1976). The main ingredient is the interdependency of the principal and the agent and the likelihood of them pursuing mutually contradictory objectives, and of the agent holding private information unknown to the principal. The theory refers to situations where the principal is dependent on the agent without having full knowledge of the latter's (real) interests, and where controlling the agent's choices and actions comes at considerable cost. Imperfect information and conflicts of interest are central to the theory, as are uncoordinated time horizons, different risk profiles, and the danger of agents behaving in a morally hazardous fashion.

PA theory is strongly influenced by economists. According to basic microeconomic theory, firms seek to optimize their production and all players generally look to further their own interests. In this view, all individuals are assumed to have a unique self-interest. However, as Wiseman et al. (2012) argue, this is not isomorphic with agency theory as such and is an oversimplification of reality. "[T]his narrow interpretation of agency theory focuses on the most pejorative view of human nature, which many management scholars find as repugnant" (ibid.:221). In order to grasp the complexity of PA relations PA theories must widen their understanding of actors by including social networks, power relations, and cognition (ibid).

PA theory offers a structure against which to assess relations and interdependencies between local authorities, landowners, and developers. In a brownfield redevelopment, it is actually not obvious who is the principal and who the actors. For the purpose of this analysis, the planning authority, the body wanting redevelopment to take place, is regarded as the principal and landowners and developers as agents. The planning authority is dependent on the agents' actions but has limited information of their priorities. In addition, there might very well be conflicts of interest between the planning authority and the landowners and developers. Conflicts of interest and lack of information are not unique to local authority-landowner relations but definitely also to landowner-landowner relations in brownfield redevelopments. However, brownfield developments also represent an opportunity for positive reciprocity between actors. The first landowner with a derelict area who decides to redevelop can do so independently of other actors, but might expect higher returns if some of the others decide to join in. If they coordinate their efforts, a larger area could be upgraded and if brownfields are redeveloped into residential areas, the quality of the neighbourhood will influence house prices (see for instance Huang & Yin 2015). Conflicts of interest can therefore co-exist with reciprocity between adjacent landowners. Redevelopment-ready urban sites allow for reciprocity and mutuality between the planning authority, as the principal wanting redevelopment to take place, and individual landowners, as agents feeling the rede-

velopment, just as they do for conflicts and contradictory objectives. This use of PA theory differs from economists' reductionist conception of principals and agents by allowing space for reciprocity and shared visions, by enlarging the possible range of behaviour-influencing factors which otherwise are seen as atomistic and utilitarian. Research illuminating the importance, and occurrence, of shared visions in urban planning (Schön 2008) and the creative enthusiasm shared by actors involved in project developments (Guy and Henneberry 2002) support this approach. Moreover, since the real estate development business is a small industry in Norway and most actors "will meet again," reputation is important to landowners and developers. Long-term relations, including former and future joint businesses, may affect so one landowner's attitude to adjacent landowners. This broader view is further encouraged by research showing the importance of social relations and the impact of "weak ties" between actors (Granovetter 1997).

2.2 Data sources: Owner information, price information, and interviews in 22 urban redevelopment sites located in seven different municipalities

The data analysed in this paper stem from a comparative field study of 22 urban brownfield developments in Norway in 2014/2015. The case units are the redevelopment area and the data sources documents, registry information (land registry and business registry), price data and interviews. The documents consist primarily of official municipal land use plans for the area and drafts of preliminary development proposals submitted by developers to the planning authority, including transcripts of political discussions about the development, consultation papers, other correspondence, and formal agreements between the developer and the local planning authority where such were concluded. The land register contains information on the official owner of a site, and date of registration.[2] These data are supplemented by price information on house sales in areas adjacent to the redevelopment sites[3]. The research

[2] Land Registry (Matrikkelen) (www.matrikkelen.no) and Ambita (www.ambita.com). The Land Registry (LR) is managed by the Norwegian Mapping Authority, a government agency with nationwide responsibility for the property registry. Site-wise information was extracted from the LR database. This included information of socio-code, lot seizes and usage as well as information about the registered owner (date of purchase/registration and the basic characteristics of the registered owning entity). The business register Ambita was also approached to widen the information on the nature of registered owners including 'owners' owners'. The ownership structure was confirmed in interviews with the planning officers and a selection of developers on each of the 22 sites. This thorough approach is necessary firstly because the land register is not always up to date and mistakes are apparently frequent. Second, professional developers tend to buy and develop specific plots by creating temporary entities. The task of these temporary entities is to commence the development at the site in question. They usually have only one employee (sometimes none), a board and a CEO of the mother company/companies if shared ownership. The entity is dissolved when the development is completed (Nordahl 2012). It is therefore important to provide information identifying which company (or companies) owns this temporary entity, to get a correct understanding of the actual controlling bodies.

[3] Eiendomsverdi AS. Eiendomsverdi AS is a private company owned by the four largest bank constellations in Norway. It develops and supplies information tools for estimating market values to the Norwegian residential real estate market. Eiendomsverdi AS gave the research team information on the deviation of the selling price of individual units from a comparable national mean for units with similar characteristics (apartments only). The research team used this information to ascertain whether the site was in the upper, medium, or lower (local) market tier.

team also interviewed planning officer(s) in each of the seven municipalities about the redevelopments, and one or more of the developers' project leaders about their development schemes. All sites are centrally located and defined as mature for redevelopment in the municipal master plan. One of our selection criteria was that the local planning authority had earmarked the lands for redevelopment in at least one generation of municipal strategic plans. In Norway, detailed development plans (drafts of legal zoning and development conditions) are mostly drafted by the landowner/developer (Nordahl 2006). This is the case for these sites as well, but only after the planning authority had earmarked the area for redevelopment. The interval between the initiative to draft a detailed zoning plan and the final decision to develop the land varies from one to fifteen years. The sites vary in scale. Table 1 in the appendix lists the sites by name and location, size in square meters, distance to CBD (central business district), number of individual plots, land-use before redevelopment, year of first planning initiative, and year when the last registered planning initiative was finally approved.

3. Ownership structure, dominance and development strategies

The institutional context in which the redevelopment takes place frames the options available for the local authority as principal to control the agents' behaviour. For Norwegian local authorities, these instruments are limited in practice to adopting general planning schemes and thus to confer development rights on the landowner, and establish systems that allow for stepwise financing of infrastructure. All projects in this study have adopted general zoning plans designating the sites to be redeveloped into urban residential areas and urban centres. Further, all requirements regarding landowners'/developers' contributions to the financing of infrastructure and common areas are tailored to be compliable on an individual basis.

The analysis starts with a review of landowner structure on the 22 sites, showing the variation in size and landowner complexity (figure 1). This is followed by a discussion of the three kinds of ownership structure and actors' behaviour within these structures.

The land-owning entities can be sorted into three main categories of private entities: owners whose main task is to run a production or sales business but who also own the premises and the land; property management companies whose expertise is in leasing and managing land and premises; and housebuilders whose expertise is in developing market housing. In addition, private households own some of the lots in the fringes of the development. Landowner composition is dynamic and owners who use their property for production tend to decline in numbers, whereas property management companies tend to increase.

3.1 Ownership structure dominated by local authority

The surface survey shows that the local authorities own land in 20 of the 22 areas. The land in most cases consists of streets and public services, and will remain to do so after the redevelopment (in size and purpose, even though the location may be altered). In seven of the areas, the municipality also owned land designated for redevelopment. Table 1 shows

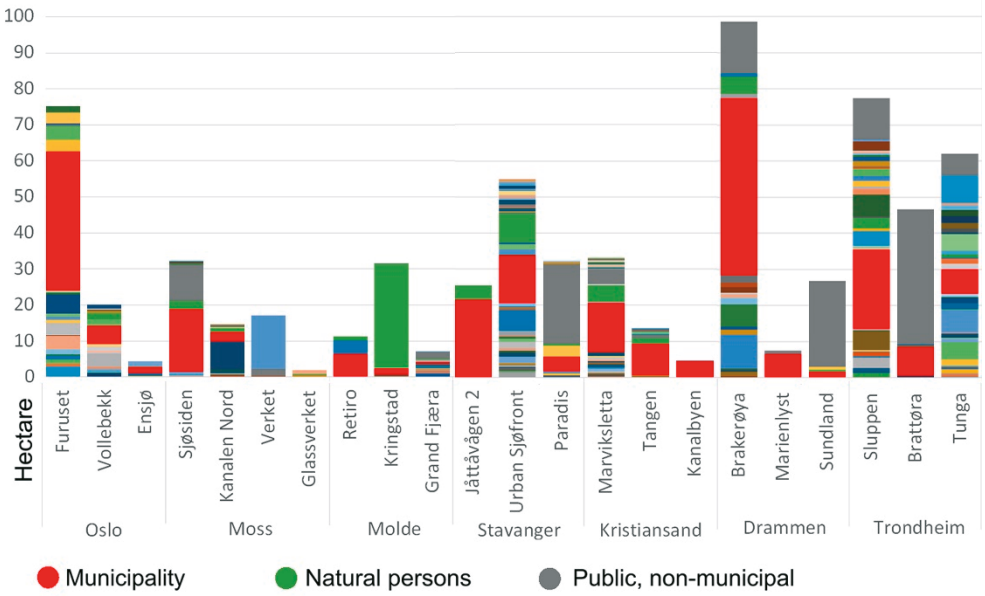

Figure 1: Structure of ownership by site name; municipality; total size; and number of individual owners. Source: land registry, URBAN PLAN.

sites where a substantial fraction of developable land is owned by the local authority. This land is in public hands for historical reasons. Although local authorities in Norwegian cities do buy land, they buy little, and do so to facilitate market development rather than with a view to developing it itself (Barlindhaug et al. 2014). The double role of planning authority and landowner embeds a potential to boost the redevelopment. A closer look at local authorities' strategies shows that none of them uses ownership to redevelop themselves. Instead, they sell the land to professional developers or partners. In the case of the latter, the land is transferred to a holding company, which sells 50 percent of the land to a professional, commercial developer. Conditional sale and collaboration strategies allow local authorities to ensure the developing company begins redevelopment without exposing the local authority to any inherent risks. In a PA terminology, the principal transfers risk to agents more familiar with developing real estate on market conditions, while remaining in control.

Table 1: Landownership structure of 10 sites where the local authority is the dominating or a significant landowner and the strategy applied. Source: URBAN PLAN

Site	Share	Strategy	Result
Kanalbyen	100%	Transfer land to a holding company, which sells 50% to a commercial developer	Partner
Marienlyst	89%	Transfer land to a holding company, which sells 50% to a commercial developer	Partner

Jaattavaagen	85%	Conditional sale to developer. Conditions refer to time of completion.	Sell
Brattoera	73%	Land utilized for transport before and after redevelopment. Owners of other, smaller lots, redevelop at their own pace.	Keep for service
Tangen	64%	Sell their share of land to the holding company instigating the redevelopment project.	Sell
Retiro	57%	Owns green areas and historical buildings, retains both for conservation	Keep for service
Furuset	44%	Sell lots to (different) commercial developers.	Sell
Marviksletta	41%	Transfer land to a holding company instigating the redevelopment project.	Partner
Ensjo	38%	Sell surplus land while retaining some for transport (metro)	Mixed: sell & keep
Vollebekk	25%	Utilize plot for new school.	Keep for service
KanalenNord	18%	Awaiting rise in market prices, renewed lease contract (industrial purposes).	na

3.2 Ownership structures with one solitude private owner

Three projects have an ownership structure dominated by a single owner. These sites vary considerably in size and actor characteristics. In Moss, a small town south of Oslo, the sole owner at the Verket project (see fig.1) is a professional investment company. Although mostly associated with shipping, the company is also familiar with residential development. The land in question has a prime location close to the shoreline and city centre and used to be owned by large paper plant. The other solely owned site, Sundland (fig. 1), is also favourably located, close to the city centre and the river. The owner is an experienced property developer set up by the Norwegian State Railways for the purpose of developing surplus land and securing income for the mother company. Both sites are large considered the local market in which they are located, and are being developed over a 20-year time horizon. In both projects, some of the buildings are leased, some of them for long periods. The local authority, seen as the principal who wants to see the land redeveloped, has no means of controlling the behaviour of these sole owners other than by adopting a development scheme that is acceptable to the agents. As sole owners of very long-term development processes, they can afford to take their time negotiating development schemes and terms, especially if the land is generating enough income to cover their costs (financial cost; planning, developers' project leader's payment). The owner of the paper plant has dismantled the machines, for example, and sold them on the global second hand market

while working on the development scheme. The situation at Sundland is similar: the process of drafting a viable development scheme, acceptable to all parties, runs parallel to income-generating activities in the existing buildings.

Single-owner-structured sites have the advantage over multiple ownership sites in that the principal and agent in principle share the same interest in redeveloping the site. There will be reciprocity and mutuality, and the relatively small number of actors involved promotes transparency and eases information flows. In this respect, P-A relations are more likely to coincide than sites with multiple owners.

3.3 Ownership structures with multiple private owners – two development strategies

Figure 1 displays sites where the number of landowners ranges from 120 to five unique landowners. The strategies evolving in projects with a multiple landowner structure vary, although irrespective of the number of owners: In six of these areas, each owner manages their project independently, according to their individual interests and pace; in four of sites the agents established some kind of cooperation, motivated by their perception of the situation.

Strategy 1: Handling multiplicity by individual development

The fact that these areas actually do progress without any coordination mechanism shows that multiple ownership does not toned to be an obstacle. We learned from our interviewees that landowners who submitted redevelopment applications saw no need to purchasing adjacent lots, coordinate with adjacent landowners, or establish a partnership with the local government. They developed their own land according to their own needs and market situation. While owners in some of these projects who had already started redeveloping would have welcomed the opportunity to add adjacent lots to be developed, they considered the cost of assembling to exceed the benefit. These individual projects on these lands develop organically and without coordination under a joint planning scheme. The advantage is that agents are only responsible and liable for their own land and project. This mode of redevelopment has reduced some people's ambitions to see greater coherency to a matter of compliance with the principals' general planning schemes. Only in one of these areas the redevelopment process was put on hold – and that was because of market considerations. In this area, one of the agents had received an offer from a neighbouring manufacturer's to renew a land lease contract, and chose to accept it. Table 2 lists the situations at multiple owned sites where agents develop the land individually and without mutual coordination. Assuming the owning entities, the agents, are rational actors, they will not bother with a coordinating mechanism unless it is useful to them.

When multiple sites develop organically, the information flows mainly between the individual agent and principal. With a robust general plan in place, this seems to be sufficient to realize the redevelopment. The pace of redevelopment is adjusted to what suits the individual owners best, but the different time horizons do not appear to complicate the

development process to any great degree. The benefit of this strategy is the low transaction costs.

Table 2: List of actors and strategies on six sites with multiple ownership and no dominant owner structure, all developed individually. Source: URBAN PLAN

Site	Landowner mix	Short history	Observed actions	Strategy
Glass-verket	2 owners: one experienced and one new.	Newcomer faces problems to realize ambitious and costly scheme.	Newcomer proposes a less ambitious scheme. The experienced develop parallel.	Both focus solely on their individual project.
Sluppen	136 individual landowners.	Principal undertook infrastructure upgrading. Individual lot owners develop sequentially,	More individual proposals 'in the tube.' Registry shows ownership changes indicating continuous redevelopment.	Develop individually due to market volatility and lot maturity. Long time horizon and relatively thin local market.
Tunga	78 individual landowners.	Principal completed superior plan.	Redevelop individual lots according to business needs and economy.	Develop individually.
Kanalen Nord	55 individual owners, incl. municipal land trust as.	Superior plan adopted, but largest private owner retained from development.	Prolonging lease considered most viable. Smaller landowners also holding back.	Major agent's choice to postpone project influenced other agents to do the same.
Volle-bekk	54 individual owners, incl. experienced developers.	Principal adopted superior plan for public areas all landowners must comply.	Ongoing redevelopment. Registry shows professional property managers purchasing lots.	Develop in parallel and individually.
Ensjø	5 owners, municipality, lessee and developer	Coordinated redevelopment scheme, initiated by planning authority.	Planning authority sells lot to largest landowner, who starts redeveloping. Other agents hesitate.	Alliance between planning authority and largest agent boosts redevelopment process.

Strategy 2: Handling multiplicity by modes of cooperation

In four of the projects with multiple owners the agents decided to work together. The level of commitment in these self-organized efforts varies from low level coordination to a comprehensive undertaking. Table 3 lists the different models observed. The redevelopment of Urban Sjøfront exemplifies a low coordination level. At this large site, the composition of landowners is a mix of professional house builders, businesses, and light industry, and many of the buildings are leased out. In this area, all agents develop their own land according their

own time preferences. Even though individual development is the basic strategy, some of the agents established an office together to boost the area's reputation in the public eye. The office arranges cultural events in the area, to raise its profile and attract house seekers, in the hope of curbing market prices. The office also liaises between the agents and the principal. In recent years, the office talks with owners of adjacent land to explore benefits of coordinated efforts.

A very different mode is seen in the case of Tangen, and partly also the case of Marvika and Grand Fjæra. Here, the agents voluntarily entered into joint ventures: they established self-owned holding companies to which they transferred their land. These holding companies work with the developers, irrespective of locations and physical borders. This mode of development relies on the agents' initiative, and is independent of, but welcomed by, the principal. In P-A terminology, it has some of the team-based characteristics since the agents themselves decide to redevelop the land as a joint venture.

These holding ventures are established in similar ways in all three projects: At Tangen, one of the owners, an experienced developer, literally knocked on the doors of every other owner, lessee, lessor and long-term tenants inviting them to join him in a redevelopment scheme. Every actor with a stake in the area was invited and all but one agreed to join. These agents converted their land into shares in the holding company[4] and started to co-fund the planning process. They also signed a code of conduct, giving the holding company right of first refusal, should any of the agents want to sell their shares. The holding company was set up as a limited stock company, with all owners in the board, and a temporary CEO. In the case of Tangen, the holding company managed to acquire sufficient funding to thoroughly upgrade the infrastructure and public spaces prior to the construction of new homes. In their opinion, this was important for the rebranding of the lands and improved the balance sheet considerably. The clause about right of first refusal proved useful as one agent wanted to sell their share. External investors showed an interest, but the board did not want 'aliens' on board. Therefore, they managed instead to buy the agent's shares. In this process, the principal, being the local authority, was of great help in easing the liabilities on the parties.

The land-owning entities can be sorted into three main categories of private entities: owners whose main task is to run a production or sales business but who also own the premises and the land; property management companies whose expertise is in leasing and managing land and premises; and housebuilders whose expertise is in developing market housing. In addition, private households own some of the lots in the fringes of the development. Landowner composition is dynamic and owners who use their property for production tend to decline in numbers, whereas property management companies tend to increase.

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4 In situations where the lands were leased, the owning Agents came to an agreement with the lessee in how and when to terminate the lease contract. In situation where the lessee actually owned the building (but not the land), the arrangement could result lessor selling the lot on which their building resided. Professional appraisal and property transactions lie at the heart of each Agent's strategy, enabling such choices.

A similar story can be told about GrandFjæra, though on a smaller scale. Two landowners pooled their properties into a single purpose company as a means to commence the redevelopment. They need new capital and would like to sell a share to a third actor. So far, they are still waiting for this new agent to appear. Agents who willingly pool their land in a

Table 3: List of actors and strategies at five sites with multiple ownership where a decision was made to coordinate activities in different ways. Source: URBAN PLAN

Site	Landowner mix	Short history	Observed actions	Argued strategy
Urban Sjøfront	120 owners: commercial developers, harbour, industry.	A large fraction of the land is redeveloped by individual developers. Principal adapted general plan to meet the needs of the whole area.	Landowners co-fund local office to raise the area's profile. Local office occasionally brings adjacent agents together.	Individual development, increased flow of information as positive side effects.
Marvik-sletta	50 owners: commercial developers and businesses.	Many long-term leased lots. Two landowners formed a holding company and encourage other owners to join.	Many of the leased lots newly sold. The company need start-up capital.	The holding company expected to attract capital.
Tangen	26 owners: mix of industry and commercial developers, incl. city sewage treatment plant.	Sequenced comprehensive development. Joint management body acting on all but one landowners' behalf.	Owners transferred land to a holding company sharing costs and revenue according to initial lot size.	Holding company enabled common facilities. Upfront.
Grand-Fjæra	2 landowners utilizing land for light industry transfer land into a joint holding company.	Existing production facilities must relocate prior to redevelop-ment. Close cooperation with principal, for approved redevelop-ment scheme.	Awaiting capital to relocate and commence the redevelopment. Continues to work with the new scheme.	Agents assume a single holding company and development scheme will attract capital.

holding company exhibit the self-organizing ability of the market. Indirectly, these agents respond to the principal's decision to allow redevelopment through planning measures. But the principal does not initiate action on behalf of these agents; that is left to them. Once the holding company is established and the CEO starts work on the detailed plans, the concurrence of interests of the agents themselves and between them and the principal is definitely more striking than the conflict of interest. The holding companies are a means to get the development process off the ground and establish the instruments to overcome capital constraints.

4. Conclusions – multiple landownership redevelopment sites preceding well

This paper has drawn on scholar writings which tend to see multiple landownership as a hindrance to redevelopment, especially on brownfield and greyfield sites, and therefore an impediment to municipal land assembly and land readjustment as alternatives to developers' costly land assembling strategies. The analysis undertaken in this paper shows that multiple ownership does not need to slow the development process. Of the 22 redevelopments in our study, eleven have multiple ownership, and all but two are proceeding well. The problem facing these two is a poor market, not the ownership structure.

The analysis of landowner behaviour in projects with multiple owners draws on P-A theory. The local authority is the principal who wants to see an area redeveloped. The landowners are the agents who may, or may not, choose to act in the interest of the principal. In situations where the principal wants an area redeveloped, and acknowledges the fact that it lacks both the legal authority to compel agents to proceed, and the economic power to buy them out, the only means left is the planning process and ability to provide incentives, replacing the means of control. Incentive planning comes in many shapes. At the lands studied here, the incentives are twofold: first, by upgrading zoning plans to signal to landowners that it will be easier to obtain permission for higher and better land use, and second to avoid impose dependency on independent agents. At the heart of the analysis lies conflict versus concurrence of interest. The analysis shows that mutual interest prevails over conflicts, both in the principal-agent relations among agents themselves. Agents who are ready to redevelop multiply owned land, tend to pursue three different strategies: each agent develops the land on their own; several agents agree to a low-level form of coordination; and finally, agents organize themselves as a joint development venture.

In *individual strategies*, agents develop the land independently, at their own pace and interests, under a general planning regime. The pace of progress is partly influenced by the new zoning possibilities, and partly by individual commitments to the land in question and otherwise. The 'cost' to the principal when the agents pursue individual development projects might be a long-drawn out process. Further, in these strategies, the flow of information goes mainly between individual landowners and the local planning authority; possible synergy effects across agents can be disregarded.

In the *semi-coordinated strategy*, the agents chose to supplement individual development projects with a coordinating device. They agreed to fund a staffed office at the location with the task of improving the reputation of the neighbourhood in the public eye and manage the dialogue among all agents with a stake in the site and the local planning authority. This strategy increases the flow of information and occasionally generates synergies between individual landowners. Another side effect is increased coherency for all agents in the area, leading to the cultivation of a sense of community. The great benefit for the principal, agents and society is the low monetary cost of both strategies.

The third strategy observed in the study is the *voluntarily transfer of land to a joint holding company*, which manages development on behalf of all. There were three cases of this,

demonstrating self-organizing ability of the market of multiply owned sites. In this strategy the agents renounce individuality and subject themselves to the pace and visions of this new entity. What the agents want primarily is to increase acting capacity, and strengthen the financial foundation in the initial phase of the redevelopment. However, the study shows that conflicts of interest may arise between the agents teaming up in this joint management arrangement. Even though the principal has no influence over or connections with holding companies established by agents, the principal in this case supports the majority in situations where agents' conflicting interests threaten the aims and ambitions of the management body. The holding companies and the principals shared the same objectives in this case; the principals' supportive actions were crucial for the success of this joint management body, and came at relatively low cost.

Toward a broader discussion of landownership in urban redevelopment

In summary, the analysis shows that under the right circumstances, a smaller role for local government and a greater role for market actors may be a recipe for successful urban redevelopment.

It is well known that planning departments can facilitate redevelopment processes. This study add to this body of evidence by showing that planning authorities acting as principals in redevelopment processes can thwart the power of obstructive agents – and leave the rest to the market. By not forcing a relationship of dependency upon diverse agents, the principal gives agents alternatives to purchasing the land and reducing the bargaining power of marginal landowners (Chowdhury and Sengupta 2012).

This analysis is meant to supplement scholarly interest in stronger public control mechanisms with a deeper understanding of the power of organic redevelopment and recognition of markets self-organizing ability. The study shows that agents have emergent powers in projects characterized by multiple ownership. With well-planned schemes and skilled principals, agents may transform these complex systems completely, individually or jointly.

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Appendix: Site characteristics. Source: URBAN PLAN

Site	Site name	Seize in hectare	KM to CBD	Number of plots above 10 sq.m	Main land use before redevelopment	Year of first development initiative	Year of re-zoning plans gained council approval	Development initiative: Planning authority or developers through one project
Drammen 1	Brakerøya	98.7	2.2	67	Industry, logistics	2010	-	Planning authority
Drammen 2	Marienlyst	7.4	0.8	8	Sports facilities	2012	-	Project
Drammen 2	Sundland	26.9	1.5	25	Train station, farmland, industry	2003	-	Project
Kr.sand 1	Marviksletta	33.1	2	137	Industry, housing	2008	2013	Planning authority
Kr.sand 2	Tangen	13.5	0.4	39	Industry, sewage clearance	1994	2004	Project
Kr.sand 3	Kanalbyen	4.7	0.5	13	Harbour, logistics	2003	2014	Project
Molde 1	Grandfjæra	7.0	1	30	Commerce	2012	2013	Project
Molde 2	Retiro	11.2	3	11	Green space	2013	na	Project
Molde 3	Kringstad	31.5	4.3	120	Agriculture	2002	2009	Planning authority
Moss 1	Verket	17.0	0.8	6	Industry	2007	2015	Project
Moss 2	Glassverket	1.8	0.5	5	Industry	2001	2007	Project
Moss 3	Kanalen Nord	14.5	0.7	55	Commercial harbour	2007	2012	Project
Moss 4	Sjøsiden	32.1	0.5	145	Harbour, housing, train station	2013	2015	Planning authority
Oslo 1	Vollebekk	20.1	5	54	Housing, industry, green space, commercial	2010	2014	Project
Oslo 2	Furuset	75.2	8.5	91	Housing, green space	2012	-	Planning authority
Oslo 3	Ensjø	4.3	2	16	Offices, commerce, industry	2006	2015	Planning authority
Stavanger 1	Urban Sjøfront	54.9	1.4	500	Industry, harbour	1982	2002	Project
Stavanger 2	Paradis	32.2	1.2	74	Train station	2005	2015	Project
Stavanger 3	Jåttåvågen	25.6	5.6	10	Industry	na	2012	Planning authority
Trondheim 1	Tunga	62.0	4.2	78	Commerce, offices, industry	2011	2012	Planning authority
Trondheim 2	Sluppen	77.4	2.7	136	Commerce, offices, industry	2006	2010	Project
Trondheim 3	Brattøra	46.6	0.6	75	Harbour, train station	1999	2000	Planning authority

Brigitte Treskow* and Hans Joachim Linke*

Aspects Influencing the Predicted Process of Demographic Change in German Cities

1. Introduction

The consequences of Demographic change, a creeping process since 1970 (Statistische Ämter des Bundes und der Länder 2011:6), become more and more noticeable in German cities. Its influences on processes in urban planning are partially enormous. Shrinking or booming cities both have to adapt to changes due to population development. Numerous publications examine the impacts of demographic change and the management of these changes such as monitoring or predictions. But what aspects can actually influence demographic change and how can cities deal with those? Statements in publications are rather rare and concentrate on immigration and emigration as well as legal regulations (Maretzke 2008:8).

International migration increases due to globalization (Swiaczny 2013) so that different aspects combined lead to new processes that can hardly be reckoned with. Immigration and emigration though affect demographic change. Population can increase instead of decline or the age pattern might change due to immigration or emigration processes. Both aspects can alter the fertility pattern considerably (Swiaczny 2013).

A survey in nine big German cities in 2013 discovered that the approach to deal with demographic change differs concerning organisation and the use of tools such as predictions, monitoring or strategic concepts. Also, the consideration of influences and changes of predicted developments and therefore flexibility of planning processes is rarely consciously dealt with. The aim of this research is to develop a prototype for the proceeding including different modified instruments and tools.

2. Challenges dealing with demographic change

2.1 Aspects influencing demographic change

Only at the beginning of 1990s, demographic change occurred deliberately as a term and was used in publications (Ehmer 2013:128). “Demographic change” refers to changes in the population according to the number and structure (Bähr 1992:230). Population growth or decrease results from the number of births, deaths and the sum of immigration and emigration (BMVBS 2013:3; Wehrhahn 2011:50).

Migrations, means a transfer of residence from one municipality to another (Bähr 1992:240–241), strongly influence population growth and structure (Ehmer 2013:74; Wehrhahn 2011:51). Migration can affect, depending on its extent, the age structure, the

* TU Darmstadt, Institute of Geodesy, Faculty of Land Management / Germany.

fertility or the lifestyles/behaviour patterns (Wehrhahn 2011:51). In comparison to other EU countries, Germany is strongly affected by demographic change (Werding 2006:49). This results due to a social transformation of the components of a change in household formation behaviour, declining birth rates, increasing life expectancy and migration gains (Wehrhahn 2011:49; Bähr 1992:236).

The population development from 1950 to 2013 points out the influence of emigration and immigration. The reason for a strong or weak immigration based upon legislation that either stop or support the migration process (see figure 1).

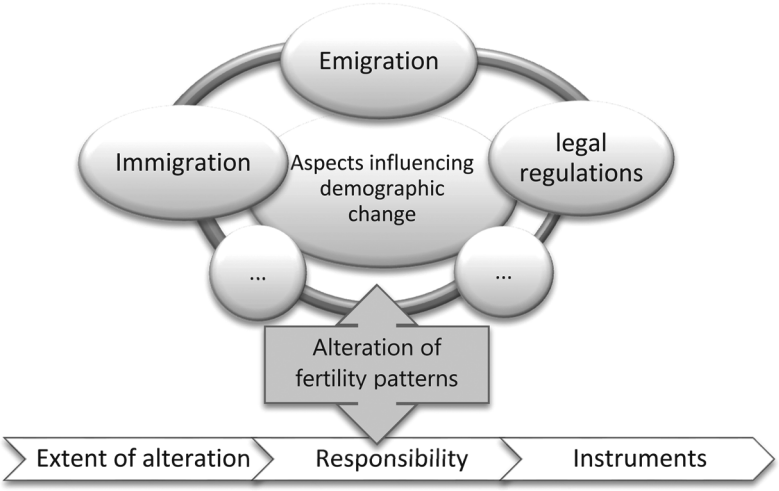

Figure 1: Aspects influencing demographic change and the reaction. (Literature references; own illustration)

After the population stabilized after the 1st and 2nd World War, the immigration of foreign population loomed particularly (see figure 2). From this time, the development towards demographic change shows in particular. From 1950 to 1973, the population increased rapidly at first, as it never again happened until 2013. From 1966 to 1967, the immigration suddenly weakened sharply and fell from about 70,000 to about 40,000 immigrants in one year (see figure 3). This was due to a new Aliens Act in 1965 in order to reduce immigration. Since 1970, an increase in population only results from immigration and not because of an increasing birth rate (Bähr 1992:234) (see figure 2 and 3). Since 2012 until now population is growing slightly again.

2.2 Reliability of predictions

Forecasts or population estimates are essential to look ahead and counteract certain trends or adapt to them. Population estimates can be carried out at global, national or regional levels. The national and regional estimates have a more reliable database in comparison to the global estimates. The estimates are determined by the migration movements which have to be included and are difficult to estimate (Bähr 1992:226; Ehmer 2013:55; Heilemann 2003:13, 24).

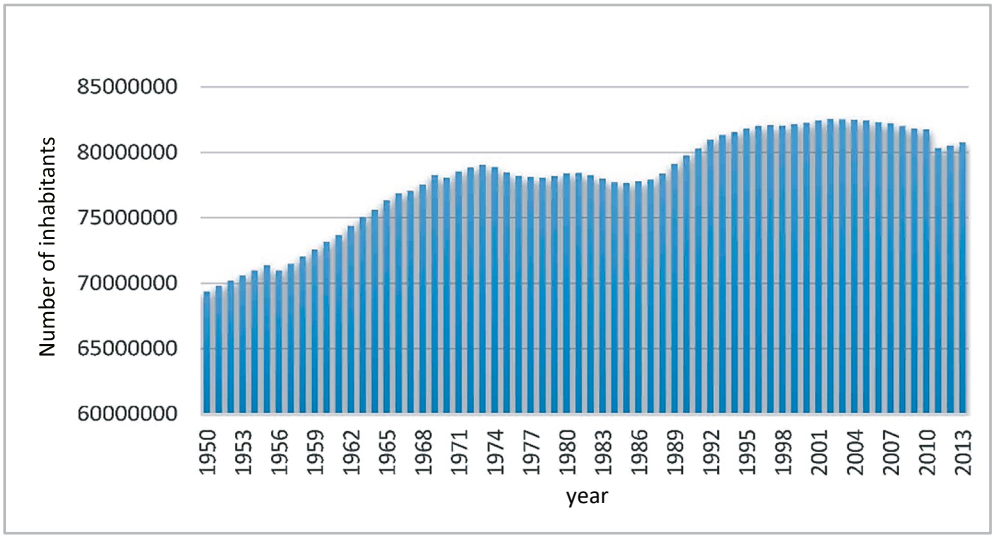

Figure 2: Population development in Germany (Source: www.destatis.de/DE/ZahlenFakten/ GesellschaftStaat/Bevoelkerung/ Bevoelkerungsstand/Tabellen_/lrbev01.html).

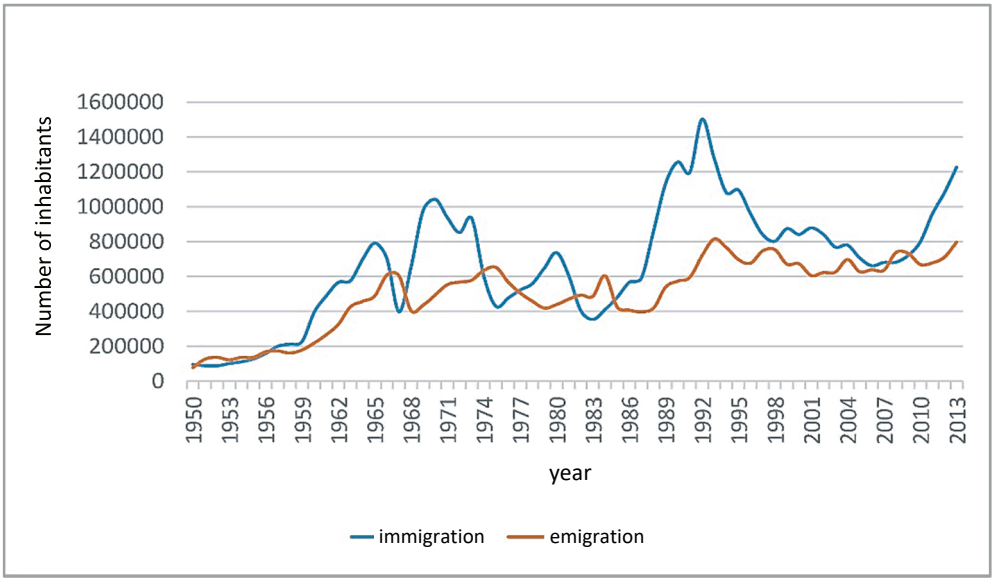

Figure 3: Comparison of emigration and immigration in Germany (Source: www.destatis.de/ DE/ZahlenFakten/GesellschaftStaat/Bevoelkerung/Wanderungen/Tabellen_/lrbev07.html).

Heilemann believes forecasts of more than five years as unrealistic, even if extreme events remain outside. Social and political attitudes can be short-, medium- and long-term change, so that proper estimates, also of empirical nature, are impossible (Heilemann et al. 2003:22). Productivity increases, capital stock and labour supply are also difficult to estimate (Heilemann et al. 2003:24).

An example of difficulties in predictions is the inclusion of new member states into the European Union in 2004 and 2007: the European internal migration (Swiaczny 2013:1). Forecasts have been prepared for the migration patterns due to EU enlargement in 2004 and 2007. Different assumptions (economic and employment development), hypotheses (immigration) and different time horizons led to very divergent results of the conducted forecasts. Germany had for these forecasts a potential immigration from 23,000 to 390,000 people (Heilemann et al. 2003:43).

In addition, forecasted migration behaved deviant contrary to the actual migration in each country. Due to the enlargement of the EU to the South in the 1981 and 1986 (Greece, Portugal and Spain) a high immigration in the older area of Europe was estimated. Spain and Portugal expected an immigration of 1.5–1.6 million people, but lack of data bases did not allow an accurate prediction. Finally, a different development occurred (Dustmann 2003:46). United Kingdom predicted a much smaller number of immigration after the enlargement in 2002, also because of missing data (Galgoczi et al. 2011:19). Data of how many people immigrated so far was not available, so that they used survey data. They also assumed that the number of immigrants reimmigrating to their home country behaved just as the years before. Regardless of which data basis is used, any survey flaws (Dustmann 2003:58).

The Federal Statistical Office carries out forecasts since 1951. In 2001, it was investigated to what extent the predictions have come true (Bretz 2001:906). After 30 years, the estimated stock (16 per cent) of almost 50 million people was 9 million less than the actual population. Different assumptions led to such imperfection e.g. (Bretz 2001:907):

- Unexpected birth rate
- mortality and life expectancy significantly underestimated or overvalued
- sudden unexpected decrease of emigration and decrease of immigration

The individual projections compared to the actual history makes clear that especially abrupt changes are difficult to predict. Particularly striking was drastic and lasting decline in birth rate on the 1960s as well as the immigration spurts during the time of recruitment of foreign workers and after the fall of the Iron Curtain. The adoption framework based primarily on the given conditions and often requires their constancy. The miscalculations, however, have partly compensated. In addition, the change in population structure has been well mapped. The marksmanship improved in recent years, because estimates were made more realistic (Bretz 2001:914).

Still further events will modify the assumptions (Bretz 2001:915). In particular, changing political preferences influence e.g. migration assumptions (Schmid 2006:38–39). Migrations will therefore continue to be a difficult assessable event (Ehmer 2013:55). Existing data are insufficient and the growth of population does not remain constant. Changes do not take place legally. Dependence on assumptions made different forecast results (Bähr 1992:221).

The fluctuation range of the age structure or a higher birth rate is lower compared top migration. They are easily influenced by political decisions (Schmid 2006:33; Maretzke 2008:8). In particular, emigration depends on the framework conditions that are set politically. This applies to restrictive access regulations and unrestricted freedom of movement of EU citizens (Maretzke 2008:8). The natural population change affects delayed, while migrations lead to much faster changes (BMVBS 2013:14). Globalization even more reinforces international migration (Swiaczny 2013:1) and hereby coherently develops new processes. The probability of changes due to different developments increases, so that cities must respond more and more frequently.

3. Findings of Research Project

In a first step, an inventory of dealing with demographic change in major cities in Germany was carried out by means of a written survey. However, a written survey was not sufficient to obtain internal knowledge of municipal employees. Therefore, a recessed knowledge with regard to the differing situation and of the actions in the area of demographic change at the city level could be elicit in a second step, with the help of a telephone survey with experts.

3.1 Organizational structure

All case studies occupy themselves with demographic change in their city. An administration unit such as the town planning office is incumbent upon the subject matter, but no extra staff function is installed. Demographic change is dealt with in working groups led by an internal consultant. Members can vary depending on the subarea. Third parties are integrated seldom and if, mainly for financial support of projects. The working groups hold meetings regularly, 3–4 times a year, but if necessary, even more. If there is no urgent need, the topic might even rest.

The working group develops overall concepts wherefore several units provide the working group with information needed. The consultant's responsibility is to conduct the overall concept.

Difficulties occur owing to departmentalized thinking, so that working in a group and develop a plan together appears obstructive. In former days, the departmentalized thinking was present and nowadays it exists only in some cities. Nevertheless, it is still an issue to be considered. Interpersonal cooperation attributes a great importance for the success of the concepts and the working group. The human side is essential for most of the cities. A person being able to make compromises and armed with a different mind-set necessary to work with people helps to reach the aim.

Political action can support or interfere a concept as politics have a big influence on decisions and the achievement of goals. Conflicts arise determining different steps and during the realisation process of projects. The town planning department thinks long-term, but politics think midterm in order to realize projects and gain voters. Therefore, the support of the political elite is essential.

3.2 Monitoring

Evaluation and small-scale monitoring are key components of integrated urban development and can serve by identifying, for example (socially) spatial inequalities as the basis of urban development policy decisions. However, they can be deceptive if paying attention alone to numbers. Neither it can give the "right" room delimitation, nor is it a safe (political) interpretation of the figures guaranteed (Adam and Othengrafen 2015:6).

All cities use statistics such as vital statistics. Most cities gather information in separate statistic units within the municipality. Especially the bigger ones draw their knowledge from the separate statistics departments. During election periods, the Statistic units are often overloaded, so that information for the working group cannot be retrieved. Communication between the working group and the Statistics units are essential, so that new developments are known and can be acted upon.

Already in the statistical bodies themselves, there are so complementary qualitative approaches of the city such as regular city inspections (Adam and Othengrafen 2015:6). Evaluation is part of the monitoring in cities. Different methods in the cities exist in order to notice changes such as indicator systems or profiles of demography. Evaluation is carried out using (own) observations of the referent of the working group and thus the perception of changes.

There exist no uniform projections in the cities, because the forecast horizons differ in each city. Some last for 15 years, some even for 30 years. In addition, different results of predictions occur between cities and the federal state. Reasons are e.g. different data used. Cities do not work with scenarios concerning demographic change, but they base their action on the prediction made.

The case studies have already established integrated action plans on the subject of demographic change and realized measures (Christ 2014:4). The expert interviews show that in 2013 a total of three cities update or control their plan of action. One Case Study stated in the questionnaire that the concept runs until 2015, but in 2013 an update was carried out. When updating, they check whether and in which areas the concept of action needs adjustments (Case studies 2013). One Case Study classifies a 100 percent implementation of its action plan of 2004 as unrealistic (Case Study 2013).

3.3 Assessments to adapt to different developments

In the expert interviews, the question was asked what constitutes a flexible approach in the opinion of those interviewed. The aim was to be able to draw conclusions which could be characteristics of flexibility in the management and in the development of concepts.

The maintenance of a red thread and the observance of fundamental problems in the city should be noted in spite of new events. Politics tend to prioritize new events. Precipitated decisions can be obsolete again or fade into the background. A momentum can lead to

counter-productivity, because the individual steps of the processing cannot be reflected and changes cannot be discussed. Therefore, prevailing conditions are highlighted.

Five case studies called an open planning or system as criteria for flexibility. Targets can serve as a working basis, but that should not be implemented rigidly. Forward thinking is noted from three case studies:

- Achieving the most flexible implementation
- Consideration of the further direction
- Consideration of the consequences

A flexible concept is a process with involvement of the right actors and possibly initiating another direction in the implementation. Four case studies mention informal contacts and communications as an important component of flexibility. This includes communication between stakeholders with a common language. Regular meetings are conducive as well as citizen participation and internal surveys. Flexibility depends on the people who deal with the subject. Aspects, which have been mentioned in this context are:

- Thinking along
- Proper distribution of tasks
- Lead by a person with supradisciplinary functions

An exchange platform or training platform will inform the players about future developments and trends, so that there will be an exchange.

Aspects that hinder flexibility are the financial situation and / or staff shortages. In addition, opponents can hamper a flexible action.

4. Recommendations for handling influences on predicted developments

The difficulties with projections and the challenges figured out in the surveys causes a modified approach dealing with influences on predicted developments concerning demographic change in cities (see figure 4).

4.1 The Process

The idea is to add zest to the process with the help of agile methods. Agility implies flexibility, adaptability and coordination ability. Agility allows addressing complexity. The topic of demographic change and its influences occupy municipalities and lead to internal and external discussions and problems that are difficult to cope with.

In the organizational context, agility refers to the ability of an organization to be able to adapt quickly to changes in market and the environment if referring to business processes (Schacher and Grässle 2006:14). Main features include continuous learning, continuous development, a culture of cooperation and the exchange of knowledge and self-responsible behaviour of its employees and flat hierarchies (Tsourveloudis and Valavanis 2002:337).

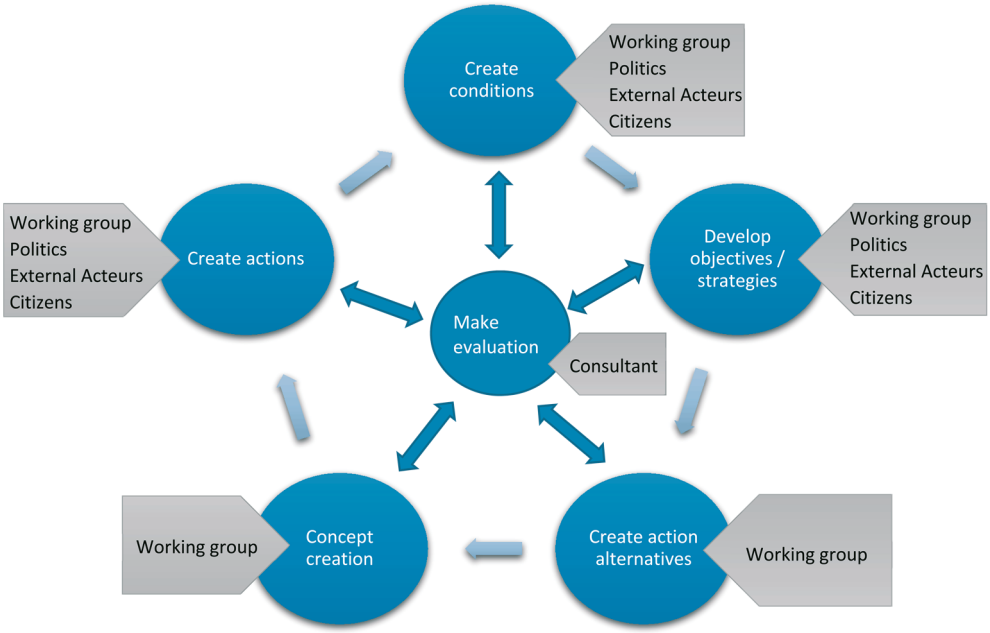

Figure 4: The process of concept creation (Source: own illustration 2015).

An agile organization is distinguished by the flexible and dynamic adjustment of its operations to the environmental conditions. For this, the processes of the organization must be agile designed at least in parts. It is called a planned process. Challenge is the design of the process in the form that it is sufficiently flexible on the one hand, but on the other hand, the designed model still creates benefits simultaneously (Grosse Böckmann 2012:40). Cities should first create conditions in order to be aware of the situation in their city concerning demographic change (growing, stagnating or shrinking) and the development of e.g. migration or economic processes. In a second step, objectives and strategies should be developed. A new step, "create action alternatives" leads to a higher flexibility. The working group discusses about the situations of growing, shrinking and stagnating issues in their city. The aim is to get a broad idea about actions that could occur and find approximate solutions. A possibility would be to establish a flow diagram showing actions if growing, shrinking or stagnating. The actions concentrate more on an organizational level rather than on detailed measures.

The importance for cities is to know the persons responsible for reactions and the running of the procedure. The working group records its concept concerning the different solutions in a clear and brief concept paper. In a last step, actions or rather measures are created for the actual predicted situation. It makes no sense to develop measures for each scenario, because measures subsist on a short-term implementation.

A continuous evaluation accompanying each step leads to a permanent update of the current situation. It is a main issue in the procedure in order to be able to respond to altering situations and to stay flexible and efficient.

4.2 Participants

Major projects as the management of demographic change cannot function without a central control element. The large number of dependencies between the (sub) projects and the different interests of the project must be coordinated centrally, so that the overall objective can be achieved (Bitter and, Brüning 2014:146–147). One neutral person, in this case the "consultant", is in charge of the working group as well as the whole procedure. This should also include detailed specifications of working formats or reports (Bitter and Brüning 2014: 146–147). "Core of agile software development is the use of simple but successful rules for project performance and the use of human and communication-oriented rules" (Cockburn 2003:12). Strict observance of strict (and effective) practices is likely to be difficult to implement, but it will turn out at the end as productive.

Tolerant practices can be more easily accepted, but are unlikely to be productive (Cockburn 2003:79). The consultant should be suitable for the position as the human side contributes to success of the process (Grosse Böckmann 2012:49). Human success includes the following (Cockburn 2003:96):

- Have a good overview
- Be able to learn
- Be malleable
- Be proud of the own work
- Be proud of its own contribution
- Be a good citizen
- Take the initiative

A project only works with a consistent project organization. Speed and clarity of communication and decision-making are key success factors of large projects (Bitter and Brüning 2014:145–146). The communication will not work perfectly, but the aim should be to work on an almost ideal communication (Cockburn 2003:37).

The most important aspect of the structure of elected bodies is to bring all the key decision-makers up to the line at the same table to discuss controversial points quickly and clearly in order to be able to take the necessary decisions as soon as possible and to realize those decisions immediately (Bitter and Brüning 2014:145–146). The presence of humans in a project is an extremely important element for the project result (Cockburn 2003:21).

In the beginning and end of the process, several participants should be involved in order to gather many ideas and support acceptance of the next steps. Politics, external actors and citizens can provide their point of view and complete the actions of the working group.

The success of communication is only safe if the sender and receiver share common experiences to which they can relate. (Cockburn 2003:24)

5. Conclusion and outlook

Demographic change has an impact on cities development as it might lead to a growing, stagnating or shrinking city or parts of it. Emigration and immigration influences the trend as a gain or loss of population changes the predicted demographic situation. The development from 1950 until now shows the major impact of emigration and immigration.

Municipalities try to adapt to the predicted course. Predictions though only show one direction and cannot include any possible developments. Examples of predictions concerning migration due to new member states of the European Union illustrate the unreliability of predictions.

Cities deal with demographic change with the help of a working group composite of different (internal) participants that meet several times a year. Together, the group establishes an overall concept and works on measures. Difficulties occur due to departmentalized thinking and false staffing. The human side plays an important role for the success of e.g. the overall concept as well as flexibility. The topic of the human side appears again and again and is a key component in the planning process. Monitoring is necessary in order to have developments constantly in mind. Cities work with statistics and establish predictions, but with different approaches. Monitoring lacks refinement and it should be reviewed if predictions are sufficient.

Dealing with different developments leads to a new planning approach in order to be able to act flexible and efficient. The process includes agile methods, so that especially the human aspect can be considered. The process concentrates on organizational aspects and participants to be included. To tackle the new approach, three main components play an important role:

1. Development of action alternatives instead of only predictions
2. Permanent evaluation
3. Consideration of participants in the individual steps

In the future, it is important to work out in detail, how the working group works out action alternatives efficiently and reasonable. It will not make sense to establish detailed scenarios, because it is too much effort and it affects negatively the financial situation of the city. Finally, there will not be one process for all cities as they are too different. The process needs adaptation for each city and its characteristics.

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Anja Jeschke* and Alexandra Weitkamp*

Stakeholders' Behaviour and Interaction in Context of Land Use

Abstract

In recent years, the understanding of planning has changed. The administration has realised that top-down planning is often not favourable. On the contrary, the involvement of all stakeholders is required for a smooth process.

In former times the economy was involved in planning because of its influence in urban processes. During the 1980s, another group of stakeholders was also included – the citizenship. These changes resulted in an extended number of stakeholders: the administration, the economy, the citizenship and the property owners were involved in urban processes of planning, land readjustment and development. Within the last years, the circle of participants increased. Today, the administration is one stakeholder among others.

The interaction between stakeholders is not easy to understand, especially in cases of an extensive variety of participants with their different aims and interests. Therefore, a practical example of urban development is presented within this paper. The stakeholders will be identified and the interaction will be explained. There are a lot of decision-making processes in the field of land use. Within these situations, the result does not only depend on the decision of only one stakeholder. In many cases, a lot of participants are involved, for example in urban development or in measures of private initiatives. Is the game theory, an instrument known from economics or business administration, a proper tool for analysing such decision-making processes? And what is the added value of applying this method?

1. Introduction

Particularly with regard to sustainable land use, the stakeholders in land management processes should be analysed. These are not only the owners of land, it is also the administration, the economy and the public. Recently, we often read about civic society and its engagement (for example in Weitkamp 2014). Initiatives, associations or organisations are becoming more important. These are the stakeholders from the private households. For example, within the establishment of land use plans, the citizens have the opportunity to participate at an early stage. They have the chance for statements and discussions. In many cases the local community is very familiar with the locality. But, in fact, this is the advantage. Involving the citizens means providing the process of planning. In addition, on the basis of limited financial budgets of municipalities, it is necessary to involve private stakeholders in processes of land use.

* Technical University Dresden, Geodetic Institute, Chair of Land Management / Germany.

Thus, the circle of participated stakeholders increased. And it should be noted that every stakeholder has its own interest within the process. This depends not only on the motivation but also on financial or social aspects. Thereby, each stakeholder pursues an aim and tries to reach it.

The key for successful processes are the stakeholders. Therefore, future researches have to focus much more on all stakeholders, who take part in processes of land use.

2. The Change within the Understanding of Planning

Dealing with the stakeholders in processes of land use, it is necessary to look at the history of urban planning. In recent years, a change within the understanding of planning has taken place. This change is closely linked with the role of the public administration (Selle 1994:55) and leads to a modification within the level of participated stakeholders. Figure 1 shows that the change of understanding of planning as well as the role of public administration take place in overlaying steps, which currently exist next to each other (Selle 1994:55).

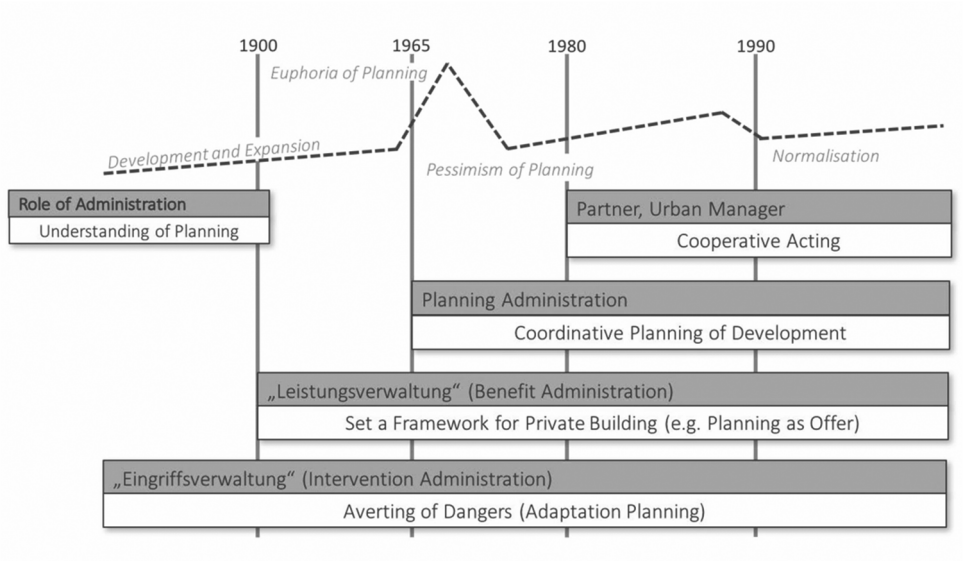

Figure 1: Change within Understanding of Planning (Source: Selle 1994:56).

The urban growth in the 19th century led to a lot of problems in housing provision, infrastructure and transport. The task of the urban planning in this time was to ensure security and order with the help of alignments, building lines and firewalls. It was a separation of public and private space. This stage is called adaptation planning (*Anpassungsplanung*). The role of public administration can be described as intervention administration (*Eingriffsverwaltung*) with the main task averting of dangers (Selle 1994:55). The identification of participated stakeholders within the first stage of urban planning is easy. On the one hand there were the planners with their ideas about the land use and on the other hand there were the owners with their land ownership. In this time participants in

processes of land management are the public administration and policy (together defined as the state sector) and the owners as a part of the citizenship.

In the next stage the role of state side was regarded as benefit administration (*Leistungsverwaltung*). The planning provides a framework for (private) building in form of planning as offer or negative planning. Today we find planning as offer in the development plans of the municipality. With these offer, only alternative opportunities for uses are given. If or how these opportunities were implemented dependent on the different markets. So the realisation of land use planning is mostly uncertain (Selle 1994:57). In this stage the administration realised that the economy, for example the real estate market or the capital market, is integrated in urban planning, too.

Figure 2: Wordle of Stakeholders (Source: own illustration).

Within the third stage the understanding of planning changed. The role of the public administration is reflected in the planning administration (*Planende Verwaltung*). The development is coordinately planned. In this step coordination means the coordination and cooperation of public stakeholders (Selle 1994:56). This is due to the fact that the public administration can be found in nearly all market areas, but acting within the public space is not coordinated (Selle 1994:58). With coordination the behaviour of stakeholders of different markets (economy) should be influenced. Although this concept failed for the whole area of a municipality, as it offers only advantages for small projects.

The stage of coordinately planning will be followed by the phase of cooperatively acting (Selle 1994:57). Planning tries to take part directly in developing projects together with private stakeholders. Therefore, it is important to push planning together with all stakeholders – to connect planning and realisation and act cooperatively (Selle 1994:59). In this moment planning gives up the leading role and becomes one stakeholder among others (Selle 1994:46). The public administration is now an urban manager and also a partner.

The change within the role of public administration and understanding of planning shows that the circle of participated stakeholders increased from stage to stage (Selle 1994:24). Top-down planning is no longer an acceptable solution. The participation of different

stakeholders becomes more important. Methods and instruments from the fields of communication, moderation and mediation are in the focus of the current consideration.

3. Stakeholders in Context of Land Use

In the last section some different stakeholders were named (Figure 2). Thereby, the terminology is often not similar. This is an attempt to systemise the stakeholders.

Stakeholders can be systemised in non-collective ability to act and ability to act strategically. There are three types of stakeholders: individuals, organisations and collectives. Individuals and organisations are clearly outlined units, while collectives are considerably structured more heterogeneous: the type of stakeholder can be subdivided in non-organised collectives and collective stakeholders. Table 1 shows the characteristic of these types (Dolata and Schrape 2013:19–26).

Table 1: Systemisation of Stakeholders (Source: based on Dolata and Schrape 2013:26)

	Individual Stakeholders	**Non-organised Collectives**	**Collective Stakeholders**	**Corporate Stakeholders**
Ability to act	Individually	No sovereign collective ability to act	Ability to act strategically beyond the participated individuals	
Organisation	Individual	Collective behaviour (as an aggregate of individual actions)	Collective actions (based on negotiation, coordination, consensus)	Corporate actions (based on formal and hierarchical structures)
Decision Mode	Individual decisions (along individual preferences and objectives)	No collective decision-making ability	Strategic decisions (depending on individual preferences of the participants)	Strategic decisions (disconnected from individual preferences of members)
Stability	-	Low	Context-dependent	High

Individuals act intentionally and creatively. Social rules and norms as well as specific role expectations characterise their actions. Rule-conformant, rule-deviant and rule-changing actions are always mixed (Dolata and Schrape 2013; Schimank 2007).

Normally, modern societies are influenced not only by individual actions but by interactions of different kinds of formal organisations. Corporate stakeholders, like companies or

political and scientific organisations, can act more systematically and reliably than individuals, owning formalised and across situations callable action and decision routines. They are able to pursue their aims in a strategic way without or only with little individual preferences or interests of their members (Geser 1990).

The third type between individuals and organisations are social collectives. It can be differentiated in non-organised collectives and action and strategy enabled collective stakeholders. The non-organised collectives are characterised by individual decisions and behaviours and base on individual or problem perceptions. There is no organised core that instructs the actions. If such a randomised social constellation gets intensified with consciously shared objectives, rules, identity characteristics and organisational bracing beneath a pure formal organisation, it is an action and strategy enabled collective stakeholder. Own group identities are developed. Institutionalisation processes arise and the group can be divided in activists and sympathisers with asymmetrical influence and power. Overall, the group members are able to mobilise themselves as well as to act strategically. But in contrary to formal organisations, decisions are made without reference to any form of regulations, and there is no hierarchy in the group (Dolata and Schrape 2013).

According to Geser (1990), groups, associations, administrations, institutions, states or other social collectives are referred as stakeholder if following conditions are fulfilled:

1. Activities, events or other effects can be identified as absolutely assigned to the collective of 'polluter pays'; no subunits or members that are causally responsible for can be identified.
2. The behaviour of collectives can be interpreted as actions: It is based on processes of autonomous selectivity of meaningful intentionality and rationality targeted.

Collectives and organisations can be interpreted as secondary stakeholders, while individuals are understood as primary stakeholders. Because of organisations are related only by action contributions of its individual members, they are generally appropriate to be 'perfect' stakeholders corresponding idealised model requirements (Geser 1990).

The change in the understanding of the state and understanding of planning results in a steadily increasing range of actors that are involved in processes of land management (Selle 1994:24). These stakeholders pursue considerably divergent objectives. Cooperative actions affect not only local (also political) and economic stakeholders, but also private ones (Kötter and Linke 2013).

Private stakeholders are not only owners as individuals, but also associations in neighbourhoods or societies as collectives. Selle noticed "City and landscape change in the tension between households, markets and numerous public and local stakeholders. Anyone who wants to influence spatial developments in a target manner, the considerations and activities of the other parties have to be always included in his thoughts and actions" (Selle 1994:62). Such a process of negotiation is named 'Governance': beneath public coordination

activities, the coordination of collective actions and decisions of all types of stakeholders from all resorts like policy, economy, culture or science is meant (Mayntz 2003:72).

A closer look on collectives as stakeholders shows that the members of the group could pursue different targets. Also a supposed homogeneous stakeholder could act out of many different single interests. According to the Public Choice theory, a single member of the stakeholder may act in public interests as well as in private ones. Beneath, the stakeholder 'public hand' can be subdivided in policy and administration levels. The actions of both of them are characterised by the following three main objectives: effectiveness, legitimacy and efficiency (Heinelt and Mayer 1997:14).

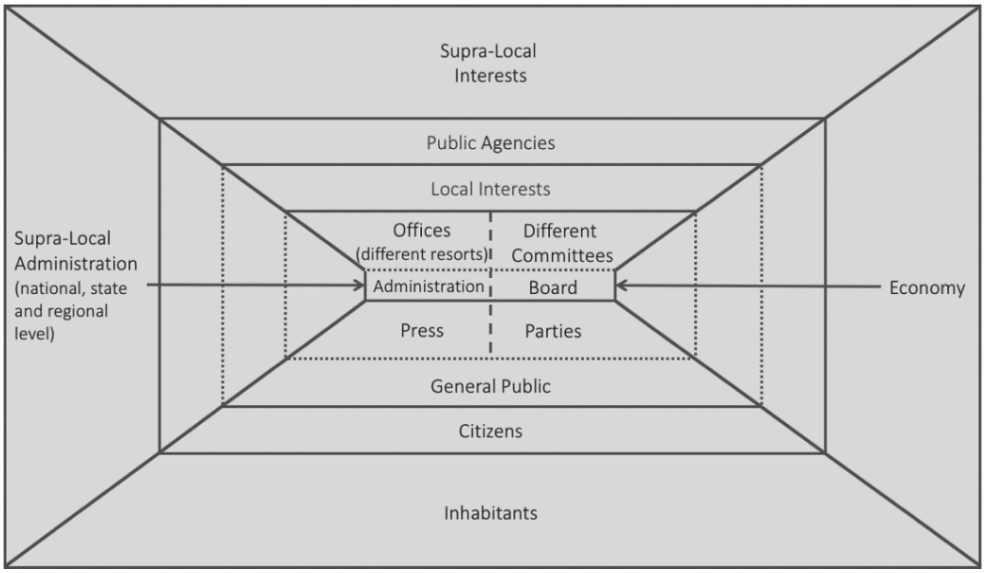

Figure 3: Local Decision System with Participated Stakeholders (Source: Beckmann u.a. 2000:23).

Figure 3 shows the different participated stakeholders in the local decision-making process. Having a deeper look on the administration, it must be mentioned that this stakeholder can be divided into different branches with different targets (construction, cadastre, green, economy etc.). There are even other organisational units like municipal enterprises, special purpose associations or private legal entities with public participation. All entities are eager to keep their influence as large as possible (Benz 2008). This hinders processes by the need of multiple discussions of the same issues with different organisations (Köhler 2011).

4. Stakeholders' Behaviour and Interaction – An Example

In this chapter the behaviour and the interaction of stakeholders are illustrated by a practical example. It is a method for the provision of building land – a development from the 'green field site' to the largest zero-emission development in Europe: the zero:e park in Hanover, Wettbergen (Lower Saxony, Germany).

The zero:e park has an area of nearly 26 ha and offers place for 300 new plots for homes in passive house standard[1]. The ownership structure shows nine former owners. Some preliminary contracts have already been signed by a few former owners, so that sovereign instruments do not seem to be the suitable choice for this area. Furthermore, especially from financial aspects the city of Hanover was not able to develop the area alone, so the decision was made to collaborate with two partners from the private sector (Danielzyk et al. 2014:7; Jeschke et al. 2016). All in all, after the purchase of the area the following stakeholders could be identified: the city of Hanover and two developers. The ownership structure after the purchase of the area is presented, in an anonymised way, in Figure 4.

Figure 4: Ownership Structure in Year 2010.

4.1 Aims of the Stakeholders

The city of Hanover pursued a variety of different aims. In answer to the migration of inhabitants, Hanover wants to improve the housing stock, especially for families with children. In addition, there was the political claim to realise a pilot project of a climate protection housing development. The different aims can be divided in urban, socio-political, fiscal and ecological categories. So there are already a lot of aims on the level of administration and politics.

In addition to the aims of administration and politics the two developers pursue own aims. For commercial stakeholders the achievement of a financial gain is the primary goal. Furthermore, they are otherwise motivated to take part in such a process of urban

1 Passive house standard is a strict, normally voluntary standard for energy efficiency in a building.

development: One of the developers (Developer A) comes from the real estate sector. Developer A already has an early interest in activating the area and has made preliminary contracts with some of the former owners. The political claim of creating a climate protection housing development is a chance to show that Developer A can also built houses in passive standard as well as regular houses. One aim of the other developer (Developer B) is the financial gain, too. Furthermore, there is a huge interest in starting cooperation with the city of Hanover to establish trust for later proceedings. Besides, Developer B wants to expand its working space from rural to urban areas.

Figure 5 sums up the aims of the different stakeholders. It shows a lot of aims standing side by side. For a successful development, it is necessary to give consideration to all aims.

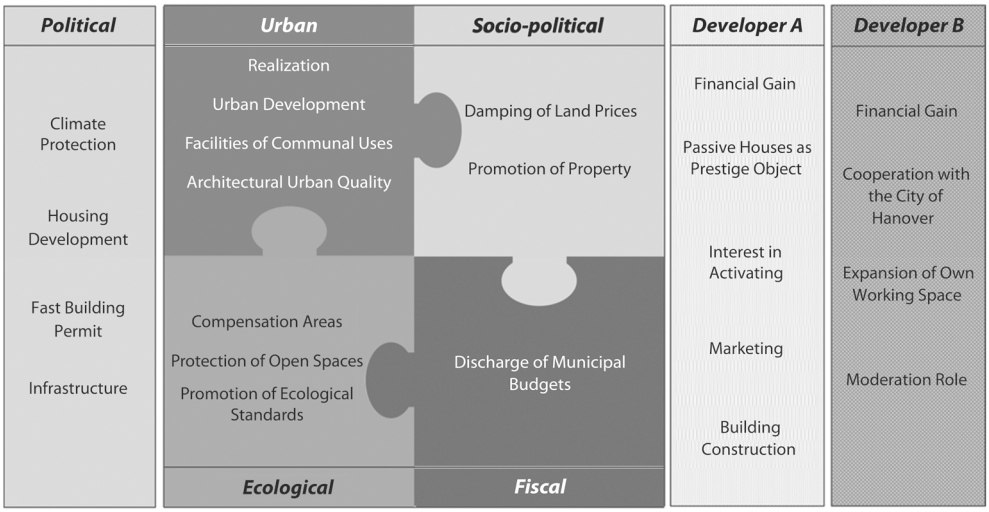

Figure 5: Aims of the Stakeholders (Source: own illustration).

4.2 Interaction

Interaction is defined as the acting of two or more people, who are related to each other. The given example is a best practice regarding to the behaviour of the participated stakeholders. Within this urban development, the three stakeholders act as equal partners next to each other (Danielzyk et al. 2014:8). Moreover, the stakeholders from the private sector use their personal knowledge to support the process. Developer A from real estate sector could help with its knowledge about the local market and experience in marketing. Developer B could insert its negotiating skills with the former owners to acquire the property.

There are some single targets within the aims of the city Hanover given in chapter 4.1. These aims can be assigned to individual departments of the administration of Hanover. For example, the demand for the provision of compensation areas or the promotion of ecological standards are connected with the department of environment and urban green space. In

principle, administration as well as the developers are not only one stakeholder – a lot of single stakeholders take part in the proceeding.

The proceeding zero:e park was successful because there are 'special individuals' within the stakeholder groups – three persons, who accompany the process from the perspective of the city and the two developers. These persons are so called key-actors, particularly supporting the process and leading them to success. But in consideration of institutional rules and laws they are also interested in maximising their own benefits and interact in own interests (not mandatory a monetary aim, e.g. professional success as achievement motive)[2]. Furthermore, key-indicators for the success of the given example are, among others, the willingness to participate, transparency and a close cooperation between administration and the two developers.

5. Further Work

The last chapter showed that proceedings only work if all stakeholders with their different aims and their special information are considered. In field of land management, a lot of stakeholders from policy and administration as well as from economy and citizenship take part. They all have different objectives. During the processes, there are situations, in which the stakeholders have to decide between two or more options (decision-making situation) (Jungermann et al. 2005:3). The decision-making situations in land management are strategic decision-making situations with conflicting interests. Thereby, the result in such situations depends on the decision of more than one stakeholder. One stakeholder is not able to determine the result independently from the choice of other stakeholders (Holler and Iling 2006:1).

The game theory could be a promising possibility to model decision-making processes in field of land use. If the rules within a decision-making process are known, we are able to name concepts of solutions. Otherwise, we are able to model different types of games if the rules are unknown. By using this analysis, we can name some aspects for further decision-making processes in field of land management. With the help of the rules the process will design in a way that leads to the achievement of the desired aim. Thus, the game theory could contribute to a higher transparency within processes of land management. The potential of conflicts as well as the time of the processes could be reduced.

The main task for further work is the analysis of decision-making situations to provide processes in land management. The game theory, as a part of the decision theory (for the difference between both see (Jeschke et al. 2016; Jeschke and Weitkamp 2015:2)), is an instrument known from economics and business administrations to analyse strategic decision-making processes with more than one stakeholder.

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2 For more details to motives and motivation we refer to Jeschke et al. 2016; Weitkamp et al. 2015; Weitkamp 2014.

6. Conclusion

Stakeholders in context of land management are the key to success or failure of proceedings. Thereby, the understanding of the behaviour and the interaction of participated stakeholders and groups of stakeholders is very important. Normally, different stakeholders from administration, economy and citizenship are involved. Their objectives differ between emotional aspects and rational choice. But all in all, they are interested in maximising their use. Therefore, the transmission of game theory into processes in land management offers a great incentive for research (Jeschke et al. 2016; Jeschke and Weitkamp 2015; Kötter et al. 2015:144; Weitkamp 2015:176–177).

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Armands Auziņš*

Evaluation of Land Use for Justification of a Decision-Making Process

A study on experiences and tools in the implementation of spatial development plans

Abstract

The issues regarding the rational use of land resources and effective monitoring of land-related activities are urgent and rather challenging in many parts of the world. It is argued in the article that by choosing a sound scientific approach and applying both selected methods and criteria, it is possible to explain the processes of land use from point of view of efficiency in the widest possible form. The author suggests that a systematic evaluation of land use by applying the efficiency domain within appropriate methodological framework permits not only decisions to be justified in land use management, but also to improve the spatial planning process. A systematic, logical and comparative analysis of the existing approaches and tools for the justification of a decision-making process in relation to the implementation of spatial development plans is used for the research.

Key words: land use; evaluation techniques; efficiency domain; decision-making

1. Introduction

The way land is managed may have a profound effect on economic growth, social security, and environmental protection. Basically, "land use" is concerned with the usage of the beneficial features of a land. Managing the use of land is an essential part of land administration systems and represents the process that has to provide sustainable development (Williamson et al. 2010). Accordingly, "modern land administration theory" prescribes the "land use" as one of the four land administration functions. Although effective land use management should promote sustainability in land developments, often it is not clear what effects will follow when readjusting land infrastructure, designing new urban areas, distributing hazardous and polluting facilities, and developing appropriate engineering infrastructure.

Experience on the evaluation of land use (ELU) largely indicates a sector approach, which focuses on research within specific projects in both rural and urban areas. The evaluation experience in rural areas is to be associated with solutions of land consolidation projects, providing processes of real estate development together with improvements in engineering infrastructure. By contrast, in the urbanised environment mainly promotes the formation of compact and multifunctional urban developments whilst contributing to the spatial and

* Riga Technical University, Institute of Civil Engineering and Real Estate Economics / Latvia.

architectonic perception of the construction to carry out an analysis of urban and spatial structure. In many locations the evaluation is carried out by using GIS technologies, multi-criteria analysis, solving optimization tasks, and creating land use models.

ELU is often associated with decision-making in the optimization of economic activities and the best possible management of land areas. However, initiating some positive effects, e.g. land improvements and increased land use intensity, does not necessarily mean that the best possible outcome will be gained. Examples of such actions may include agricultural land management through investments in the improvement of engineering infrastructure, and additional land acquisition in circumstances where there is uncertainty in the sales of agricultural products. This displays the variability of the land use intensity and its impact on land use results. It is argued that funds invested in land consolidation projects in rural areas cannot be repaid because of the narrowing of the market of agricultural products and migration of population to cities and towns (Dixon-Gough 2006:174–175). Therefore, more topical research on the rural-urban relationship and land readjustment projects in urbanised areas, in particular – peri-urban areas, became more pertinent.

Recent research by the author suggests specifically that in terms of efficiency the land use process has not been comprehensively evaluated and the evaluation experience relatively small (Auziņš 2013). In most cases, the evaluation is focused on development projects and related to the application of socio-economic indicators in a cost-benefit analysis. The assessment experience of land use reflects a systemic approach, primarily through the input-output and cost-benefit analysis methods. Thus, the effects gained and the socio-economic nature of resources used to obtain them is indicated. The system is built and the evaluation made by using the efficiency domain that takes place where it is topical and urgent. For example, in China such an approach was made because of a governmental initiative to carry on with an 'accelerated urbanisation' programme.

The aim of the study is to explore and discuss the experiences and tools in ELU for supporting decision-making in land use management. Therefore, the implementation of spatial development plans has been researched through analysing the planning-implementation relationship and ELU techniques. In addition, an appropriate methodological framework is proposed that would allow justifying decisions for better and more efficient land use.

This study presents knowledge about: the land use management within the framework of the socio-economic, environmental and institutional aspects; the experiences and tools of both the spatial planning and the implementation of spatial development plans; the practices and applications of various evaluation techniques based on the review of scientific literature; and the necessity to employ a methodological approach for more efficient use of land-related resources. The scientific research methods mainly used in this study include the logical-constructive, the monographic, the analysis and synthesis, and the historical approach method.

2. Land use planning-implementation relationship

2.1 Spatial planning systems and practices in Europe

European Commission (1997) described the spatial planning systems (SPS) as control systems, which vary considerably in terms of scope, maturity and completeness, and the distance between expressed objectives and outcomes. SPS also varies in terms of the locus of power – e.g., centralization versus decentralization – and the relative roles of the public and private sector – e.g., the planning-led versus market-led approach. More generally, SPS are influenced by the cultural and administrative development of the country or jurisdiction, the same way as for cadastral systems (Williamson et al. 2010). Approaches to spatial planning vary considerably throughout the world, reflecting historical and cultural developments as well as geographical and economic conditions (Williamson et al. 2010:176–177). Across Europe, four major traditions of spatial planning have been identified (European Commission 1997).

Recently conducted comparative studies on SPS and practices in Europe show considerable changes facing some European countries since 1990s – the continuity and decay in Danish system; recent developments in Finnish system; the end of an era in Dutch system; the institutional inertia and new challenges in German system; drifting away from the 'regional economic' approach in France; the modernization in Italian system; the evolutionary changes of planning in Greece; serving a by-pass capitalism in Flanders; the evolving planning guidelines in UK; changes in the planning system of the Czech Republic; institutional change and new challenges in Turkish systems; European influence and dominant market forces in Polish system (Reimer et al. 2014). The impact of administrative-territorial reform influenced the spatial planning practice since 2009 and SPS has been significantly changed since 2012 in the Republic of Latvia.

Following the identified traditions of spatial planning, one can conclude that most of European countries, including countries of Baltic See Region (BSR), employ a 'comprehensive integrated' planning approach. Comparable information about the SPS of the BSR countries is available on the website (Commin 2007), which gives the definition of 'land use planning':

> *"Land use planning is a branch of public policy which encompasses various disciplines seeking to order and regulate the use of land in an efficient way. It means the scientific, aesthetic and orderly disposition of land, resources, facilities and services with a view to securing the physical, economic, social and environmental efficiency, health and well-being of urban and rural communities. The systematic assessment of land and water potential, alternative patterns of land use and other physical, social and economic conditions, for the purpose of selecting and adopting land-use options which are most beneficial to land users without degrading the resources or the environment, together with the selection of measures most likely to encourage such land uses. Land use planning may be at international, national, district (project, catchment) or local (village) levels. It includes participation by land users, planners and decision-makers and covers educational, legal, fiscal and financial measures."*

From the above definition it is obvious that the process of land use planning is an integrated part of local spatial planning and is concerned with an *efficiency domain*. Assessing the SPS in Latvia and Norway, it was found that local planning contains two levels of statutory (legally binding) plans as in most regulatory planning systems: an overall (comprehensive) plan and a detailed plan (Kule and Røsnes 2010; 2011). However, the Latvian system includes more specific statements, covering descriptions of existing land uses, preconditions for development, development objectives and directions, existing planning policies, land use and building regulations with zoning for future uses, and public participation. At the end of year 2011 the new Spatial Development Planning Law was adopted by the Parliament of the Republic of Latvia (Spatial Development Planning Law 2011). The Law introduces a local plan as an additional planning document in hierarchy between both comprehensive and detailed plans. On the one hand, such legislative change may lead to more flexible planning system, but, on the other hand, it may cause to more complex interpretation of regulatory norms in the cases of changes in functional zoning, and so, in land use.

Any changes either in the Law, regulations or land use patterns itself do not cause the changes in the appropriate territory. Even if the priorities of the territory are set and clear, the following questions should be addressed to the land management entities: What direct and indirect effects have been analysed during the planning process? What are the objectives for improvements in land structure and site developments? Which territories are appropriate for specific projects, for example, land consolidation projects in rural areas or developments of urban infrastructure in neighbourhoods? How previously set priorities and objectives are to be implemented in the territory? Does the implementation of plans follow the methodological framework? Does the land use and site development comply with the provisions of land use and building regulations? Are the effects from application of the regulations monitored systematically? These and similar issues are directly related to the land use management measures in practice.

2.2 Why does evaluation of land use make sense?

Studying various topical researches of recent years, it can be concluded that the issues on ELU become increasingly important to support the sustainable usage of land-related resources. It is argued that the success of a land consolidation project is directly related to the detailed examination of the project territory and at the preparatory stage it is very important to have as much actual GIS data and documentation as possible (Paškarnis et al. 2013). Accordingly, it is expected that after a successful implementation of the project, the value of the land will rise and it will attract investment, which will in turn lead to further rise in value and improvements of local environment. However, it also indicates the necessity to gather comparable data about effects and potential outcome from implementation of the project in the territory. For the purpose to evaluate the rationality of land use and its monitoring as well as to analyse the results of the implemented measures of land use policy, specific indicators revealing underlying changes in the qualitative and quantitative content should be used (Auziņš et al. 2014). An irrational use of either agricultural or building land is examined as a consequence from applying the techniques of land use planning in the

Republic of Slovenia, because of focusing in particular on the physical balancing of land surfaces for a specific type of land use, and do not considering the economic aspect in preparing the foundations for land use decision-making in the process of spatial planning (Šubic Kovač 2013). Accordingly, it is argued that a sustainable development largely depends on defining of the land development potential, using appropriate methodological framework.

Land use objectives (patterns) spatially characterise the functional use of the territory. Thereby, they are effectuated by land use planning and implementation system (measures) in a country. In Baltic countries like in more advanced European spatial planning practices, the land use planning follows the 'bottom-up' approach and points to the responsibilities of local governmental level – municipalities (Auziņš et al. 2014), which basically represents a decentralised SPS. The areas of various land use patterns can be identified according to the functional zoning designed by the land use plan of specific territory. Figure 1 shows the process through which the land use pattern may be changed. Thus, a land use pattern may be changed in the result of land use planning and implementing desired developments in the territory.

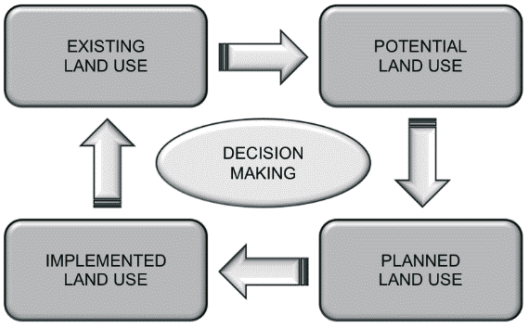

Figure 1: Changes in a land use pattern (Source: Auziņš 2013).

Potential land use (pattern) follows the assessments on feasibilities and necessity to change the existing land use while the area of changed land use is determined through implementation of land use plan. The collection of specific indicator sets for the assessment of land use dynamics indicates to the application of land use modelling methods and GIS technologies. For instance, spatial decision support systems are designed to deal with complex spatial allocation problems for balancing interests and solving land use conflicts. Therefore, generic conceptual framework has been proposed to support land use planning in the region of Flanders with focus on soil protection (De Meyer et al. 2013). Programme-based planning of natural resources is an evolving planning frame for solving complex land use, environmental and forest management problems within hierarchically administrated funding and decision-making schemes. It acknowledges that an effective planning process requires the combined consideration of environmental, technological, economic and socio-political factors. The approach is based on a list of key criteria for the phases of a *collaborative planning process*: (1) problem identification, (2) problem modelling and (3) problem solving (Vacik et al. 2014).

3. Practices and applications of evaluation techniques

Based on literature review

Alongside the definition of land use principles, the making conditions for the best possible land use and its sustainability should be determined by national land policy. Accordingly, the implementation processes of land policy are related to the development of national economy sectors and the evaluation of land use efficiency – applicable approaches, methods, evaluation criteria and indicators based on sustainable development principles.

Actual information plays meaningful role when starting the assessment of possible land use solutions in particular areas. Thus, the information has to show the impact of various factors, such as worksite increasing, decreasing of land units, formation of more compact structures of land units, improvement of accessibility, on profitability in agricultural and forestry sectors (Backman 2002). Systems approach for evaluation and analysis of land use potential has been proposed in China (Zou and Li 2008). Thus, systemic analysis provides the land managers with a possibility to oversee the utilisation of land resources if considering the outcome of versatile usage of these resources. For the purpose to assess the relationship of both the land consolidation and rural housing, an indicator system and a mathematical model allow the efficiency determination of land consolidation process (Gao et al. 2011). An optimal allocation of land resources from the usefulness and effectiveness point of view in a region resulted when the technique for order of preference by similarity to ideal solution has been applied and integrated with other methods (Li et al. 2013). Performed territorial assessment and solved optimisation tasks resulted to the substantiation of most suitable allocation of land use patterns (Taromi 2011). A collaborative analysis shows the territorial changes of farm holdings and suggests in addition to quantitative indicators of differentiated agricultural land use zones apply also qualitative indicators in order to better identify most suitable possibilities of land use (Atkoceviciene et al. 2011).

When analysing the methods for evaluation of investment projects in several European countries, it has been concluded that there do not exist standardised and unified methods to evaluate the infrastructure characterising urban systems (Griškevičiūte-Gečiene 2010). Cost-benefit method still widely is used for evaluation of project solutions co-financed by EU, thus capitalising economic benefits and costs. However, the methods of multi-criteria analysis are becoming more employed if assessing the funding possibilities and alternative solutions for development of sustainable infrastructure (Lazauskas et al. 2015). Explored ELU practices in urban environment indicate to feasibility analysis and assessment of alternatives, the process of land use planning, specific solutions of either the construction design or territorial improvement as well as to processes of elaboration and implementation of detailed plans, making specific territorial investigations. A particular model for evaluation of urban sustainability has been proposed (Yigitcanlar and Dur 2010). This model can be seen as a remarkable instrument of land use planning within urban area, because it provides integrated assessment of urban environment.

During the last decade the interest of researchers increased significantly towards applications of modelling tools with the aim to study changes of land use and land cover. By employing

various approaches and techniques, including cellular automata approach integrated modelling, agent-based models, the complex tasks can be solved and systems simplified (Sohl and Claggett 2013; Matthews et al. 2007). The application of land use modelling techniques mainly involves: cellular automata, statistical analysis, Markov chains, artificial neural networks, economic models and agent-based models (Celio et al. 2014). Some recent researches emphasise on necessity to develop and apply the models, which reflect integrated approach. Accordingly, the methods of analytical modelling are applied together with participatory modelling (Hewitt et al. 2014) as well as Bayesian networks are used in order to integrate both quantitative and qualitative data resulting to improvement and implementation of more efficient land use planning and policy instruments (Celio et al. 2014). Modelling the urban dynamics and using particular specification lead to convincing arguments in favour of integrated modelling and imitation (Lektauers 2010). These instruments would promote better justification of a decision-making in land use management.

Some analysis of land use changes showed the results of empirical research and thus the calculated loss of ecosystem services value caused by these changes when observing the time series from 1980 to 2010 (Chen et al. 2014). Recently some review of methods, data, and models to assess changes in the value of ecosystem services from land degradation and restoration has been done. It was stressed a need for further development of the integrated approaches and methods. The developed models should be addressed by adding the 'human factor', for instance, in participatory decision-making and scenario testing (Turner et al. 2015).

4. A methodological approach for more efficient use of land-related resources

Efficiency domain, objectives for evaluation, evaluation criteria and indicator system

By choosing scientific sound approach and applying of both selected methods and indicator system, it is possible to explain the processes of land use from point of view of efficiency in the widest possible form (Auziņš 2013; Auzins et al. 2013). However, it has been researched that the indicators in the estimates are used in accordance with the purpose and context of the relevant study, observing the different functional goals of land management entities (stakeholders) and the need to support the decisions on the respective land management level – national, municipal and land users' level. It is argued by the author's recent research that the application of 'efficiency domain' for an assessment of land use effects points to the approach when the *rationality assessment* of sustainable usage of land resources may replace the *directional assessment* of territorial development (Auziņš 2013).

The *variability* of the influencing factors of the land use outcomes indicates the significance of the 'efficiency domain' in studies on land management, given potential land use objectives and outcomes as well as the resources necessary to achieve them. The evaluation outcomes may cause to changes in functional land use, or in more detail – in land use patterns (Auzins et al. 2013). Several scientifically sound solutions and the results of the performed analysis by the author show that the *coincident influence* of socio-economic, environmental and

institutional factors and the linkages between them enable the determination of criteria and development of an indicator system specific to the ELU (see Figure 2).

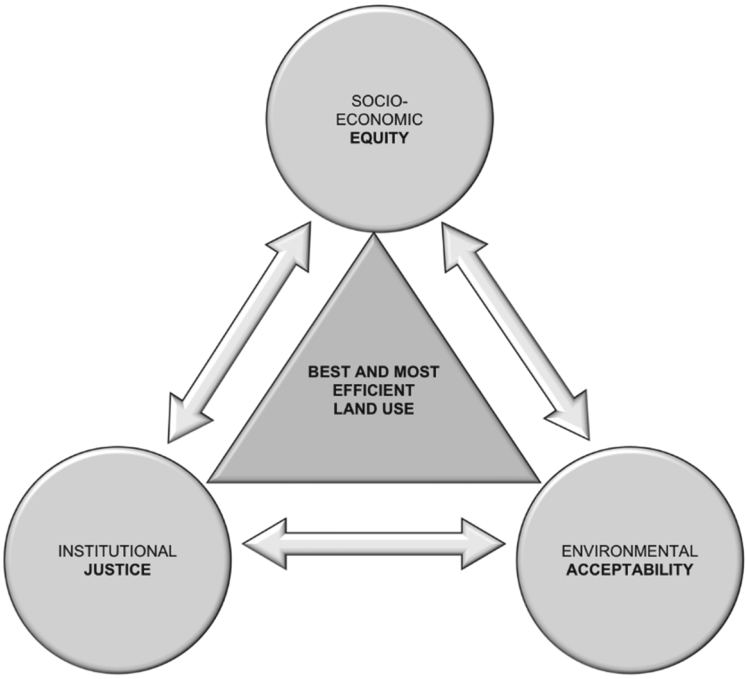

Figure 2: Objectives for evaluation of land use (Source: Auzins et al. 2013).

Linkages are the relationships between set objectives and can be identified to promote a balance in the development of these objectives to increase welfare gains for local communities. Here "equity" represents the internal linkage between economic growth and social security, e.g. if assessing the criteria of "investments into public infrastructure per capita" at municipal land management level or "labour productivity" at land users' land management level, "acceptability" represents the internal linkage between ecological live ability and environmental quality, e.g. if assessing the criteria of "land use diversity" and "ecological viability" at either municipal or land users' land management level, and "justice" represents the internal linkage between administrative management and the regulatory framework, e.g. if assessing the criteria of "administrative capacity" and "regulatory framework" at municipal land management level. External linkages are identified in addition to the internal ones according to the study context. For instance, "resource productivity" represents the linkage between socio-economic and environmental objectives, "land use monitoring" represents the linkage between institutional and environmental objectives, and "participation in decision-making" represents the linkage between the socio-economic and institutional objectives. External linkages are dependent to a great extent on the evolution of objectives and changes in society. Therefore, their features may be considered changing, specifiable and attributable to the context of the study (Auzins et al. 2013).

The application of the indicator system makes it possible to evaluate the regularities that determine and affect land use, to support the decisions for the best possible and more efficient land use as well as to provide prospective development directions and the required resources in the respective area. The "best and most efficient land use" conceptually refers to the land use activities resulting in the greatest benefit to society (Auziņš et al. 2014). Accordingly, the land use planning and the implementation of spatial development plans should be provided and the sustainable management of land use promoted.

5. Conclusions

Spatial planning is a continuous process. However, the plans are elaborated and accepted taking into consideration the perspective of its likely implementation. In Latvia this period of time is set for 12 years. Evidently, during this period of time, the changes and adjustments according to the needs of the society normally be implemented. In the scientific literature more attention is paid to the evaluation and optimisation of land use as well as to conflict resolution by using a variety of techniques for project assessment in land consolidation areas, evaluation of land use potential, scenario analysis, a decision support, etc. Accordingly, for ELU widely GIS, multi-criteria analysis, land use optimisation and various modelling methods have been used. Developed and practically implemented models provide land use planning-implementation relationship, mainly employing GIS technologies. Integrated approaches, if combining quantitative and qualitative criteria and indicators, create more objective base for decisions as well as integrated methods show more convincing research outcomes and thus serve for better justification of decisions in land use management. Comparable and actual data and thematic maps, including land use-related information are needed to assess the land use changes when considering long enough dynamic time series. Data availability needs to be improved properly to the purpose of the evaluation. The research outcome of Latvia's case indicates this as main issue to be solved before to carry out the empirical studies on how the spatial planning documents have been improved following ELU. If introducing the ELU system, the spatial-environmental, socio-economic, and institutional effects can be analysed by identifying changes in dynamic data sets of outcome indicators as well as the decision-making to optimise business operations and to improve the management of land units can be provided. These changes, optimisations, and improvements by analysing the impact indicators may lead towards effectiveness measures – qualitative changes in the socio-economic and environmental situation. A methodological framework for ELU prescribes the conditions, integrated methods, models, classifications, an indicator system and sequential evaluation procedures. This framework should be designed as a support system in decision-making and used for systematic monitoring of land use that will lead to sustainable land use management.

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Robert Dixon-Gough*, Józef Hernik** and Jarosław Taszakowski**

From the Norse to the Newcomers

The evolution of land use and land management patterns in Greater Langdale, North-West England

1. Introduction

All landscapes are important since they demonstrate the interaction between the physical environment and human society and are a product of attitudes as well as actions. This paper examines the history of a small part of the British landscape, the human component of which is very recent compared with the landscapes of Eastern and Central Europe and Asia where human settlement patterns and civilisations are much older and, therefore, more complex.

The study area is located in the north-west of England and immediately south of the Scottish border. Figure 1 illustrates the location of the study area, which is a relatively unpopulated mountain region, fringed by a narrow coastal plain to the west of the main north-south routes linking Scotland with the industrial, commercial, and populated regions of England. To paraphrase Winchester (2000a:1), the environment of the upland fells of Greater Langdale are beyond the limit of cultivation where the flat landscape of the valley gives way to course grass, moorland and peat bog, which appears on first sight to be untamed but yet has been exploited and bears the imprint of centuries of human activity. The systems of land tenure and land use in the study area were not very different to any other part of Britain but its geographic location has meant that it effectively became disconnected from the evolving agrarian and industrial revolution experienced by most other parts of the country and, hence, old practices remained unchanged certainly until the mid-nineteenth century. Furthermore, those practices still form an important part in the appearance, landscape and land management practices used across the area today.

This paper provides an understanding of the evolution of land use and land management practices and how they have influenced the development of the landscape from approximately 900 until the present time. It will examine the evidence of occupation and the agrarian activities of pre-medieval land use, which underlies the continuity and very slow evolution of the medieval patterns of land use. Underlying this was the influence of the Manorial Courts upon rural life and land management practices, which continued virtually unchanged until the period of Parliamentary Enclosure during the early to mid-nineteenth century, far longer than in most parts of England.

* Corresponding Author (dixongough@tiscali.co.uk). Visiting Researcher of the University of Agriculture in Kraków / Poland.

** University of Agriculture in Kraków, Faculty of Environmental Engineering and Land Surveying, Kraków / Poland.

2. The Development of an Agrarian Society

The first broad category of land change is that leading up to the pre-medieval period. Although the effects are relatively minor, they laid down the basic framework of the settlement patterns and agrarian economy that slowly evolved throughout the area. Landscape research conducted by the National Trust in both Ennerdale and Great Langdale (Quartermaine & Newman 2003; National Trust 1993; Lund & Southwell 2003) has established links between the early settlers and the subsequent evolution of land use and land management through to the modern period.

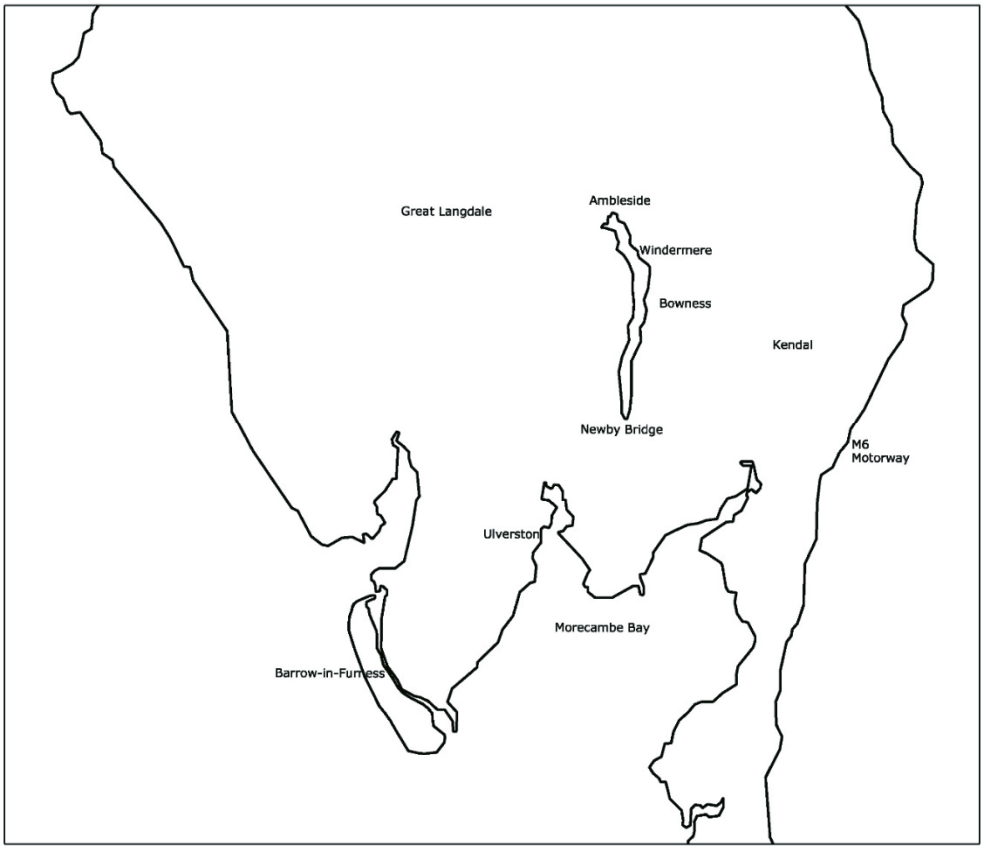

Figure 1: The location of the study area.

2.1 Early man

There is no evidence of any activity in the study area during the Iron Age and none also in Great Langdale from the Roman period although there is evidence of Roman occupation in the study area in Little Langdale, which lies on the Roman road between the forts at Ambleside and Hardknott Pass (Lund & Southwell 2003). The Roman settlement at Ambleside (Galeva), was constructed from stone quarried near Lancaster and was probably transferred across Morecambe Bay and up the River Leven to Windermere (Evans 1991)

but little evidence of any agrarian economy exists for this period, most of which date from the Norse or later Medieval periods.

From the late sixth century onwards there are indicators of a regeneration of woodland cover although in some areas the soils were too impoverished to support the re-establishment of trees. Most of the tree cover by the time of the Scandinavian settlement during the tenth century was in the sheltered valleys and its subsequent clearance for grazing may have led to the main valleys being opened up for settlement (Whyte 1988:52–53). There was large-scale settlement throughout Cumbria by the Norse and it is thought that, being pastoralists, they occupied the poorer valleys (Whyte 1988:61–66). There is evidence of settlement throughout the region, particularly in Great Langdale in which Baysbrown Farm is thought to be a compound of two Norse words (*Bass* for cowshed, and *Bruni*, a person's name), hence Bruni's cowshed (Smith 1964:204). This provides evidence not only of settlement but of land use – cattle farming. The name Rossett may also have Norse origins and suggests that a settlement existed at the head of the valley in Norse times. An occurrence throughout the study area of derivations of Norse words, which provide further evidence that the area was settled by the Norse (Atkins 1991). For example, the farm name 'Scale' is derived from the old Norse *skali* meaning a shieling or group of shielings. These sites often occupied the highest and most remote regions (Whyte 1988:64). Furthermore, the expression still used in Norwegian for summer grazing or temporary huts is *saetre*, which produces in modern place names an ending of 'set' or 'side'. Another word introduced during this period was *aergi* for a sheiling that is now incorporated in names ending in 'er' or 'ergh' (Winder, Sizergh, etc.). This expression is thought to have been used more extensively during the earliest periods of Norse colonisation and mainly occur in lowland or semi-lowland areas such as the Kent valley.

Although there are not extensive remains relating to this period of settlement, there is sufficient evidence to suggest that by the end of the tenth century both the pattern of settlements and the main form of land management had been established.

2.2 To the Medieval period

The conquest of England by William of Normandy in 1066 witnessed a period that established the process of land organisation and feudal administration that was to remain in place for almost 800 years. It is generally believed that the feudal boundaries, wards and parishes created after the conquest, adopted elements of earlier land organisation. Thus, the historical continuity from the Dark Ages to medieval provided a pattern of estates and parishes that created the framework for the development of later settlements (Whyte 1988:75).

The colonisation of this region following the Conquest was rapid for two important reasons. Firstly, the land was virtually deserted and was granted by the Norman lords to their dependants and retinues in return for service. Secondly, the border regions remained volatile and it was essential to maintain a strong Norman presence to maintain security and discourage the Scots from raiding England. This feudalism of the post-conquest period

brought with it a new social understanding of obligation and kinship that encouraged the rising population to settle and establish communities.

During this period the continuity of farming patterns in the uplands continued to be determined largely by environmental constraints, with altitude and exposure reducing the growing season, whilst high rainfall and low temperatures creating acidic, waterlogged soils. In such an environment the management of grassland, both as pasture for grazing animals and as meadows to provide hay as feed for the livestock through winter, continued to form the heart of the agrarian system (Winchester 2000b:75).

Whilst information concerning land use during this period in the study area is not readily available, documentary evidence reveals, for example, that in the thirteenth century, William de Lancaster, Baron of Kendal, granted to Conishead Priory the 'land of Basebrun'. Also recorded in the grant is a hay meadow somewhere between Wall End Farm and Great Langdale Beck, hedges, and the stocking of cattle on the Baysbrown farmland. This existence of a meadow would have meant that the land would have been cleared of stone in or before 1216 (the date of the grant), with the possibility of some rudimentary drainage. This provides evidence of the existence of organised agricultural practices in the valley during the thirteenth century and probably a continuity of cattle farming at Baysbrown from the tenth or eleventh century.

The grant also makes reference to the 'inclosed land of Great Langden' suggesting the existence of a wall built to enclose much of or even the whole of the valley floor. Walls of this nature have been recorded in Scotland and elsewhere in Cumbria, and are important components of medieval upland agriculture and land use (Winchester 1987:59–60). They were known by a variety of names, including the Ring Garth, Fell Garth, Head Dyke, Moor Dyke, Fell Dyke, Ring Dyke or Ring Fence. The wall had a two-fold purpose: as a legal boundary between the land managed by the tenants and that belonging to the Lord of the Manor, and as a physical boundary to keep stock pastured on the fellside in summer from trampling the crops growing in the valley bottom (Winchester 1987:59).

By the thirteenth century, much of Cumbria was exploited as pasture in three different ways (Winchester 2000a). Some upland farms were settled by peasant communities who paid rents and provided services for land that they had enclosed, whilst other areas were retained as private demesne pastures, some of which were exploited through agistment. The remainder were directly managed as stock farms, one type of which was a vaccary. The term vaccaries had been used since the late middle-ages to either refer to a building (a cow house or byre), or as a stock rearing establishment, including the settlement and its associated pastures. Once leased, vaccaries tended to be sub-divided into smaller tenanted farms and had grown into small hamlets by the end of the fifteenth century (Winchester 2003). Another unit of estate, used from before this period, was a manor that was originally held in feudal tenure either directly to the crown or through a mesne lord. This might consist of several villages, although a village might be divided between several manors. The Lord of the Manor held some land in demesne, farmed either by labour services or through paying

wages, whilst the remainder was farmed by tenants or used as common land. Following the Black Death of the mid fourteenth century and a shortage of peasants, labour services were increasingly replaced by rents.

Once again, the National Trust's Archaeological Monitoring Report of Great Langdale (Lund & Southwell 2003) provides a valuable image of the state of land use and land management within the study area, of this period. Apart from Baysbrown and Rossett, both of which seem to have had Norse origins, there are place-name and field-system evidence for the existence of four additional farmsteads in the valley during this period. Middlefell Place is inferred through the personal name 'Charles de Mithelfell' recorded in 1332 (PRO E179). It is also believed that farms ending with the word 'Place' are believed were settled as encroachments in to the former forests (Winchester 1987:62). Throughout the Barony of Kendal these encroachments were legalised by Royal Charter in 1190 (Armitt 1916:96) and Middlefell Place, Robinson Place, and Harry Place are likely to have been established during the twelfth or thirteenth centuries.

Other forms of documentary evidence help develop a wider picture of agriculture and land management throughout the area. One source is the *Inquisitions Post Mortems* of families who had inherited the Barony of Kendal on the death of William de Lancaster in the mid-thirteenth century. In 1283, fifteen tenants held just over 136 acres (54.4 ha) of land in the

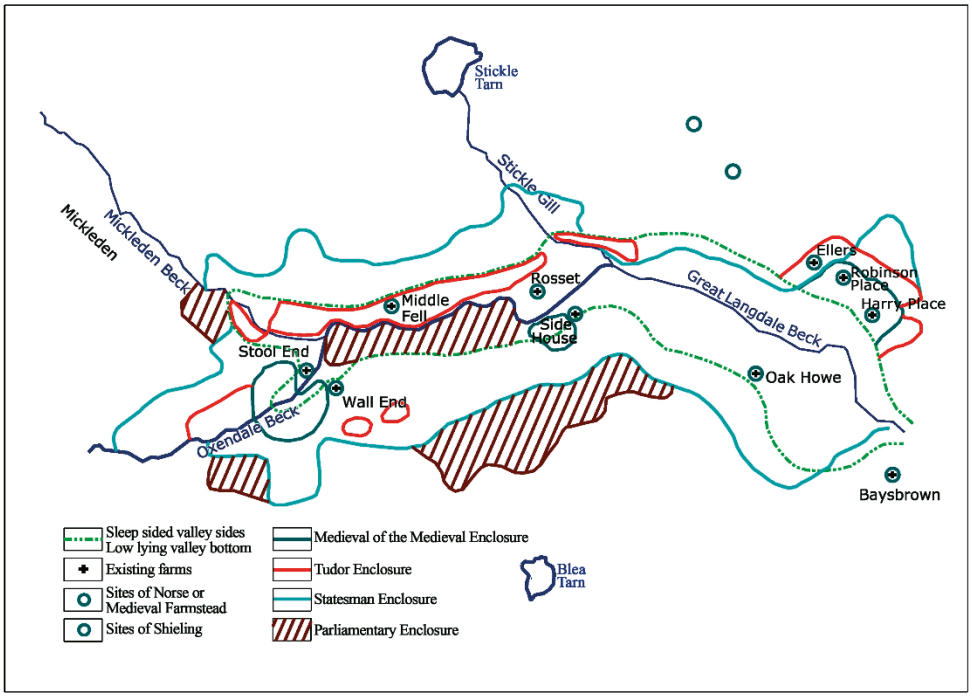

Figure 2: Sketch map illustrating the enclosure and development of Great Langdale (Based upon Lund & Southwell (2003) and fieldwork by Robert Dixon-Gough).

valley – possibly inbye, while six tenants held 28.5 acres (11.4 ha) of waste – intakes. In one such *Inquisitions Post Mortem* there is reference to a water mill. The *Inquisitions Post Mortem* of Christiana de Gynes refers to the 'Hamlet of Langedene', which contained eleven tenants and a water mill (PRO C135/37/24) as well as ten unnamed tenants, and three identified pastures, including a pasture and customary payment called 'Le Haye' rented by Thomas de Ros (PRO C135/74/4).

During this period Cumbria was subjected to regular Scottish raids in the first half of the century and while the study area did not suffer extensive attacks by the Scots, it provided men to guard the border with Scotland. This combination of factors led to a reduction in population and livestock and the subsequent abandonment of some settlements throughout the region.

2.3 The Tudor Period

Whether in crown or lay ownership, moorland forests were potentially valuable grazing reserves. Desmesne cattle farms (vaccaries) were established and income raised through allowing adjacent communities to graze stock in the forest-agistment (Winchester 2000a). By the beginning of the sixteenth century, these had been leased and sub-divided into smaller holdings increasing both the number of people living in hamlet communities and, in all probability, the number of livestock. Between 1540 and 1640 commercial livestock farming was introduced, together with the enclosure of pastures (Winchester 2000a), the cumulative effect of which was to transform many of the valleys and hunting forests into pastoral farming landscapes (Winchester 2004:26).

There is specific evidence of rural communities appearing to enjoy a period of recovery during the fifteenth century. According to local tradition, tenants paid Forest Silver, for right of pasture in the forest (the upland fells), and a payment called 'Goldwhether', reputedly a tax on the increase in the number of tenants' sheep or a sum paid to the Lord of the Manor for the service of his ram (Farrer 1903; Armitt 1916:94). By 1454, the tenants of Great Langdale once again had enough livestock for Forest Silver of 33s 4d. to be paid (£1.66), the water corn mill was running full time, and two new mills had been constructed for the fulling of wool (PRO DL 29/644/10444). This is the first reference to fulling mills in the valley and dates their construction to between 1390 and 1454 (Farrer 1903; PRO DL 29/644/10444).

In general pasture farmers lived in isolated farms and hamlets as well as in villages and the population was more widely scattered than in arable lowlands. Manorial courts could not exercise close surveillance over their tenants, and the tenants generally held their land by tenure that was relatively free from interference. In many of these dispersed centres of settlement, it is noticeable that the population consisted of one class only (Thirsk 1984:205).

The field patterns characteristic of the enclosure of this period are visible as small and irregular shaped fields close to farmsteads and can be identified at three farms in Great Langdale (Lund & Southwell 2003:16). These areas are located immediately south of Stool

End, adjacent to Sidehouse, and within patterns of intakes at Robinson Place. Beyond those scattered farmsteads and their enclosed fields stretched the commons, formerly manorial wastes or hunting forests that had been opened up for grazing and gradually being appropriated by the tenants. In many cases the commons ran down into the nucleated settlements as funnel-shaped driftways for moving livestock, and often opened out into village greens.

One of the clearest evidence of contrasting land management was the 'head-dyke', an effective boundary between those lands capable of being improved and the parts where slope and thinning soils dictated the limits of their land. It remained in the Langdales where the fells are still open common grazings (Winchester 1988:77). Hill farming was centred on the complementary roles of two specific categories of farmland: the relatively flat valley floors and shallow lower slopes of the fells; and the unenclosed wastes of the higher fells (Winchester 2000a:52). The first category (referred to as the 'intake') was land that had been cleared of stone and was capable of yielding limited arable crops and hay for winter fodder. Intake fields within the valley were documented in 1283 and 1374 (Farrer 1903:31), although extensive intaking of land was only minimal until the end of the fifteenth century when a rising population increased the demands on the land (Winchester 1988:83). The grassland, once the hay had been harvested could later be used as good quality grazing to fatten livestock. All these activities were dependent upon manure to improve the fertility of the land. The poor quality vegetation of the higher fells would have provided rough grazing during the summer.

This relatively simple model of land use and land management relied a physical barrier that formed an effective boundary between the two categories of land and which, with communal regulations, controlled the movement of livestock between these two categories of land. This system of land management certainly prevailed from the fifteenth century through the enclosure movement in the early nineteenth century, although as increasing informal enclosure took place about the tenanted farms, the significance of the head dyke was diminished.

The agricultural depression, brought about by over a century of destruction wrought by bands of Scottish raiders, followed by devastating cattle plagues and sheep 'murraine' came to an end in the 1450s when a revival of the economy in the area brought about another phase of land-taking which lasted until the latter seventeenth century. This was to a large part brought about by the growth of the woollen industry in Kendal which both stimulated the demand for wool and provided an additional means of livelihood for farming. From the 1450s this land hunger led to small intakes of new enclosures that 'nibbled' at the fellsides along the head-dyke or created small islands of farmland to satisfy new demands on land and food production on some of the better land, some distance from the main bodies of enclosure within the valleys (Winchester 1988:83–84).

The dissolution of the monasteries under Henry VIII (or the 'Second Great Land Grab' according to Cahill 2002:22–23) also influenced landownership patterns throughout the

study area. For example, upon the dissolution of 1536 Conishead Priory in 1536, the manor of Baysbrown was taken into crown hands and the land surveyed. This survey listed fifteen tenants but gave no indication of the locations, sizes or names of the tenements (PRO DL/29/143/2274).

The number of tenants in the farms surveyed throughout Great Langdale during 1573/74 is also an indicator of the population expansion of this period. Some thirty-seven tenants are listed at this time, with many of the farms having multiple or split tenancies. For example, some farms such as Side House had one tenant, Thompson's Tenement had three tenants, while Wall End had six farming families. There are also six landless cottagers listed and rents for four mills. From the numbers of tenants recorded at each farm and the groupings of surnames, it is likely that the population expansion had come through improved infant survival and a resultant increase in family sizes rather than through an influx of immigrants. With more heirs, a farmer would have had to divide his land into smaller units (partible inheritance) producing 'multiple tenements' centred on the original family holding. This period between 1550 and 1750 has become known as the period of the 'statesmen' (from estatesmen) who were small, family farmers whose customary tenure gave them a security comparable to free-holders. The power to change the landscape lay firmly in the hands of the statesmen since the influence of the Lord of the Manor was limited by the strength of the tenant's customary rights (Winchester 1988:85). By 1550, the vaccaries and virtually all other land formerly retained by the great lords had been let to tenants so that the statesmen's influence was almost total and led to a farming landscape that developed slowly and in a piecemeal manner across the Tudor and Stuart periods.

The main direct human impact of this period was the construction and repair of tracks, walling, the construction of sheepfolds, and attempts to improve the drainage.

2.4 The yeoman farmers, or the 'Age of the Statesmen'

The period from the late-sixteenth century to the mid-eighteenth century is often referred to as the 'Age of the Statesmen', an expression peculiar to the Lake District. Statesmen, or estatesmen, were independent customary smallholders who had acquired, often by virtue of their border service, a greater degree of security of tenure by the late-sixteenth century than was common in other parts of the country. In practical terms their status was the same as freehold. These statesmen were responsible for the rebuilding in stone of many of their farmhouses and outbuildings, a national trend, which is often known as the 'Great Rebuilding', which reached Cumbria later than southern England.

Common-fields also appear to have been progressively enclosed by the tenants from the late-sixteenth century to the eighteenth century, thereby rationalising common rights to make them more specific to particular farms. This process is inferred from the mid-eighteenth century by reference to High and Low Common-fields, suggesting the existence of enclosed fields around dwindling areas of open field. This process was not documented until Acts of Parliament enclosed the last remaining areas of the common-field during the nineteenth

century. Some of these new enclosures may have still been farmed in common, a close being shared by a number of people.

This was a period of continuity and improvement. By the beginning of the seventeenth century it was becoming common practise for tenants to surround their smaller fields with a physical boundary (either a hedge or a stone wall) and thus the landscape was beginning to assume its current appearance (Bouch & Jones 1961). This era is often regarded as a 'Golden Age' in the history of the Lake District. It was the period when the Cumbrian farmers reached the height of their security and independence.

3. Economic consolidation

The decline of the yeomen or customary tenant came from a range of reasons towards the end of the nineteenth century. Agricultural prices were one factor and to maintain income, small estates were over-cropped leading to a marked reduction in vegetation cover. A second factor was the reduction in the availability of by-employment which, as late as 1800 still provided a vital source of income to the Cumbrian yeoman – mainly through weaving but also in the small industries such as mining and quarrying. Much of this was lost to factory production and by the mid-1830s the textile factories of Kendal and Ulverston had not only superseded the cottage industries but had provided full-time employment to those migrating from rural areas.

The social and industrial development of the study area was, at the early part of the nineteenth century largely unchanged from that that had existed since the medieval period. Searle (1986; 1993) and Winchester (1987; 2000a; 2000b) discuss the systems of land tenure in the rural areas, in which the manorial system, with customary tenants (statesmen) given the rights to sell or pass their land down from one generation to another. The advantageous nature of such tenancy agreements was recognised until the early part of the nineteenth century when cattle herders from Ireland and Scotland, transporting their livestock to the industrial centres, overwhelmed the common grazing lands of the tenants. They petitioned for the land to be enclosed, in some cases over 100 years after Parliamentary Enclosure had taken place in many other parts of England and Wales (Marshall 1958; Bouch and Jones 1961; Whyte 2000). This led to a number of enclosure awards being passed that both enclosed the land and also drained and improved it (Whyte 2003:26).

There are no definite reasons for the decline of Statesmen tenements throughout the study area but as a regional trend it is believed to have been due to a combination of factors (Beckett 1984). With increased industrialisation at centres such as Kendal and Ulverston, the farmers' traditional secondary by-employment during the eighteenth century, such as the traditional cottage industries based about textiles and quarrying gradually diminished, and this was compounded by a run of hard winters and the nation-wide agricultural depression. This caused marginal farms to become uneconomic and be acquired by the more profitable creating a surplus of labourers, another traditional by-employment for the families of many of the smaller farms. Such adversities forced many of the poorer rural population away from agriculture to the increasing employment opportunities of the growing towns.

The financial problems experienced by the Statesmen allowed outsiders to buy land and farms in the Lake District, many of whom had agricultural and financial interests outside the area. This influx of 'Newcomers' brought with it agricultural improvements that had occurred in other parts England during the seventeenth and early-eighteenth centuries. These improvements brought about changes in the land use of the Lake District in general and the study area in particular. New arable crops such as potatoes and turnips were introduced, and improved drainage systems were laid, and more extensive areas of the fellside commons and valley common-fields were enclosed and the land improved.

One of the products of enclosure was its inter-relationship with the 'gentrification of the landscape', which coincided with the discovery of the Lake District by tourists. Many of the industrialists of the north-west purchased enclosures, particularly in the more spectacular valleys of Great Langdale, around Windermere and Coniston Water, and along the coastline, to build villas and generally landscape the area.

Prior to the formal enclosure of the commons and wastes, little land improvement, other than improving the drainage in the low-lying arable fields had been attempted and the process simply carved the former manorial wastes into new property units. In one respect, the full effects of the Parliamentary enclosure was delayed for several generations through allowing 'blocks' of land to be bought for afforestation in the period following the First World War (Winchester 1988:96).

4. Conclusion

The gradual evolution of land use and land management patterns in Greater Langdale have their origins from the times of the Norse settlers in the 10th century. The practices they developed were continued after England had conquered by William of Normandy (who was of Norse descent) in 1066, and his followers settled across the land.

Until the beginning of the nineteenth century there was a prolonged period of stability in terms of land use and land management practices that was owed almost entirely on a system of agriculture, based upon communal tenure that had largely been outmoded across the remainder of England by the end of the sixteenth century. That this system continued across Cumbria was largely due to its geographic location and distance from major urban areas, but also in the power and status quo of the Cumbrian Statesmen, who had managed to use the Manorial Court system to their best advantage.

The years of the Napoleonic Wars benefited Cumbrian in much the same way as it benefited agriculture through Britain and the years following the conflict were critical to the Cumbrian landowners and tenants yet there are reports by Marshall (1980) that the wealth of the yeomen and tenants throughout the region was increasing. One of the main reasons for this is that the agrarian wealth of the region was not dependent upon the price of cereal crops but upon a pastoral economy, which remained steady throughout seventeenth to eighteenth centuries. The records of will and inventories suggest that agricultural conditions remained favourable throughout this period (Marshall 1980). The decline in this system

came effectively with enfranchisement as the region started to become influenced by external effects. It was the cattle drovers bringing cattle from Scotland and Ireland to feed the masses in the urban areas further south that caused the degradation of the commons, the effects of which were sufficiently drastic to encourage the tenants to seek enclosure by petitioning the respective lords of the manors. Through the process of Parliamentary Enclosure, the tenants became freeholders and, therefore, in times of hardship with little or no by-employment to turn to, could mortgage or sell their properties to seek easier and more profitable employment (Beckett 1984). This period was marked by agricultural 'improvements' brought about by the 'Newcomers' and the introduction of larger areas of arable.

The tenants managed to successfully overcame the great agricultural depression of the eighteenth century, and even the period of Parliamentary Enclosure. It was, however, the period following enclosure, as the effects of a national agricultural depression and nucleated industrial employment were experienced, that the region suffered its greatest decline, which was to have severe implications on land use and land management throughout the region.

Finally, it would be tempting to suggest that similar studies be conducted in all parts of Europe with a view to differentiating between the respective relationships between the physical landscape, human and settlement, and cultural differences.

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Markus Schaffert* and Torge Steensen**

Land Cover Changes in Northern Germany Between 1990 and 2000 – An East-West Perspective

A study based on CORINE Land Cover data

Abstract

Land cover and land use are visual key elements of cultural landscapes. In the scope of a transdisciplinary project under the topic of "Branding of Cultural Landscapes", changes in land cover types within northern Germany are analysed.

This article shows results from an analysis of land cover changes in the metropolitan region of Hamburg. The focus will be on developments in those territories formerly belonging to the Federal Republic of (Western) Germany, to the German Democratic Republic, as well as to an area along the former inner German border.

The core of this research is two-fold. Firstly, an analysis of the numbers and sizes of areas changed between 1990 and 2000 is performed. Secondly, we identify the largest changes with respect to original and final land cover types (based on the CORINE Land Cover level 3).

1. Introduction

Cultural landscapes are, based on a common definition, "cultural properties representing the combined works of nature and of man" (UNESCO 2012). The "works of man", however, are also represented in land covers that can be seen as a part of human land uses (Kröhnert 1999). Hence, the knowledge of spatial patterns and temporal developments of land cover is of utmost importance for the understanding of cultural landscapes.

The goal of the transdisciplinary[1] project Regiobranding is to establish an extensive understanding of cultural landscapes in northern Germany to use their characteristics for an image- and identity-focussed branding of these regions (Ickeroth et al. 2015). A part of this project is the study of land covers and their changes within the metropolitan region of Hamburg (HMR).

The eastern part of the HMR used to be a part of the former German Democratic Republic (GDR). Many regions in Europe formerly belonging to countries of the Warsaw Pact showed significant land cover changes (LCC) in the years after 1990 following the end of

* Leibniz Universität Hannover, Geodetic Institute / Germany.

** Leibniz Universität Hannover, Institute of Photogrammetry and GeoInformation / Germany.

1 Transdisciplinary as a principle of integrative research combines scientific and practical knowledge in a systematical way (Bergmann and Schramm 2008). In terms of Regiobranding, partners from diverse scientific disciplines and stakeholders from three study regions within the HMR meet on a frequent basis, sharing experiences and results from ongoing research, trying to develop knowledge and innovation together.

the planned economy (e.g. Pazur et al. 2014; Popovici et al. 2013; Bicik and Jecelek 2009; Vaclavik und Rogan 2009 and Feranec et al. 2006) and the fall of the Iron Curtain (Kupkova et al. 2013; Bicik et al. 2010).

The analyses in this study are based on the assumption that similar changes can be observed within the HMR in the 1990s that have their roots in the fall of the political-economical system of the GDR, and the opening of the inner German border (IGB), and are aimed at identifying their spatial patterns.

The results should help answering different questions with regard to the project Regiobranding: Are type and pattern of today's land cover units comparable to those from earlier times? Is it, therefore, reasonable to derive characteristics of cultural landscapes based solely on recent land covers? Does regional branding, alternatively, need to extent the temporal range further back to be able to understand current cultural landscapes and to foresee future changes?

2. Research Area

The HMR is one of eleven metropolitan regions within Germany. In the German "Raumordnungspolitik" (Policy of Regional Planning), European metropolitan regions are defined as territorial units, whose unique functions in the international scope reach above the national boundaries. As power houses for the societal, economic, social and cultural development, they are destined to maintain the efficiency and the competitiveness of Germany and Europe and to foster the European integration process (BMBau 1995).

Located in the north of Germany, the HRM comprises the city state of Hamburg, and parts of the adjacent states Lower Saxony, Mecklenburg-Western Pomerania and Schleswig-Holstein. There are about 5 million inhabitants living in an area of about 26,000 km². While the city of Hamburg, and the states of Lower Saxony and Schleswig-Holstein form those parts of the HRM belonging to the Federal Republic of (Western) Germany (FRG) before the reunification in 1990, the state of Mecklenburg-Western Pomerania comprises those areas formerly belonging to the GDR.

The HMR was founded in the early 1990s as a cooperation between the Western Federal States (including collaborating counties resp. municipalites), while the federal state of Mecklenburg-Western Pomerania did not join before 2012.[2]

The HMR is neither a politically unity, nor agriculturally, historically, culturally or functionally homogenous. It comprises cities like Hamburg (1.76 million inhabitants) and Lübeck (0.21 million inhabitants) as well as rural and partially peripheral areas.[3] About a

2 This information has been gathered from www.metropolregion.hamburg.de, visited on 2015/12/20.

3 According to www.statistik-nord.de, population number (cut-off-date 2013/12/31), visited on 2015/12/20.

third of the HMR's population resides in the city of Hamburg itself on less than 3% of its area. This also causes the land cover structures within the HMR to be very diverse (Figure 1).

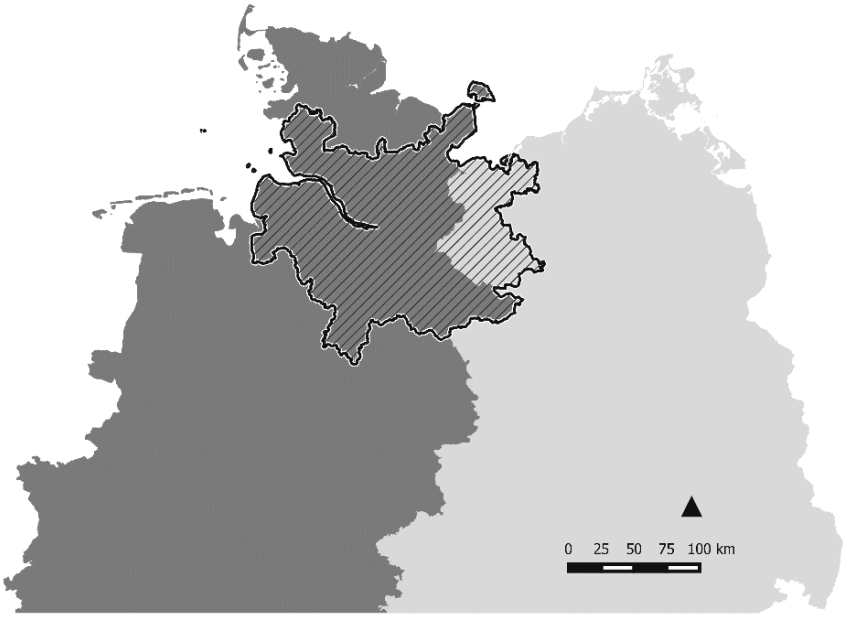

Figure 1: The HRM (black boundary) within Germany, shown in a fictive context (the HRM was founded after the fall of the Iron Curtain) with the former FRG (dark grey) and the GDR (bright grey).

3. Methodology

The analysis focuses on three distinct spatial areas:

- *the metropolitan region of Hamburg as a whole.*
- *the part of the HMR belonging to the former GDR (HMR-East) as well as the part already belonging to the FRG before 1990 (HMR-West).* These parts cover 18% and 82%, respectively, of the entire HMR. By applying this differentiation, spatial specifica of LLC in the 1990s that were rooted in the different political-economical situations prior to 1990 should become visible.
- *an area of about 15 km to the east and west of the former IGB.* This stretch of land represents about 22% of the entire HMR, with the western part being about twice as large as the eastern equivalent (see also Figure 2). The special treatment of this area is done to identify specifica of LLC that are caused by the IGB and its opening itself and not due to the political-economic developments at a larger scale.

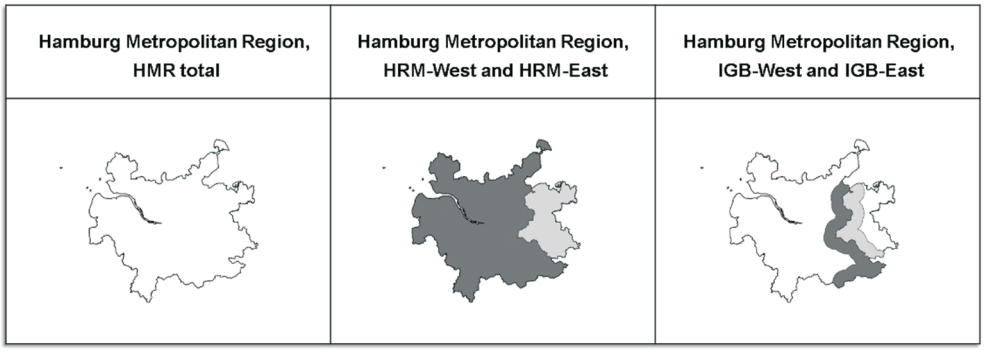

Figure 2: Overview over the HMR as a whole, the location of its Eastern and Western part and the IGB with its associated areas.

The chosen spatial areas are analysed regarding to these questions:

- Where did LLC occur in the 1990s within the HMR? How large was the area modified? How many patches were involved?
- Which type of LCC (e.g. transformation from arable land to pastures) represents the largest part of these changes and how many patches did it cover?

We analyse not only the area of the patches with occurring LCC but also their number. This procedure is based on the assumption that a given LCC can have different influences on cultural landscapes when taking place in one large patch, as opposed to several smaller patches.

The data set used to identify these changes is CORINE Land Cover (CLC) with the Coordinate Reference System (CRS) EPSG:3035. The CLC project is part of the EU commission's "Coordination of Information on the Environment" (CORINE) established in 1985. This project offers a seamless unified data model for land cover in Europe at the scale of 1:100,000 (Einig et al. 2009). The geodata sets offered by CLC are vectorised and based on the interpretation of different satellite data sets. They include a minimum mapping unit[4] of 25 ha for existing units, 5 ha for changes[5] and a minimum mapping width of 100m. Their geometric accuracy is better than 100 m and their thematic accuracy in most countries is at least 85% (Büttner et al. 2004).

CLC data sets provide four land cover inventories timed around 1990, 2000, 2006 and 2012 as well as LCC between two adjacent time steps. The CLC nomenclature is based on a 3-level hierarchical classification system. The third level is the most detailed with 44 land cover

4 Features of the real world with a size below the given minimum mapping unit are not represented in the respective data set.

5 In the CLC change layer 1990-2000 any changes > 5 ha were mapped if they lead to an increase / decrease of a polygon that existed already in the CLC 1990 inventory. If a change > 5 ha occurred that did not alter the area of an existing polygon that change was mapped only if it resulted in a polygon > 25 ha in the CLC 2000 inventory (Büttner et al. 2004).

classes (of which 37 occur in Germany). Level 2 and 1 can be seen as semantic aggregations thereof (Büttner 2014).

Level 1 comprises the classes Artificial Surfaces (1), Agricultural Areas (2), Forests and Semi-natural Areas (3), Wetlands (4) and Water Bodies (5). The Artificial Surfaces (1), as an example, can be separated into Urban Fabric (11), Industrial, Commercial and Transport Units (12), Mines, Dumps and Construction Sites (13) and Artificial Non-Agricultural Vegetated Areas (14) withing level 2. Lastly, the third level distinguishes these into eleven sub-classes. Table 1 presents the classes mentioned in this article with their respective (level 3) class numbers within the CLC classification system.

Table 1: CORINE Land Cover nomenclature and classes mentioned in this article

Level 3 Class Number	**Level 3** Class Name	**Level 2** Class Name	**Level 1** Class Name
112	Discontinuous urban fabric	Urban fabric	Artificial Surfaces
121	Industrial, commercial and public units	Industrial, commercial and transport units	
142	Sport and leisure facilities	Artificial, non-agricultural vegetated areas	
211	Non-irrigated arable land	Arable land	Agricultural Areas
222	Fruit trees and berries plantations	Permanent crops	
231	Pastures	Pastures	
242	Complex cultivation patterns	Heterogeneous agricultural areas	
312	Coniferous Forest	Forests	Forest and Seminatural areas

For this study, we used CLC data representing LCC of the period 1990–2000. For supplementary figures, CLC data sets from the period 2000–2006 were used.[6]

The segmentation of the study areas was based on the open data set "Verwaltungsgebiete" (administrative units) of the German Federal Agency for Cartography and Geodesy (Bundesamt für Kartographie und Geodäsie, BKG) with a scale of 1:250,000.[7] These data sets have been analysed in an ArcGIS environment.

4. Results

Between 1990 and 2000, an area of 418.25 km² changed its land cover in the HMR. This area of total land cover change (tLCC) equals a share of 1.61% of the entire HMR's areal extent (26004.4 km²).

6 Both data sets – "Corine Land Cover 1990-2000 Changes" and "Corine Land Cover 1990-2000 Changes" (version 17, cut-off-date 2013/12) – were downloaded from the website of the European Environmental Agency (EEA), www.eea.europe.eu, on 2016/01/14.

7 The data set "Verwaltungsgebiete" (cut-off-date 2014/12/31) has been transferred from its native CRS EPSG:25832 to EPSG:3035, the CRS of EEA´s CLC version. The analyses presented in this article are based on EPSG:3035 to support comparative studies throughout Europe. The data set was downloaded from BKGs service center, www.geodatenzentrum.de, on 2016/01/05.

Comparing the changes in HMR-West and HMR-East, significant changes become apparent. The tLCC in HMR-West (228.86 km²) lies with 1.07% (of a total area of 21352.09 km²) far below the average of the HMR. The changes in HMR-East (189.39 km² of a total area of 4652.31 km², 4.07%), however, show significantly higher values than the average tLCC of the entire HMR.

The tLCC along the former IGB (162.71 km² or 2.8% of the stretches total area of 5801.5 km²) are also significantly different from those of the entire HMR. The tLCC in IGB's western part represent 2.18%, the ones in the eastern part 3.79% of the respective total areas.

HRM's tLCC were recorded in 1554 patches. This represents a density of 0.06 patches per km² for the entire HRM.

Within the HMR-West, 982 patches represent a density of 0.046 patches/ km², while in the HMR-East, 583 patches signify a density of 0.125 patches/ km².[8]

Along the former IGB, the patches of the LCC have a density of 0.082 per km² (west) and 0.127 per km² (east). They accumulate to a total of 0.1 patches per km² for the entire former IGB stretch (Tables 2 to 7).

Table 2: Total LCC – area size and patch number

	total area (km²)	area of total LCC (km²)	ratio of total LCC (%)	number of patches	patches/ km²
HRM, total	26004.40	418.25	1.61	1554	0.060
HRM-East	4652.31	189.39	4.07	583	0.125
HRM-West	21352.09	228.86	1.07	982	0.046
IGB, total	5801.50	162.71	2.80	579	0.100
IGB-East	2249.19	85.23	3.79	286	0.127
IGB-West	3552.30	77.48	2.18	293	0.082

In the total HMR, LCC was dominated (with regard to the area size) by three types of land cover transformation (at the CLC level 3) equalling 53% of the tLCC's area size. Thus, 103.32 km² of non-irrigated arable land (CLC class 211), which is a total of 24.7% of the tLCC area in HMR, changed to pastures (class 231) between 1990 and 2000, whereas 63.15 km² (15.1%) of pastures were transformed into non-irrigated arable land. Additionally, 55.21 km² of areas formerly covered by non-irrigated arable land (13.2%) turned into discontinuous urban fabric (class 112).

8 If one patch crosses into a second administrative unit, it is split along the administrative boundary. Area and number of the split patch will be assigned to the administrative unit encompassing it. Due to this, the cumulative number of sub-regional patches is slightly above the respective number of the entire region (e.g. the entire HMR consists of 1554 patches, whereas the combined number of patches in HMR-West and HMR-East equals 1565).

The change from non-irrigated arable land to pastures is also the most important land cover transformation in the HMR-East and the former IGB regions, always followed by the transition of pastures to non-irrigated arable land. However, in the HMR-West, these two changes within agricultural areas (class 211 to 231 and vice versa) are, respectively, the second and third important type of LCC, when it comes to the area size affected. The type of LCC with the most land affected in HMR-West is non-irrigated arable land becoming discontinuous urban fabric (18.77% of the total size of land that changed its cover in that part of the HRM).

Table 3: HMR: Most common LCC flows, area size and patch number

Flow type (CLC classes)	change area (km²)	share of total change area (%)	number of patches	share of total patch number (%)	ranking (area)
211 - 231	103.32	24.70	266	17.12	1
231 - 211	63.15	15.10	226	14.54	2
211 - 112	55.21	13.20	329	21.17	3
211 - 121	17.69	4.23	58	3.73	4
242 - 231	15.59	3.73	22	1.41	5
Total	**418.25**	**100**	**1554**	**100**	**133**

112: Discontinuous urban fabric, 121: Industrial, commercial and public units,
211: Non-irrigated arable land, 231: Pastures, 242: Complex cultivation patterns

Table 4: HMR East: Most common LCC flows, area size and patch number

Flow type (CLC classes)	change area (km²)	share of total change area (%)	number of patches	share of total patch number (%)	ranking (area)
211 - 231	74.50	39.33	171	29.33	1
231 - 211	39.96	21.10	124	21.27	2
211 - 112	12.25	6.47	73	12.52	3
222 - 211	10.59	5.59	17	2.92	4
242 - 231	7.36	3.88	8	1.37	5
Total	**189.39**	**100**	**583**	**100**	**66**

112: Discontinuous urban fabric, 211: Non-irrigated arable land,
222: Fruit trees and berries plantations, 231: Pastures, 242: Complex cultivation patterns

Table 5: HMR West: Most common LCC flows, area size and patch number

Flow type (CLC classes)	change area (km²)	share of total change area (%)	number of patches	share of total patch number (%)	ranking (area)
211 - 112	42.96	18.77	256	26.07	1
211 - 231	28.83	12.60	104	10.59	2
231 - 211	23.19	10.13	102	10.39	3
211 - 121	12.93	5.65	43	4.38	4
211 - 142	11.62	5.08	22	2.24	5
Total	**228.86**	**100**	**982**	**100**	**113**

112: Discontinuous urban fabric, 121: Industrial, commercial and public units,
142: Sport and leisure facilities, 211: Non-irrigated arable land, 231: Pastures

Table 6: IGB East: Most common LCC flows, area size and patch number

Flow type (CLC classes)	change area (km²)	share of total change area (%)	number of patches	share of total patch number (%)	ranking (area)
211 - 231	33.10	38.83	84	29.37	1
231 - 211	17.85	20.95	67	23.43	2
222 - 211	6.91	8.11	12	4.20	3
231 - 242	4.09	4.80	5	1.75	4
211 - 312	3.91	4.59	34	11.89	5
Total	**85.23**	**100**	**286**	**100**	**34**

211: Non-irrigated arable land, 222: Fruit trees and berry plantations, 231: Pastures,
242: Complex cultivation patterns, 312: Coniferous forest

Table 7: IGB West: Most common LCC flows, area size and patch number

Flow type (CLC classes)	change area (km²)	share of total change area (%)	number of patches	% of total patches	ranking (area)
211 - 231	22.83	29.46	78	26.62	1
231 - 211	14.36	18.53	55	18.77	2
211 - 112	7.51	9.69	45	15.36	3

211 - 242	5.72	7.38	6	2.05	4
242 - 231	3.36	4.33	7	2.39	5
Total	**77.48**	**100**	**293**	**100**	**50**

112: Discontinuous urban fabric,
211: Non-irrigated arable land, 231: Pastures, 242: Complex cultivation patterns

5. Spatial and temporal context of the results

The area of the tLCC in the entire HMR was 418.25 km² (1.6% of the total area). To identify if this represents a large or a small LCC in the 1990s, a spatial comparison is provided: The entire area of the city of Lübeck is about 214 km². Hence, the area of the tLCC within the observed temporal range equals about twice the size of the second most populated city within the HMR (see Figure 3). Similarly, the tLCC area in the entire HMR equals about half the spatial extent of the city of Hamburg – Germanys second largest city in terms of population and size.

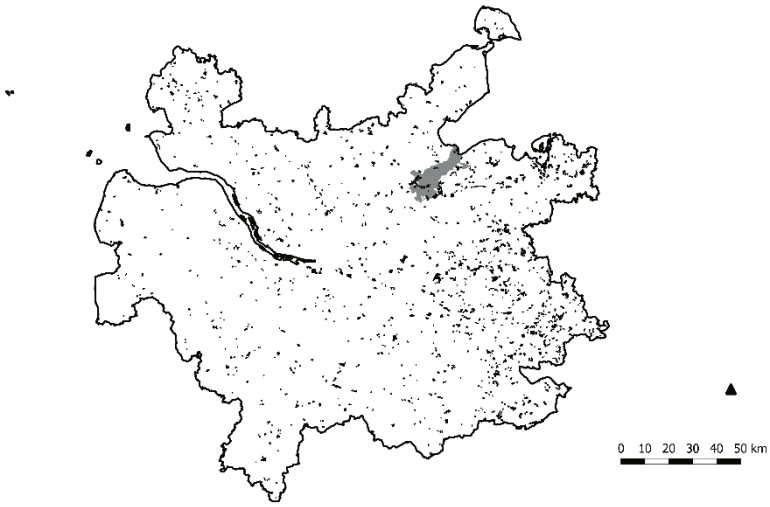

Figure 3: A spatial comparison: The area of the city of Lübeck (grey) in the context of all patches (black) that changed their land cover during the period 1990–2000 within the HMR.

Within a European perspective, the spatial share of tLCC that occurred in the HMR between 1990 and 2000 is under the total average of 2.5% of all countries participating in the CLC programme for the given period (Feranec et al. 2010). In the subregions HMR-East and the former IGB, however, the tLCC is significantly above the European average. It has also to be taken into account, that the land cover transformation within European countries has been very heterogeneous and a comparison to the average value can only be a rough guidance (see Feranec et al. 2010).

In addition to the spatial comparison, the usage of CLC data sets also allows a temporal evaluation. The derived LCC can be seen in relation to later time periods and according transformations. With respect to the HMR, we evaluated this for the period between 2000 and 2006. In this period, the tLCC was 0.6% (164.9 km²).

The period between 1990 and 2000 is longer than the following CLC period. Hence, a direct comparison is not possible as an annual expression of the tLCC would only represent an average and not a definite value. Still, the tLCC value of 1.6% in the previous period seems overproportionally large representing a time of rapid change within the HMR.

6. Discussing the data sets and the area under investigation

CLC does not cover all the LCC in a research area at a given time. Due to the minimum mapping unit of 5 ha and a minimum mapping width of 100 m only transformations surpassing this threshold are listed. Analysing CLC data sets therefore allow identifying significant landscape-shaping trends in LCC. Still, a number of changes below an individual size of 5 ha or 100 m width can have a significant impact (Gulinck et al. 2011).

Furthermore, the scale of CLC data sets (1:100,000) and according limitations due to generalisation have to be acknowledged. As such, a simplification of the features shapes can result in spatial inaccuracies.

The effects of the generalisation are also to be taken into account with the applied geo base data. The free-of-charge data set "Verwaltungsgebiete" with a scale of 1:250,000 produced by the BKG is the prime source for the segmentation of the study areas (HMR, HMR-East, HMR-West and former IGB). It is compiled through down-scaling of the paid version with a higher spatial accuracy (BKG 2013). This generalisation produces a simplified and shorter border line which results in a somewhat modified area due to the omission of details.

Moreover, the potentialities for comparing the CLC change period 1990–2000 with later periods are limited. This is true not only due to different time frames as discussed above, but also with regard to modified mapping standards. Thus, the period 2000–2006 gathers every change > 5 ha. This counts even if a respective change did not alter the size of an existing polygon, as it was the case in the earlier period (Büttner 2014).

Furthermore, an aspect influencing the shape and the size of the study areas is worth mentioning: The Amt Neuhaus, a municipality which today is part of Lower Saxony (Alte Bundesländer), belonged to the GDR before 1990. Still, it left the Bundesland Mecklenburg-West Pomerania (Neue Bundesländer) and joined Lower Saxony after the end of the GDR. In our calculations, however, this area was attributed to the MRH-West and to the IGB-West. This is done analogously to the approach of the study by Kupkovka et al. (2013). Even so, the resulting major trends are not influenced by this: Had the tLCC of Amt Neuhaus been attributed to the MRH-East, the tLCC (1990–2000) would have been 4.26% (instead of 4.07%) for MRH-East and 1.03% (instead of 1.07%) for MRH-West, respectively. Similarly, the tLCCs for the IGB-East would have amounted to 4.17% (instead of 3.79%) and to 1.94% (instead of 2.18%) for IGB-West, respectively. Assigning Amt

Neuhaus to the eastern part would have resulted in likewise small changes during the period between 2000 and 2006 (MRH-East: 0.69% instead of 0.66%; MRH-West: 0.62% instead of 0.63%; IGB-East: 0.70% instead of 0.65% and IGB-West: 0.64% instead of 0.67%).

7. Conclusions

In the time frame between 1990 and 2000, LCC occurred within the HMR that can be associated with the change of the political and economic landscape. Thus, different extents of tLCC were recorded in those regions of the HMR representing the former GDR and those belonging to the FRG during the Cold War. The HMR-East subset showed almost a four times higher value in tLCC with respect to the tLCC of the HMR-West subset. Additionally, within HMR-East, a 2.5 times higher density of changed patches has been detected as compared to the Western part of the HMR.

Furthermore, along a 15 km stretch west of the former IGB, a comparably high tLCC with a large number of changed patches could be defined. Thus, this stretch shows a tLCC with an extent twice as high compared to the entire HMR-West. The density of changed patches here was also significantly higher than in the total western area of the HMR.

Regarding the type of change, we observed similar and differing trends in East and West. In the entire HMR, in its Eastern part and in the former IGB, the transition from non-irrigated arable land to pastures is the most dominant. The reverse transition, pastures to arable land, shows the second largest extent. This results in a distinct net loss of arable land to pastures.

The HMR-West also shows a significant conversion of non-irrigated arable land to pastures. Still, this loss is only the second largest transition trend following that of non-irrigated arable land to an urban LC class ("Discontinuous urban fabric"). This is especially important since such a trend tends to be permanent as opposed to the more fluctuating changes within agriculture.

Our analyses show, that some regions within the HMR underwent LCC during the 1990s that differ in type and number, while other regions showed no LCC in the scale pictured by the CLC data sets. The impact of these regional differences in the branding process will be determined together with all partners of the Regiobranding project. The aim of this study was the derivation of supplemental information regarding this process.

It needs to be taken into consideration, that the results shown here need to be seen in relation with the used data sets. The CLC data does not show all LCC in a given area and a specific time as small changes are not taken into account. In addition, generalisations as a result of the CLC data sets' scale (1:100,000) can result in spatial inaccuracies. Along the borders of the research areas, where LCC patches of the CLC data set intersect with the applied data set representing German administrative boundaries (1:250,000), this problem can accumulate.

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Andreas Hendricks* and Karl-Heinz Thiemann*

Transition of Power Generation to Renewable Energies

New challenges for rural land management in Germany

Abstract

The political decisions of the last years demand a reduction of energy consumption by 50% and increase of the percentage of renewable energies up to 60% by 2050.

By far the greatest land requirements will be from bioenergy. In 2011, slightly more than two million hectares of agricultural land have been used for the generation of renewable energies. These land requirements have so far been fulfilled without negative consequences concerning food production.

The probable development up to 2050 will result in an increasing demand for land. The total requirements will be around 4.2 million ha.

The shrinking German population, the improvement of productivity of agricultural land and the rising number of vegetarians will increase the quantity of available land for energy production. Conversely, soil sealing permanently reduces the disposable agricultural land. In total, there will be 6 million ha for the sector energy and therefore enough area for the transition of power generation to renewable energies.

The biggest obstructions of the desired development originate from landscape aesthetics and the corresponding deficient acceptance of particular installations by the population.

1. Introduction

Germany has an area of 35,716,900 hectares (357,169 km²). At the end of 2012 4,822,500 ha were covered by settlement and traffic areas (13.5%), 10,797,000 ha were covered by forest (30.2%), 18,646,500 ha were used for agriculture (52.2%), 863,400 ha were covered by water (2.4%) and there were 587,500 ha of other areas (1.6%) (DESTATIS 2013).

Some political decisions over the last few years will have a major impact on the future land use. Firstly, the climate protection demands a significant reduction of greenhouse gas. Secondly, the Federal Government decided to stop the operation of nuclear power plants in 2022 in consequence of the nuclear disaster in Fukushima in 2011. Furthermore, Germany prefers to reduce its dependence upon other countries concerning power generation.

* Universität der Bundeswehr München, Institut für Geodäsie / Germany.

For the first time, the Kyoto Protocol from 1997 contained legally binding agreements aimed at decreasing emissions for industrial nations. Germany committed itself to reduce the emission of carbon dioxide by 80% in relation to 1990.

The German government decided in June 2011 to shut down in the short term 8 nuclear power plants and to shut down the remaining 9 power plants by 2022. For this reason, in Germany fossil fuels cannot be replaced by nuclear energy (Thiemann 2014).

Another problem is the big percentage of fuels and corresponding natural resources which has to be imported from other countries. Germany wants to change this situation due to increasing prices on the global market and the instable political situation in several petroleum exporting countries. Furthermore, the Federal Government wants to stop the production of biogenic fluid fuels instead of food in developing countries and countries in transition.

All these aims should be achieved by a reduction of energy consumption by 50% and increase of the percentage of renewable energies by up to 60% pursuant to the energy concept of the Federal Government from 2010. On the other hand, the degree of self-sufficiency in food should be maintained at 100%. Accordingly, food production and the production of biomass for power generation will have to be harmonised.

The main objective of this paper is the answer on the question of whether there is enough available area to achieve all these political aims. In the first step, an estimation of the actual and future energy consumption is needed. Afterwards, the necessary area has to be calculated for the generation of the needed energy. On the other hand, further developments have to be taken into account that will additionally influence the required land for food production. The necessary data has mainly been investigated in a literature analysis in two master's thesis (Schwien 2013; Temmler 2013). Furthermore, landscape aesthetics and further problems have to be considered that may provoke resistance against installations of power generation.

2. Actual situation of energy consumption and power generation

2.1 Sectors of energy consumption

Basically, three different sectors of energy consumption can be identified. The biggest item is heat (almost 50% of energy consumption), whilst traffic and electricity are responsible for around 25% of the total consumption (cp. Fig. 1), which was equal to 2621.5 TWh (terawatt hours) in 2011.

Heat can be sub-classified into process heat (40.1% of heat energy) and room heating/water heating (59.9%). On one hand, process heat is needed for industrial procedures (e.g. drying) and, on the other hand, it is the waste heat of procedures (e.g. thermal loss in energy plants). The part room heating/water heating can be further distinguished in private households, commerce and industry. Private households required 513.4 TWh for heating in 2011, which is equal to around 20% of the total energy consumption in that year (Temmler 2013).

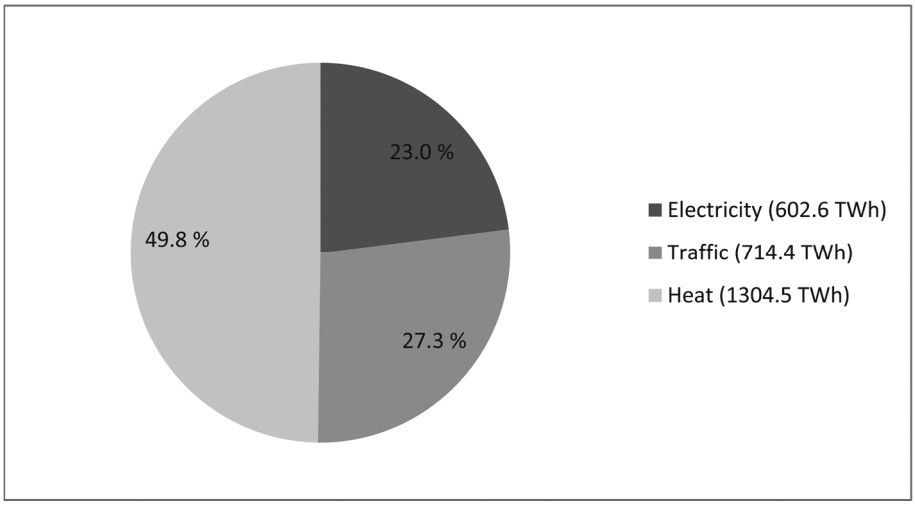

Figure 1: Sectoral distribution of energy consumption in Germany in 2011 (Source: Following Temmler 2013).

2.2 Power generation by renewable energies

11.2% of the total consumption has been generated by renewable energies. In absolute terms, the largest part of renewable energies belongs to the sector heat. Considering the relative part of renewable energies in the different sectors, the highest percentage is documented in the sector of electricity (cp. Fig. 2).

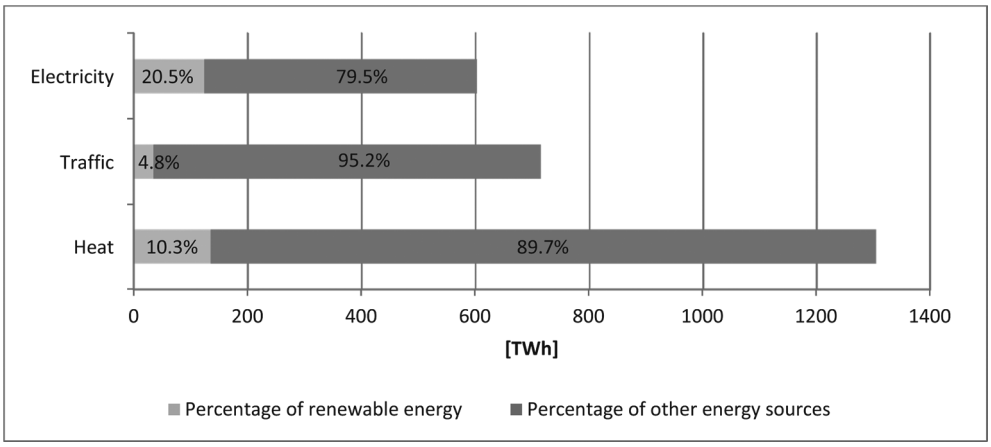

Figure 2: Percentage of renewable energies in the sectors of heat, traffic and electricity in 2011.

For a detailed analysis we have to consider different renewable energy sources. The most important source by far is bioenergy, which was responsible for 66.6% of the generated renewable energy in 2011 (cp. Fig. 3). Wind energy is in second place with 16.7%, followed by photovoltaics (6.6%), hydraulic power (6.0%), geothermal energy (2.2%) and solar thermal energy (1.9%).

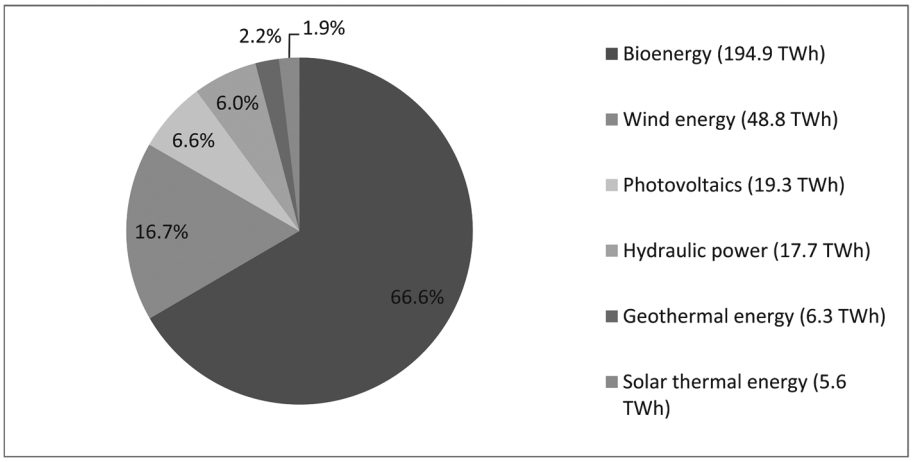

Figure 3: Percentage of different energy sources at total power generation by renewable energies (Source: Following Temmler 2013).

The most important parts of bioenergy are biogas (approx. 28 TWh), biogenic solid fuels (approx. 112 TWh) and biogenic fluid fuels (approx. 40 TWh). Biogas is especially important for the generation of electricity. In 2011, 7215 biogas plants produced electricity for 5 million households (Schwien 2013). Biogenic solid fuels (especially wood) are very important in the sector of heat and fluid fuels in the sector of traffic.

Wood

81% of the bioenergy in the sector heat has been generated by wood (100 TWh). This was equal to more than a third of the total renewable energy. Nearly 60% of this has been produced in private households.

The potential of the forest in property of public authorities or corporate bodies for energy production is widely exploited. However, around one third of the forest area (3.5 million ha) consists of small private forests with structural deficiencies (e.g. small parcels, insufficient infrastructure). Land consolidation procedures may be helpful to improve the situation and therefore to increase the wood production (Thiemann 2014).

In 2010, 135.4 million m³ of "wood" (wood trunks and by-products) have been harvested from German forests. It was the first time that the energetic use of wood was higher than the material use (Mantau 2012; cp. Fig. 4).

Biogenic fluid fuels

In 2011, biogenic fluid fuels had a market share of 5.5% in the total consumption of petrol and diesel in Germany. The percentage of biodiesel was close to two-thirds of this quantity and the share of bioethanol was more than one third (cp. Fig. 5). The most important source of biodiesel is rapeseed oil (84.7% some 2.328 million litres). Edible and animal fats (294 million litres), soy bean oil (82 million litres) and palm oil (44 million litres) are further natural resources. Bioethanol is generated by use of grain (two-thirds) and sugar beets (one third).

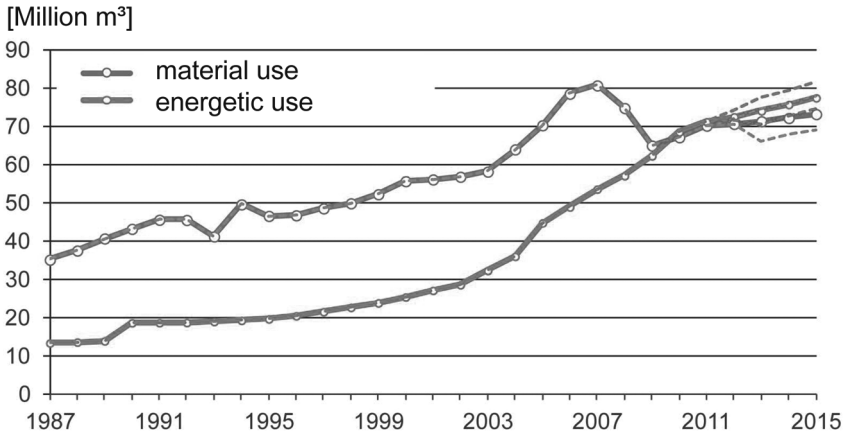

Figure 4: Development of material and energetic use of wood between 1987 and 2015 (after 2011 predicted values) (Source: Following Mantau 2012).

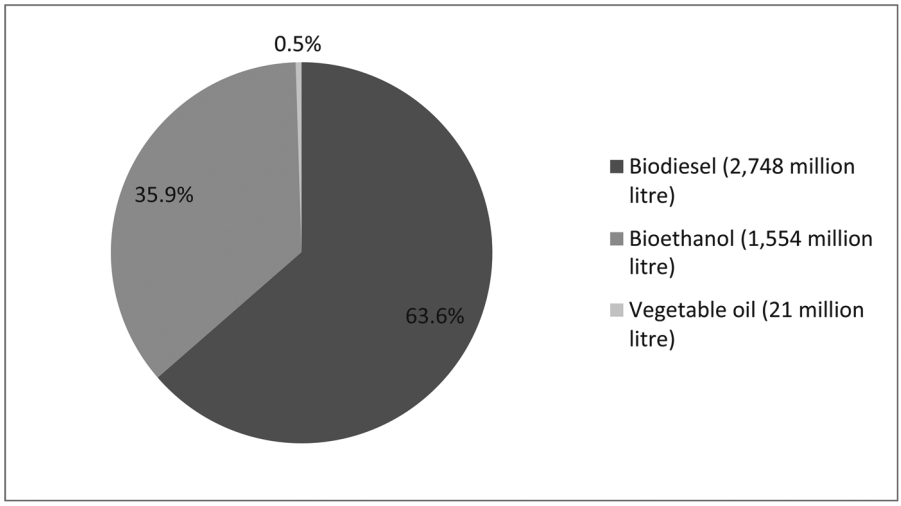

Figure 5: Market shares of biogenic fluid fuels (Source: Following Temmler 2013).

3. Actual land requirements

Most sectors of renewable energies require only a small amount of land. Photovoltaic and solar systems are oftentimes installed on roofs. The generation of geothermal energy only requires temporary space for the installation of the technical equipment. Wind turbines need only little land for their position and access roads. The generation of hydraulic power needs only space for some water reservoirs. In consequence, the undoubtedly biggest land requirements result from bioenergy.

The cultivation of renewable resources was more than tripled between 1999 and 2012 (cp. Fig. 6).

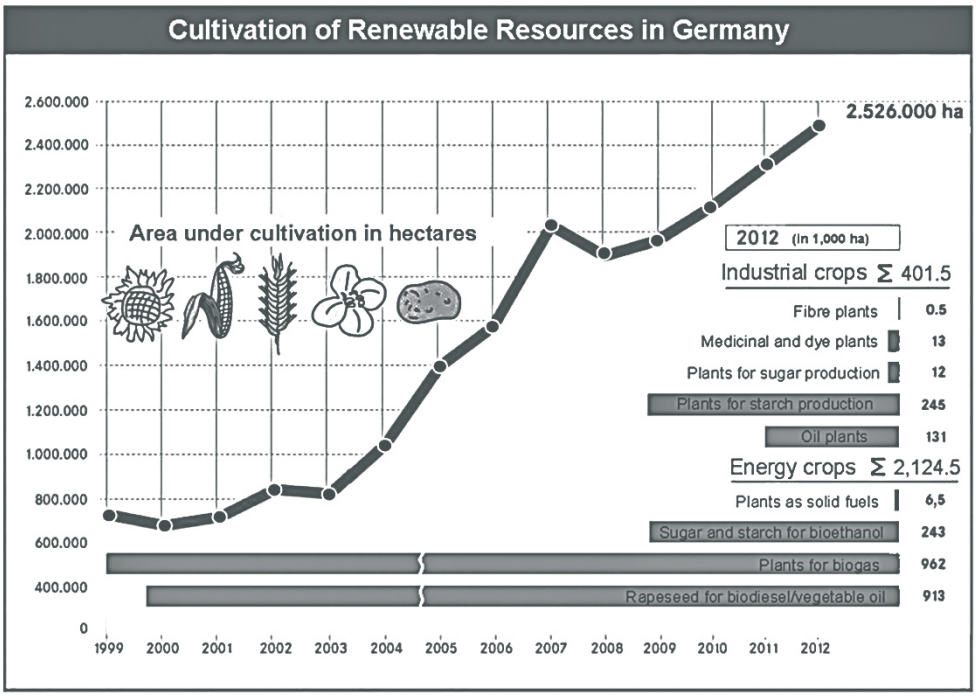

Figure 6: Cultivation of renewable resources in Germany (statistical data from 1999 to 2011 and estimated values for 2012) (Source: Following FNR 2012).

In 2011, around 28 TWh were produced by use of biogas. The sources of this quantity of gas were mostly plants (49%) or excrement (43%). Maize was the most cultivated plant for this kind of exploitation (79% of all cultivated plants). One hectare of land produces around 6,000 m³ of biogas. One m³ of biogas is on average equivalent to 2.55 kWh of electrical or thermal energy (depending on the degree of efficiency). Accordingly, around 900,000 ha were needed to produce 28 x 0.49 = 13.72 TWh.

Similar calculations for rape, soy beans and palms result in a required area of 1,560,000 hectares. But statistically only 910,000 hectares have been used for the cultivation of crops for biodiesel and vegetable oil. The reason for this difference is the import of biogenic fluid fuels or corresponding natural resources. Therefore, the area of the imported fuel is equivalent to around 650,000 hectares.

Bioethanol is generated by use of grain (two-thirds) and sugar beets (one third). The output of sugar beets (6,250 l/ha) is much higher than the output of grain (wheat: 2,760 l/ha). Accordingly, the corresponding required area is around 460,000 hectares. In contrast, only 240,000 hectares have been used for the cultivation of crops for bioethanol. In consequence, the imported bioethanol is equivalent to 220,000 hectares (Temmler 2013).

Biogenic solid fuels have been mainly produced in forests. Agroforestry was only practised on a small scale. The total land requirements in 2011 were close to 3 million hectares

(including the "imported area" and roof areas, cp. Tab. 1). In Germany, 2.068 million hectares of agricultural land have been used for the generation of renewable energies.

In 1993, the Federal Government directed the set-aside of 15% of the agricultural land (around 2.5 million hectares) to prevent the overproduction of agricultural products. This set-aside was reduced step by step until 2009 due to the increasing land requirements of industrial and energy crops. For this reason, the land requirements could be fulfilled so far without negative consequences concerning the food production (Thiemann 2014).

Table 1: Land requirements for renewable resources in 2011 in Germany (Source: Following Temmler 2013)

Energy source			Land requirements [ha]	
Bioenergy				**2,938,737**
	Production in Germany		*2,056,000*	
	Thereof:	Biogas	*900,000*	
		Biodiesel and vegetable oil	*910,000*	
		Bioethanol	*240,000*	
		Agroforestry	*6,000*	
	"Imports"		*882,737*	
Wind energy				**9,066**
	Foundation, assembly areas, access roads		*9,066*	
Photovoltaics				**14,877**
	Systems on roofs		*12,377*	
	Systems on open areas		*2,500*	
Solar thermal energy				***1,650***
	Systems on roofs		*1,650*	

4. Land requirements in 2050

4.1 Scenario 2050

The actual strategy in Germany to manage the transition of power generation to renewable energies is mainly influenced by "Szenarium 2011 A" (Nitsch et al. 2012). This scenario was published in 2012 and provides an overview of the probable power generation in 2050.

The improvement of the thermal insulation of existing buildings and the strict legal norms concerning the energy standard of new buildings are the most important measures for the reduction of energy consumption. More than 600 TWh can be saved (cp. Tab. 2), especially in the sector room heating (cp. Chapter 2.1). Furthermore, the share of solar thermal and geothermal energy will increase significantly and for this reason renewable energies will surpass 50% in the sector of heat. Another important point is the growing use of wood, because the potential of forest for energy production is widely exploited (cp. Chapter 2.2). In consequence, agroforestry will become more important.

Table 2: Energy sources in the sector heat in 2011 and 2050
(Source: Following Thiemann 2014)

Energy source	2011	Percentage	2050	Percentage
Fossil fuel	1,169 TWh	90%	339 TWh	48%
Renewable energies, thereof	135 TWh	10%	360 TWh	52%
- solid fuel (wood)	100 TWh	8%	**136 TWh**	19%
- biogas	15 TWh	1%	33 TWh	5%
- biowaste (incineration)	8 TWh	< 1 %	6 TWh	1%
- solar thermal energy	6 TWh	< 1 %	**95 TWh**	14%
- geothermal energy	6 TWh	< 1 %	**90 TWh**	13%
Total	1,304 TWh		**699 TWh**	

Traffic volumes will rise slightly in the next 40 years. For this reason, a decrease of energy consumption in this sector is only possible if the efficiency of drive technology could be improved. The Federal Government set itself the objective to increase to 50% of total road traffic by electric vehicles in 2050 (cp. Tab. 3). Accordingly, the consumption of fluid fuels will decrease significantly. On the other hand, the power needed for the electric vehicles is not included in Tab. 3. "Biomass to liquid" (Btl) and hydrogen ("power to gas", ptg) are important new sources of biogenic fluid fuels. The advantage of Btl is the possibility to use the whole plant or vegetable waste as energy source. Hydrogen is used to store surplus wind or solar energy and to utilise the gas in fuel cell electric vehicles. Both technologies are actually not marketable at present but should be improved rapidly.

Table 3: Energy sources in the sector traffic in 2011 and 2050
(Source: Following Thiemann 2014)

Energy source	2011	Percentage	2050	Percentage
Fossil fuel	680 TWh	95%	212 TWh	59%
Biogenic fluid fuels, thereof	34 TWh	5%	150 TWh	41%
- biodiesel	25 TWh	4%	34 TWh	9%
- bioethanol	9 TWh	1%	16 TWh	4%
- biomass to liquid			**33 TWh**	9%
- hydrogen (power to gas)			**67 TWh**	19%
Total (without electricity for electric vehicles)	714 TWh		362 TWh	
Electric vehicles	6,600		**50 % of total road traffic**	

The advanced efficiency of modern electric devices and illuminants will decrease the energy consumption in the sector of electricity. Conversely, the demand of mobility will nearly exhaust this savings. Finally, the energy consumption in this sector in 2050 will be more or less the same as in 2011 (cp. Tab. 4). The biggest rising of energy generation will be realised in the subsectors wind energy, photovoltaics and geothermal energy. The increasing wood consumption is important for the development of agroforestry.

Table 4: Energy sources in the sector electricity in 2011 and 2050
(Source: Following Thiemann 2014)

Energy source		2011	Percentage	2050	Percentage
Fossil fuel (and nuclear energy)		489 TWh	80%	150 TWh	26%
Renewable energies, thereof		124 TWh	20%	434 TWh	74%
- wind energy	→ onshore	48 TWh	8%	**135 TWh**	23%
	→ offshore	< 1 TWh	0%	**131 TWh**	23%
- photovoltaics		19 TWh	3%	**65 TWh**	11%
- biomass	→ biogas	21 TWh	3%	28 TWh	5%
	→ wood	12 TWh	2%	**25 TWh**	4%
	→ biowaste	5 TWh	1%	6 TWh	1%
- hydraulic power		18 TWh	3%	25 TWh	4%
- geothermal energy		< 1 TWh	0%	**19 TWh**	3%
Total (including mobility)		613 TWh		584 TWh	

4.2 Land requirements

With respect to the scenario of 2012, the energy consumption will drop to 1645 TWh in 2050. This is equal to 62.5% of the quantity in 2011. The percentage of renewable energies will be equal to 944/1645 = 57.4%. In the whole, the political aims (cp. Chapter 1) will not be aimed totally. However, it has to be discussed, if the presented modifications can be realized.

In the first place, the increase of power generation by renewable energies (+651 TWh) will be realized by wind energy (+217 TWh), solar thermal energy and photovoltaics (+135 TWh) and geothermal energy (+102 TWh). These kinds of power generation require only small areas (cp. Tab. 5).

Table 5: Land requirements for renewable resources in 2050 in Germany
(Source: Following Temmler 2013)

Energy source		Land requirements [ha]	
Bioenergy			**4,200,000**
	Production in Germany	*4,200,000*	
	Thereof: Biogas	*1,000,000*	
	Biogenic fluid fuels	*2,300,000*	
	Agroforestry	*900,000*	
	"Imports"	*0*	
Wind energy (onshore)			**40,000**
	Foundation, assembly areas, access roads	*40,000*	
Photovoltaics			**37,310**
	Systems on roofs	*22,310*	
	Systems on open areas	*15,000*	
Solar thermal energy			***29,500***
	Systems on roofs	*29,500*	

The potential of hydraulic power is more or less exhausted.

Bioenergy will be still the by far biggest factor concerning the demand for land. On the one hand, the higher demand for bioenergy, the rising use of wood and the stop of import of biogenic fluid fuels or corresponding natural resources will increase the land requirements in this subsector. On the other hand, the technical improvement will decrease the required quantity of natural resources per TWh. In total, around 4.2 million ha will be required.

In 2011, the agricultural area was equal to 18.7 million ha (DESTATIS 2013). The productive area was around 16.8 million ha. The differences are moor (0.92 million ha), heath (0.65 million ha) and others (e.g. gardens, farmsteads). 2.06 million ha of the productive area have been used for the cultivation of energy crops and 0.31 million ha for industrial crops. Accordingly, 14.4 million ha have been covered by food and forage crops.

The German population is shrinking. The number of inhabitants will decline from 81.8 million in 2011 to 72.3 million in 2050 pursuant to Scenario 2011 A. In consequence, there will be a reduction of demand for food of 11.6%. The corresponding area is equal to 14.4 million ha∗11.6% = 1.67 million ha and can be used for cultivation of energy crops.

Secondly, the improvement of productivity of agricultural land will reduce the required area for food production. A presumed rate of increase of 10% to 2050 results in savings of 1.44 million ha.

Thirdly, the number of vegetarians is rising. The food production for vegetarians requires a lower quantity of land due to the low productivity of cattle breeding. The demand for forage crops will decrease significantly while the demand for food crops will increase slightly. The share of forage crops is actually about 70% of the productive agricultural land (10 million ha (AEE 2009). A reduction of meat consumption of 10% to 2050 would result in savings of 0.9 million ha (taking into account the higher demand for food crops).

On the other hand, the soil sealing reduces permanently the available agricultural land. Between 2009 and 2012, 74 ha have been sealed daily by settlement and traffic areas. The strategic aim of the Federal government is a reduction to 30 ha until 2020 (around 11,000 ha per year). The resulting reduction of available agricultural land is close to 0.5 million ha.

Finally, there are 2.37 million ha of existing land for cultivation of energy and industrial crops and a potential of 1.67 + 1.44 + 0.9 – 0.5 = 3.51 million ha. In consequence, the available land of nearly 6 million ha meets the land requirements of 4.2 million ha for the transition of power generation to renewable energies.

5. Landscape aesthetics and further problems

Whether the vast majority of Germans generally supports the transition of power generation to renewable energies, most of them refuse the necessary installations close to their homes (Hook 2012).

Wind turbines are often perceived as ugly, said in German terms “Verspargelung der Landschaft”. Furthermore, the fast alternation of light and shadow may result in mentally and

health problems (often described as the "disco effect"). Other problems are the noise and ice throw in winter (Nohl 2009). In addition, photovoltaic and solar thermal systems are frequently perceived as disfigurement of the village or landscape, said in German terms "Verspiegelung der Landschaft".

For these reasons, the quadrupling of these kinds of technical installations will be difficult.

The great need of bioenergy plants is another aesthetic problem and, in addition, the high demand for maize and rapeseed results in extensive monocultures. In the case of power generation by biogas, the odour nuisance is a further disturbing factor.

Another important point is the energy transport (Hendricks 2012), especially the production of wind energy, which is very attached to a certain location. For this reason, long distances exist between the locations of energy generation (Northern Germany) and the locations of the main energy consumers (Southern Germany). Different solutions of this problem are discussed. Overhead line systems often provoke resistance of the population due to their appearance and emissions ("electric smog").

Finally, there is the conflict between national nature conservation bodies who are generally supportive of the concept of renewable energies, whilst local organisations try to prohibit certain installations (e.g. wind turbines because of bird protection or water reservoirs because of nature protection).

In consequence, civic participation becomes increasingly important in the planning process, which the responsible authorities use to promote the acceptance of major projects (e.g. big wind energy plants or photo voltaic plants). Furthermore, this participation includes the consideration of public opinion concerning the location of the plant by utilising different financial models either to spread the earnings across a bigger group of land owners or to allocate a part of the profit to the municipality. An empirical study in the federal states of Hesse, Rhineland-Palatinate and Saarland showed clearly the promotion of acceptance, when all citizen or the municipality has a financial advantage (Hook 2012).

6. Conclusions

There will be enough available land to realize the transition of power generation to renewable energies. The biggest problem is the deficient public acceptance of particular installations.

Generally, individuals and organisations support the development of renewable energies, but the planning of concrete measures often causes massive resistance, because many installations are perceived as ugly. Furthermore, the people are afraid of noise, odour nuisance and other problems.

For this reason, the most important assignment of the Federal Government in the future will be convincing the population. If the people do not accept personal limitations for the benefit of the general public, there will be massive obstruction to the development of renewable energies. This is a problem especially because the advantage of "clean energy" has no

concrete advantage for the affected individuals. The delay of the extension of the high voltage power grid in Germany demonstrates clearly, that there is a lot of work to do.

However, changes are always discussed and the aesthetic perception may change by and by. Nowadays, old windmills are perceived as beautiful. Future generations may have the same impression of wind turbines.

The concerns of the population have to be taken into account in the planning process. The distance between technical equipment and settlement area should be far enough to avoid disturbing emissions.

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Janos Katona*, Andrea Pődör* and Judit Nyiri*

Computer-aided Land Consolidation in Hungary

Abstract

Land consolidation is still needed in Hungary 25 years after the change of the political system. The land structure has been fragmented; in many cases people who use the land do not own it. The undivided joint ownership also makes problems for example: owners of the same land can hardly agree. The absence of legal, economical and technical conditions makes the fulfilment of land consolidation difficult. On the other hand, it would be crucial to have an informatical application that could be widely used. While consolidating land (reallocation of parcels and their owners), land quality and other essential influential aspects should be taken into account. Geoinformatics is the most efficient solution. DigiTerra, which is a Hungarian development, contains a Land Consolidation module. It deals with the tasks on the basis of cluster analysis. The improved version of the software would be suited to support a complex land consolidation.

1. The Hungarian land structure

In the 1990s, the great challenge for the integrated land registry and cadastre was the coordination of the land privatisation impacting on more than 50% of the total area of the country, creating approximately 2.5 million new properties and through a process involving compensation and land privatisation affecting some 20% of the population. Only a small number of the new owners were actually able and willing to rely on agriculture as their main occupation. In 1991 the agricultural census registered 1.4 million farmers with an average plot size of around 0.5 hectares. The breakdown according to capital in agriculture has been totally changed as well. In 2000 the agricultural census registered 960 000 farmers while the average plot size had increased to 2.75 hectares.

As a result of the land privatisation, the previous farming-on-large-scale was replaced by the farming based on private ownership, characterised nowadays by inadequate property field size for sustainable and competitive family farming. Plot ownership patterns differ significantly from land use structure of the viable agricultural plots. The introduction of a well-established land consolidation procedure supported by National Land Fund integrating the rural development approach of some EU Member States can significantly contribute to a better quality of life in rural areas. (Pődör and Nyiri 2010)

1.1 The main land reform approaches

Due to the favourable conditions in agriculture, land ownership and farming structure have always been important and politically charged issues in Hungary. This is illustrated by a history of three land reforms in the past half-century. As a result of the first land reform of

* Óbuda University Alba Regia Technical Faculty, Institute of Geoinformatics, Székesfehérvár / Hungary.

1945–1948, agrarian structure became characterised by dual structure of many small-scale farms. A second large scale land reform – was completed by 1962, with 90% of the total arable land being covered by large scale farms. The third land reform started in the nineties in parallel with the political changes. These land reforms created huge problems for a rural population dependent on agriculture and it is generally agreed that agriculture and land ownership have failed to develop functionally in the past decades. (Maliené et al. 2015)

1.2 The importance and necessity of land management

In Western Europe the land consolidation process is a basic tool for more efficient agriculture but it also has a social aspect since the process must consider nature conservation and rural development aspects as well. The small size of parcels in Hungary obstructs the effective regional rural development policy and the effective programs and projects for viable rural life. Land consolidation is an opportunity for promoting sustainable rural development. The problem of land consolidation in Hungary is that the legal and institutional background is connected to various fields of interest and institutions. (Pődör and Mizsei 2014).

1.3 The new land market regulation in Hungary

The general legal framework governing the land market is set out in the Act on Arable Land, the Act on Real Estate Registration (Act CXLI of 1997), and the Civil Code of Hungary (Act V. of 2013). From 1 May arable land is regulated by the Act on Trade of Agricultural and Forestry Lands (Act CXXII of 2013). According to the regulations, only private Hungarian individuals and legal entities may acquire the ownership of real estate freely. However, a few restrictions and prohibitions exist.

The new law Act on Arable Land (CXXII of 2013) allows citizens of EU member states to purchase agricultural land in Hungary. According to the ruling, Hungarian and EU citizens can buy land in Hungary, but if the area exceeds one hectare, buyers have to prove that they are genuine farmers. This can be identified by a diploma in forestry or agriculture, or at least three years experience of an agrarian activity in Hungary prior to purchase. Only natural persons are allowed to purchase agricultural land, but some exceptions still exist. Farmers, or close relatives of farmers, are able to acquire up to 300 hectares. Farmers can also lease up to 1,200 hectares of land for farming purposes. If a tenant farmer also owns land, then the amount of land available for lease is reduced by the amount of land that he owns. (Maliené et al. 2015)

1.4 Antecedents

In 1993 a computer-aided land consolidation project called “TAMA” was introduced. This project was carried out in a Hungarian-German co-operation between the Federal Ministry for Agriculture, Bonn (BML) and the Ministry of Agriculture and Regional Development, Hungary (MoARD) using financial and technical assistance provided by the Federal Republic of Germany (Kovács 2001). The pilot project involved 16 settlements in 4 counties.

Another land consolidation project was TALC (Technical Assistance for Land Consolidation in Hungary). The resullts of the project were firstly the develop proposal/scenarios for an institutional model and a land consolidation process model, secondly to strengthening of the institutions involved, thirdly to start preparing their role and tasks, and finally to develop a training curriculum.

The projects yielded only partial results since it was not possible to totally adapt the foreign models. The reasons for this were the lack of financial resources, the insufficient technical and organisational conditions which are insufficient to meet bulk demand, but above all, due to the missing relevant legal background of land consolidation. However the major problem was that land consolidation had not become an organic part of the agricultural policy and because the land users had never experienced the benefits, we have failed to awaken a demand for the process. But the pilot programmes justified that land consolidation procedure can be performed and could be linked with rural development also in Hungary (Mizsei and Kottyán 2005).

2. Possible informatical solution of land consolidation

In the course of land consolidation, the many sources should be integrated and supported by procedures of geoinformatics. The use of geoinformatics contributes to the appearance of synergy that provides new opportunities. Its introduction enjoys advantages in terms of fast and divided data access, the reduction of redundant activities, and – with the help of appropriate maintenance – reliable and up-to-date information. Geoinformatics supports land consolidation on different informational levels. On the level of management it helps the ministries with special information. On the level of decision it provides answers for questions such as how it is possible to guarantee the advocacy of farmers; how it is possible to introduce the advantages of land consolidation; or how it is possible to get the municipalities, farmers and authorities interested. On the level of operation it contributes to the technological planning and the formation of land structure (Markus 2010).

GIS can be applied in almost all parts of the processes of land structure strategy:

- In the phase of preparation the impoundment of the area can be carried out in the data base of cadastral registry. This procedure can immediately be visualised in maps. The owners of the areas, the land users and their demands can be handled in the attribute table of the data base.
- On the previous land consolidation plan the tracks of linear constructions (roads, water furrows) can be marked that can localize the further divided blocks. On the basis of demands different land consolidation variants can be made.
- In the course of land consolidation the occurrent calculational demands such as the weighting of factors that modify the value or the release of contradictions can also be treated.
- Publicity can contribute to the success of land consolidation. It is supported by visualisation and publication of plan variants.

- The results can be easily converted from the database into cadastral registry. The web and visual applications make the acceptance simpler.

Such a GIS can contribute to the choice of the most appropriate land consolidation plan.

2.1 DigiTerra software

There is a Hungarian geoinformatical development called DigiTerra, which provides informatical supports for forestry and agriculture. One of the elements of the software is DigiTerra MAP that can help land consolidation.

The functioning of the above software is based on Cluster analysis. Although the original land structure remains, the software reallocates the ownership rights so that the parcels belong to another farmer.

The very first step of the method is to define the centre of gravity of the area belonging to the owner. Then all parcels get numerical values relevantly for all owners. These values are based on 3 parameters (Czimber 2013): the

- previous owner,
- nearest centre of gravity of distance,
- rate of the distance of the nearest and the furthest centre of gravity.

The owner receiving the highest value will be allocated the parcel.

As every coin has two sides, DigiTerra has both advantages and disadvantages. As for advantages, DigiTerra is based on voluntary land exchanges. What is more, it makes the reallocation on the basis of objective viewpoints. As for disadvantages, on the one hand, DigiTerra does not reduce the number of parcels. On the other hand, it works well primarily with numerous and small sized parcels. Besides, it ignores important factors that can modify the value of the property.

2.2 Ways of development – to get a better land structure

There are three main ways of development: to take into account the factors affecting the valuation of property; to give the premises; and to divide areas into units. Factors such as size, shape, distance or soil quality should be taken into account. Furthermore, the owner's site should also be added. In addition, the formation and unification of same size areas would contribute to the change of land structure, as well.

Land consolidation should be based on such an evaluation system that can both guarantee the value of the property and safeguard the interests of the owners. In the course of property real estate not only soil quality but also other crucial factors are taken into account. For instance: shape, area, size; geographical location; accessablity, road conditions; relief and slope condition; water management, melioration, irrigation conditions, things that can block cultivation, demografical conditions, farming culture, inclination for frostbite/ hail damage/wild animal damage; fencing; aesthetic impression; environmental status and pollution; economic situation; infrastructure and utilities; natural protection; culture status.

To determine the collateral value of land, correction needs to be taken into consideration according to Decree No. 54/1997 (VIII.1.) FM.

Table 1: Corrective factors

Corrective factors	Interval (on the basis of the law)		The basis of valuation
	lower	upper	
Shape, area, size	-20	20	Area, perimeter
Location	-20	20	Distance from the area within city limits
Reach and road condition	-20	20	Categories of connected roads
Relief and gradient conditions	-20	0	Categories of slopes
Melioration and drainage	-20	0	Likelihood of flood and inland water
Conditions of irrigation	0	20	Distance from the irrigational channel
Environmental protection	-15	0	On the basis of land use limitation

Although it is essential to use the main factors in the course of development, too many aspects can also cause problems when convincing the partners. Table 1 contains a reduced list with correction interval.

The fuzzy functions can be made on the basis of the intervals of corrective factors. Since, the functions can have only values 0-1, the neutral value should be 0.5 in any cases. The sigmoid function has been selected for fitting to the accurate series. This kind of function is useful because it is possible to give both the neutral value and the value of the slope of the sinus curve.

$$mSig(x, a, c) = \frac{1}{1 + \exp(-\frac{5}{a} * (x - c))}$$

where:
a = the growth of slope
c = neutral value 0,5

Since the value of the property is influenced by how it can be cultivated, it is important to determine the extent of correction in an objective way. Among plane figures the ratio of the area and the circumference gives the biggest number. This value is influenced by the squared variable derived from two dimensions. Therefore the square root can be eliminated and we can get a value that is appropriate for comparison. The value of the property is affected by the growth of a continuous area that is why the above-mentioned value needs to be corrected. The area size needs to be raised to the power of 0.1 to make the shape and the area size almost equal.

$$Shape\ factor = \frac{\sqrt{area}}{perimeter} * area^{0,1}$$

The distance from the area within city limits denotes that the lower the distance from the clear is the more valuable the parcel is. As for the distance from the road, if the farmer can approach his parcel under all weather conditions, the value of the parcel will be higher.

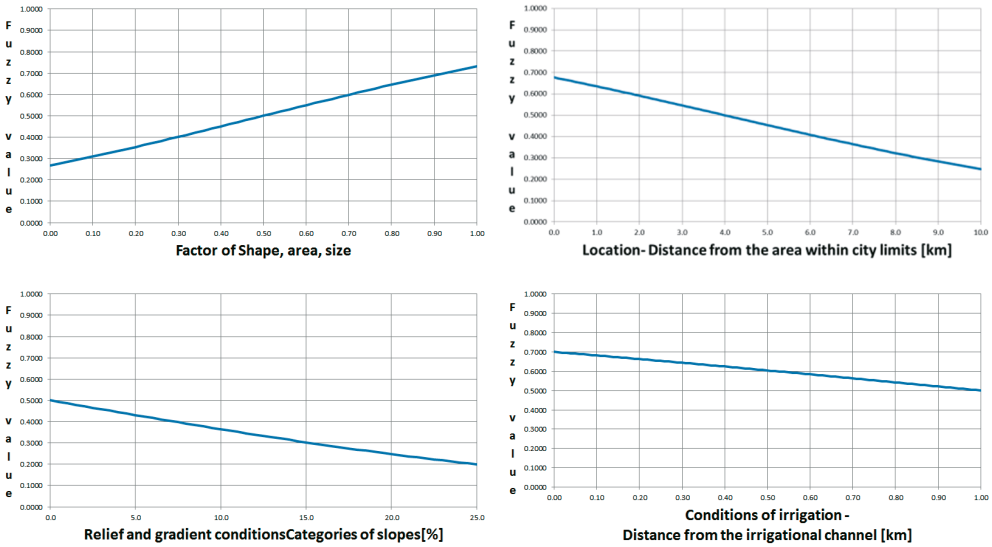

Figure 1: Fuzzy functions (Source: own calculations).

Fig.1 shows the functions of different factors affecting the property. The functions of some factors seem to be linear but to the extreme converging – not seen – sinus curve parts are significant, too, because multiplying by a number greater than 1 or smaller than 0 can be problematical in the course of summation of corrective factors.

3. Analyse of the sample area

The method introduced in the present paper has been tested in the area of Mesterszállás settlement. This village can be found on the Great Hungarian Plain. It is a plain area between the Rivers Tisza and Körös. It is 42,92 km^2, its population is 755. The village is the sample area of the Institute of Geodesy, Cartography and Remote Sensing. The Institute has provided the land registry data of the village. The land registry contained 1578 parcels, out of which 566 cultivated parcels have been selected for the analysis. The average size of the parcels is 5.8 hectares, the quality classes are among 2–7. (In Hungary there are eight quality classes, among which one refers to the best quality class.)

The data in Table 2 show how the different factors have influenced the valuation of the parcels. There are significant differences among the corrective factors; however, they are not surprising in view of the sample area. The smallest extent corrective factor can be found in case of relief. The reason for this is that the difference between the highest and the lowest

point of the village is not more than 10 metres; therefore there are no measurable differences in slope. The largest correction can be observed in case of "Shape, area and size". This conclusion is in accord with the result coming from a representative survey among land owners. According to this survey, the above mentioned factor influences the unit value eminently after the Golden Crown value. After the summation of the corrections, the discrepancy between the smallest and the biggest correction is 117%. The smallest correction (0.45) was given to a parcel (topographical number 0188/7) which has worse shape and size factors than the average: it is the farthest from the inland, it can be approached on dirt road, the likelihood of flood damage is high, it has average irrigational conditions and it does not stand under environmental protection. The highest corrective factor (1.62) was given to a parcel (topographical number 0312/4) which has better shape and size factors than the average: it is near the inland; it can be approached on pitched road, the likelihood of flood damage is high, it has average irrigational conditions and it does not stand under environmental protection.

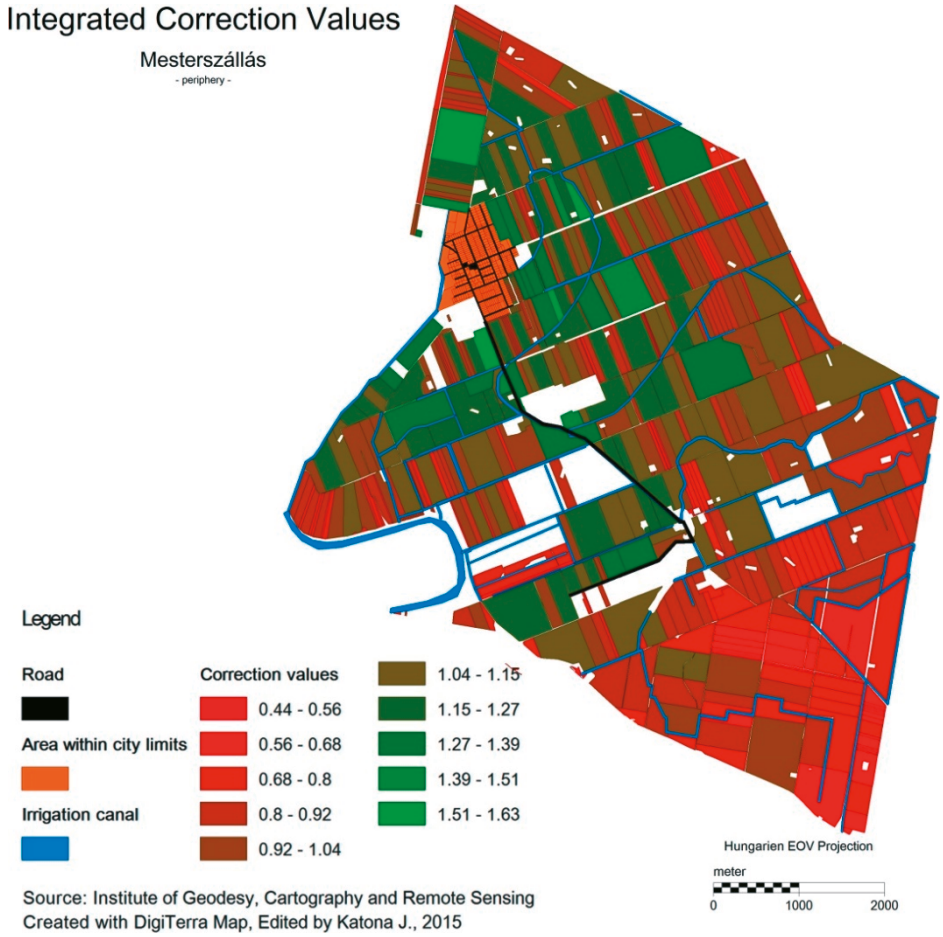

Figure 2: Integrated Correction values on the sample area (Source: own calculations).

Table 2: Statistics of factors aftering valuation of property

Corrective factors	Min	Max	Average	Range	Scatter
Shape, area, size	0.32	0.70	0.50	0.38	0.0770
Location	0.32	0.68	0.56	0.36	0.0832
Reach and road condition	0.50	0.60	0.51	0.10	0.0287
Relief and gradient conditions	0.50	0.50	0.50	0.00	0.0000
Melioration and drainage	0.30	0.40	0.30	0.10	0.0094
Conditions of irrigation	0.56	0.70	0.68	0.14	0.0309
Environmental protection	0.45	0.50	0.50	0.05	0.0051
Sum	0.45	1.62	0.94	1.17	0.2070

Fig. 3 shows the value of integrated corrections – the values are shaped after normal distribution.

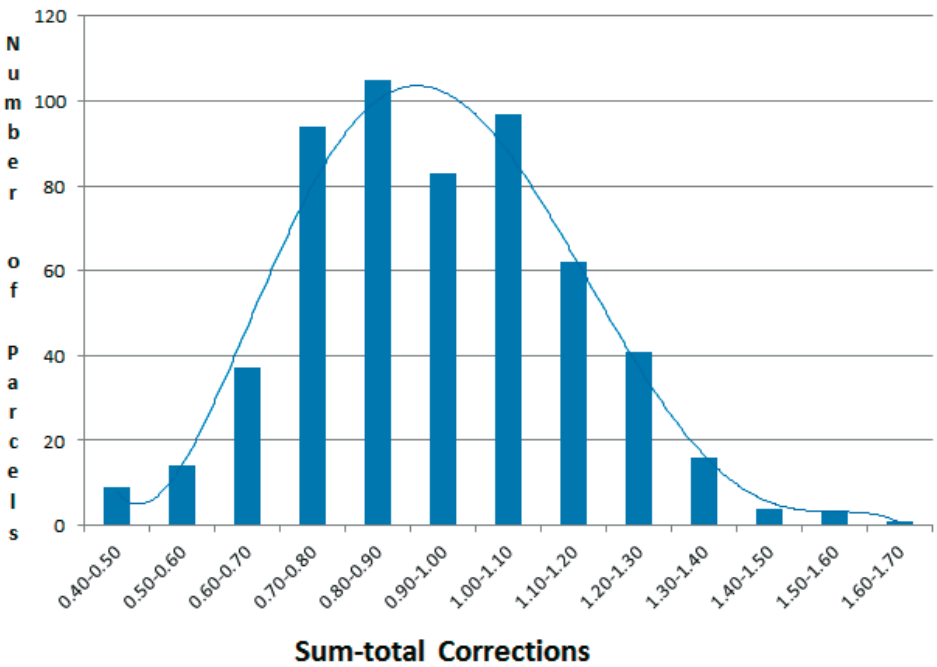

Figure 3: Integrated Correction values on the sample area (Source: own calculations).

The analysis principally leans on cadastre mapping substance. Two corrective factors (shape, area, size, location, geographical position) have been elicited from this data resource. What is more, this substance has provided the mapping basis of other corrections. Free available

digital resources (such as Interior Ministry General Directorate of Water Management – Floodmap, Rural Development Ministry – Nature Conservation Information System) have also contributed to the determination of other factors.

4. Summary

Irrespectively of land policy, land consolidation can be explained in many ways. In Hungary land concentration would contribute to competitive farming to a great extent. To accomplish it, several conditions should be fulfilled such as a pliantly applicable informatical solution. Geoinformatics can support the planning in the course of land consolidation and it can contribute to its success, as well. The method should be formed in a way that it would serve farmers' interests. It is provided by the appropriate property evaluation and the opportunity for adding the site. The application itself cannot solve land consolidation but it can contribute to its realization.

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Tomasz Salata* and Barbara Prus*

Geodata Modelling Applied to the Planning and Land Use of Rural Areas in Conjunction with the Polish Spatial Information Infrastructure

A study based on good practices

Abstract

Problematic aspects presented in the paper are connected with practical application of legal regulations resulting from implementation of the Act of infrastructure for spatial information (in Polish short: IIP) for the task of spatial data modelling for planning and spatial development purposes. The Act of infrastructure for spatial information was a consequence of the INSPIRE Directive implemented in 2007 by the European Parliament. Presented examples concern elaborating models of spatial data used on the level of communes (the smallest units of territorial self-government). These examples relate to modelling data which serve to improve life quality and they are also connected with elaborating obligatory planning studies.

1. Introduction

Implementing in 2007 the Directive of the European Parliament and Council, so-called INSPIRE (Directive 2007), that creates infrastructure for spatial information in the European Union influenced setting up national infrastructures for spatial information (Rannstig 2009; Rodriguez et al. 2009; Dukaczewski et al. 2012; Król et al. 2016). Enacted in Poland on 4 March 2010, the Act of infrastructure for spatial information (Act 2010) determined rules of creating and using metadata resources and also qualifications of authorities responsible for leading it. The rules of creating and using infrastructure for spatial information concern spatial data and also so-called metadata of infrastructure for spatial information as well as spatial data services, their interoperability, possibility of shared data usage, cooperation and tasks coordination in the area of infrastructure for spatial information. Infrastructure for spatial information is an idea which involves combination of political, institutional and economical technologies, means and projects which enable access to spatial data and make their usage easier. Kubik and Iwaniak (2007) regard infrastructure for spatial information as building spatial data national resource. It is also important that spatial data should be simple in usage and accessible through the Internet or appropriate public means of communication (Dygaszewicz 2006). In Polish administration (geodetic service responsible for IIP), managing the spatial data system is held hierarchically. Both spatial data and reports are transferred to the centres of higher ranks. Polish geodetic and cartographic services are

* University of Agriculture in Krakow, Dep. of Spatial Planning and Landscape Architecture, Krakow / Poland.

composed of three levels: central, provincial and district. There are data collections for the area of the whole country including orthophotomaps, general geographical database, the national borders register and the index of geographical names conducted at the central level. The provincial one includes databases of topographic objects scaled 1:10 000 (BDOT10k), whereas the district level covers BDOT500 database (scaled 1:500) as well as lands and buildings register (Król et al. 2016).

In case of appearing numerous spatial data resources in the Internet, mechanisms which allow to search scattered sources and gain short information about data – called metadata – are put into practise. Elaborating IIP metadata, the attention should be paid to the fact that it is the information which describes spatial data sets and services and enables finding, cataloguing and the way of usage of these data and services. Spatial data relate directly or indirectly to a determined location or geographical area. On the other hand, a spatial object is an abstract representation of a thing, physical phenomenon or event connected with a determined place or geographical area.

2. Metadata used in Spatial Information Infrastructure

The European directive INSPIRE had an impact on creating the Act of infrastructure for spatial information in Poland. Spatial Data Infrastructure (SDI) means described by metadata sets of spatial data and corresponding services, technical means, processes and procedures used and made available by IIP co-creating leading organs, administration organs and third-party. First of all, IIP requires from geodata users standardization of data, processes and formats. Secondly, it needs multiple use of the same data and also modular building of informational systems. Formats verification, using uniform standards and, generally speaking, unification of spatial data different components enables global data searching, creating dictionaries and data models repetitiveness (Xu and Lee 2002). Multiple usage of the same data sets causes strong decrease of systems' working costs, provides better control by multivariate analysis of shared data and increasing their quality in the range of completeness, restricting over-dimensionality and accuracy. The modular building of informative systems enables to decrease costs of creating systems through using the same modules in various "places" of computer system and, therefore, increase of modules' efficiency (Chojka 2013).

The subject literature query allows to state that numerous examples of spatial data modelling which may be performed by means of various applications and types of models can be found (Schrojenstein et al. 2011; Heistermann et al. 2006; Koomen et al. 2007; Verbur et al. 2004).

Figure 1 presents connection of a cadastral system with both primary and topographic maps. However, in the second and third case the phrase *database* can be used instead of the word *map.* The cadastral system in Poland provides data for the main elements of the primary map including buildings and plots borders. Nonetheless, in the cadastral system, the data which concern buildings are of a different nature than in case of the primary map. In the first one, they are used to assess charges (taxes) whereas on the primary map – to identify features and attributes of neighbouring buildings. The plots borders are only used to design

objects and to determine their influence on the neighbouring properties. In the cadastral system, borders are connected with documents of formal and legal character.

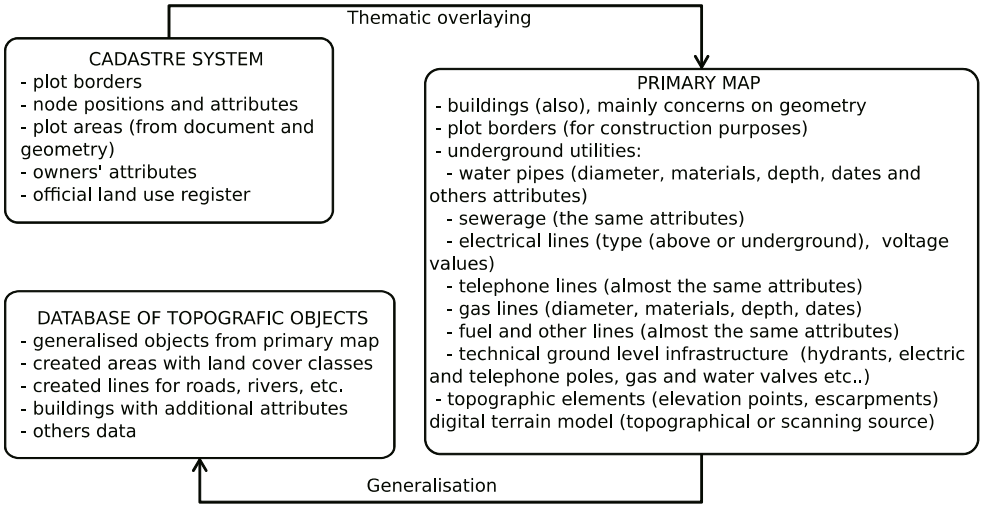

Figure 1: Data transfer between basic registers of geodetic resource in Poland.

BDOT10k is a geodetic system created to make the basis for cartographic elaborations in Poland. The map in an analogue form was known and used until the INSPIRE Directive has been introduced. From implementing INSPIRE, the works on introducing standardized database were taken up. It should provide possibility of multiple processing of the same geodata in terms of the subject matter, scale or area range which means primary map generalization. It allows to make precise and trade geodetic, cartographic and planning elaborations more legible and to adapt them to wider using even by accidental users of spatial information. Similar opinion can be observed in the papers of Rajabifard (2008), Prus and Salata (2014), Salata (2008) and also Salata and Myga-Piatek (2015).

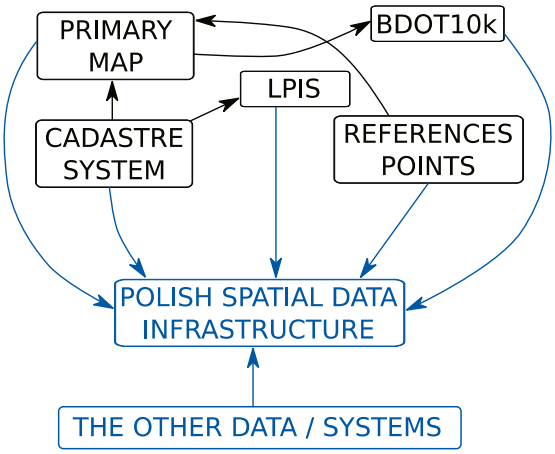

Figure 2: Essential parts of the Polish Spatial Data Infrastructure.

Figure 2 presents the principal elements of the Polish system of Spatial Data Infrastructure. The lines which join particular elements of the system represent supply sources of the whole Polish infrastructure of spatial information from national and commercial spatial databases. The cadastral system together with the basic map and the database of topographical objects constitute informative and referential base of infrastructure. The system of agricultural subsidies called LPIS is one of the biggest databases of land lots which is unified across the whole country. Additionally, the system of geodetic control network makes the data layer indispensable for functioning, although informative value of that set is very little for most users. The other data sets or systems signalled in Figure 2 represent optional sets of spatial information being implemented to the geodetic resource after the INSPIRE Directive was entered into force.

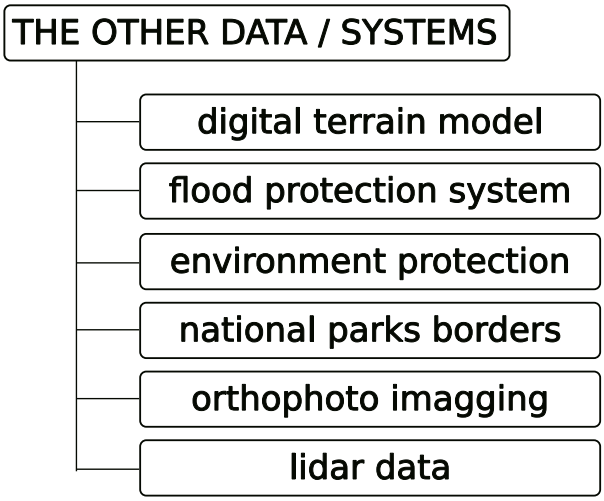

Figure 3: Facultative Polish Spatial Data Systems.

Facultative IIP systems pictured in Figure 3 have got a very big informative value which in various cases is represented by significant amount of sourcing information or by objects with great value for the areas' character (e.g. nature protection forms, flood zones etc.).

Thanks to data coherence in SDI systems in Poland, obtaining information in wide subject spectrum as well as its usage in widely understood process of spatial planning and development became possible. In the light of Polish law, records connected with spatial planning can be divided into obligatory and facultative ones. To detailed records of a local plan of spatial development due to the Act of spatial planning and development belong among others (Act 2003):

- the area purpose and lines which separate areas with various purposes and different ways of development,
- protection rules for spatial order, environment, nature, landscape and cultural heritage, monuments and also contemporary culture properties,

- rules of forming spatial order and public spaces, building and factors connected with area development, such as building intensity, maximum height and size, building lines, a number of parking places, the area biologically active,
- the way of development of protected areas and objects as well as their border lines,
- determining rules connected with properties' integration and division in the area of the current plan,
- limitations in lands usage and conditions of their development, also ban on building in the given area,
- guidelines to building and development as well as modernization of technical infrastructure.

To facultative contents of a local plan belong:

- borders of areas which need land integration or properties' division and also transformations and reclamations being performed,
- borders of areas where improvement of an existing property and technical infrastructure is planned,
- borders of areas allocated to build commercial objects the sale area of which exceeds 2,000 metres,
- borders of areas with recreational and leisure purposes,
- borders of protective zones, destruction monuments and closed grounds,
- stocktaking information for buildings (colour and kind of roofing and elevation, location of building objects with reference to roads and other public areas as well as borders of adjacent properties,
- rules and ways of lodging small architectural elements such as: commercial boards or fences and determinants of their size and materials they were made of,
- information about the smallest permissible size of a newly assigned plot.

3. Results – examples of modelling chosen fragments of the spatial information communal system

The spatial information system enables to create any elaboration from the range of planning and spatial development (Prus 2014). Maps that present land lots properties with division into register groups, a mosaic of land usage, determining a local plan of spatial development and area investment as illustrated networks of technical utility infrastructure, results of urban inventory, routing, a map of average land prizes achieved in the local property market as well as a project of streets' numbering can serve as samples. All presented examples were elaborated within creating the spatial information system in communal units. They rely on current standards which result from the INSPIRE Directive.

Figure 4: Map of properties based on unit registry (household's identification).

The map which illustrates a mosaic of land lots by means of thin, black borders is one of the basic planning elaborations (Figure 4). Such arrangement of lands could be misleading for planners in view of historical determinants of lands parcelling. In order to read the correct distribution of a property and also its basic character (whether it bears marks of a farm), spatial analysis of households and farms' arrangement is performed. The map of land property with division into farms and real estates is based on records of grounds and buildings' evidence as register units.

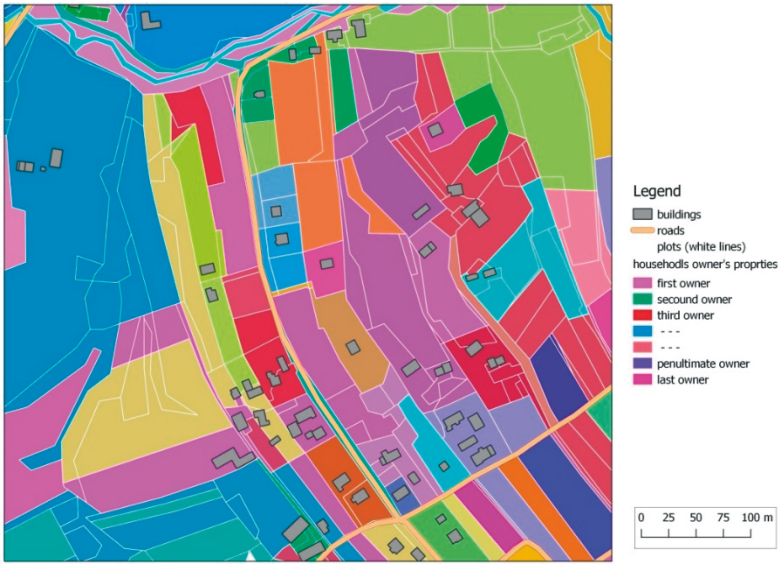

Figure 5: Map of properties based on register units (properties' identification).

Like in the previous analysis of farms' characteristics, (Figure 4) the analysis of properties' mosaic is being performed for whole places and communes in order to determine the lands property mosaic. It presents neighbour's dependencies between owners of properties as well as the state of farms' concentration. On the above-mentioned figure (Figure 5), every farm receives unique coloristic marking and its scattered land lots are identifiable.

Both the land usage map and the map of registered units show specific for southern Poland lands mosaic which was caused by the lack of ownership changes during the twentieth century. That resulted in the preservation of family based, extensive agriculture, characterized by very high land fragmentation with a mosaic crops (Baran-Zgłobicka 2012). Such traditional system of land usage is called agro-forestry system (Herzog 1998). The land usage mosaic and the mosaic of land properties are in that case conditioned by each other.

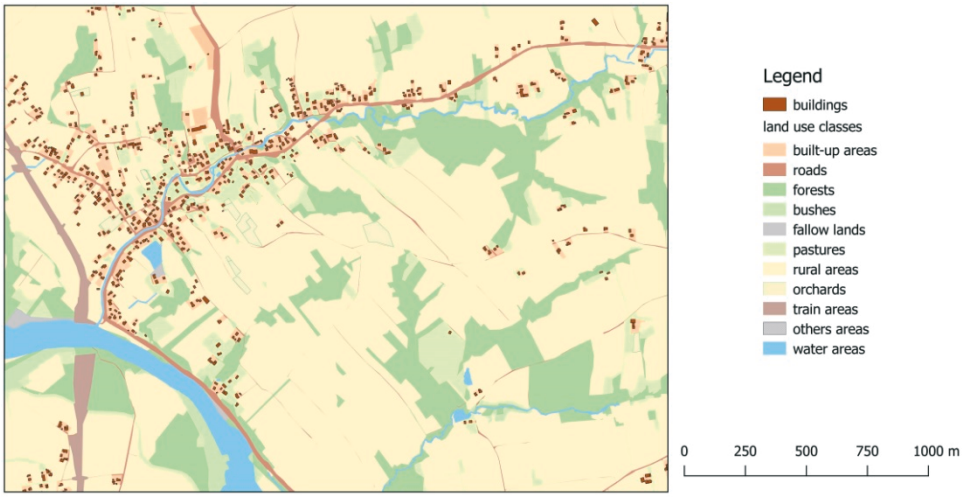

Figure 6: Map of land use mosaic (cadastral land classification).

Land usage recorded according to the cadastral register can vary from the real way of usage. Differences are visible in determining land borders for the properties which were not modernized from the moment of enfranchisement in 1973. The analyses which show these differences are significant for determination of a factual rate of changes of land uses.

Commune's spatial information system also includes information about lands purpose recorded in the form of a spatial development local plan (Prus and Salata 2013). Figure 7 presents the rural commune with visible sub-urban changes in the structure of building and transport systems. From the technical point of view, a multi-criterion spatial analysis enabled confrontation of real usage with establishments of a local plan. It turns out in practice, however, that data derived from various sources overlaid can demonstrate some discrepancies. For example, checking arrangements of the local plan characterized by high grade of generalization with the real usage showed that the zones' borders appointed by the spatial development local plan can be intersected by the lines which outline the buildings. The example in the figure 7 shows several buildings located in the zone of a public road. As the local plan

Figure 7: Verification of the local development plan arrangements with official land use map.

influences the properties' price, such situation can cause conflicts. While preparing the local plan, coordinates of a map base were improperly identified and that is why two elaborations which collaborated in creating the spatial information system in the commune do not coincide with each other.

The obligatory part of spatial information system in Poland presents the buildings together with technical utility infrastructure. When the objects' record in spatial database would be possible, which is presented in the figure 8, the map's electronic version enables to calculate

Figure 8: The example of visualization of technical infrastructure layer on the base of the orthophotomap.

factors that show densities of particular networks, their location and possible conflicts which can appear while realizing designed elements of technical utility.

a. roof colours | *b. facade colours*

Figure 9: Map of landscape parameters diversity.

In the facultative part, spatial information system enables visualization of i.e. arrangement of roofing colour as well as the buildings' elevation. Repetitive housing estates created in development system are characterised by uniform shape and colour, unfortunately, they do not refer to tradition or function of a region – for example agricultural – neither with their arrangement nor with shape. In case of original local buildings, they are scattered and multi-coloured.

Another example of using spatial information system is spatial visualization of time zones determined by roads and paths that provides fixing the zones with the same time of reaching definite infrastructure objects. Relying on roads' quality and assuming the average speed of moving on the roads, the map of time of reaching chosen points (for example bus stops) can be prepared. In figure 10, linear objects representing transport roads from every residential and

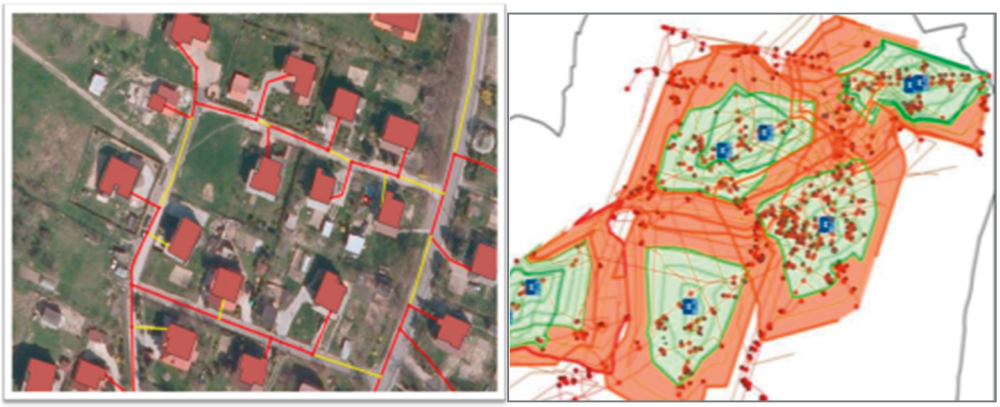

Figure 10: Public transport isochrones.

commercial building to public roads network were presented. Moving costs such as time, speed etc. were determined for every road section. That is one of very important elements of determining life quality and its differentiation in regions.

The INSPIRE Directive emphasizes meaning of address system in SDI and places this data category in the first informative group together with referential and cadastral data. The maps of streets names are the significant element of spatial development of rural areas as they can set trends (Figure 11).

Figure 11: Street names project.

The project of streets names was prepared on the basis of the land evidence map. It is the option of creating in Poland a uniform address system (Aalders and Moellering 2001; Steiniger and Hunter 2011). This system is compatible with guidelines of the INSPIRE Directive, it was published in the commune's website and is included in nation-wide repository called Locality Streets and Addresses Evidence.

4. Conclusions

After 6 years of binding force in Poland of the Act of spatial information infrastructure, good practices are visible on the level of communes. Nevertheless, these systems are still created, improved or supplemented.

The basic conclusion that can be drawn from presented examples of using data included in Spatial Information Infrastructure is allowing data flow between specific data sets not visible between each other up to now.

Increasing sets' interoperability allows to prepare planning elaborations with use of data available in the WFS form – which is in Poland a chosen fragment of the cadastral system involving land lots borders with the other objects. It is, at the same time, the significant set of georeferential data and it permits to base upon itself the main liability of determining the proper location of objects in space.

Undeniably, Spatial Data Infrastructure gives new quality in the planners' work. Increase of data generated and created by GIS systems' users allows to saturate the space with data better than while working with analogue methods. Growing data quality paying special attention to descriptive completeness and precision permits to transfer standards at resultative documentation and to elaborate the research effects in formats that enable their further automatic processing.

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Urszula Litwin*, Magda Pluta* and Bartosz Mitka*

Improving the Perception in Urban Planning by 3D Modelling and 3D Visualization[1]

Abstract

The paper presents possibilities of using modern techniques of 3D visualisation in urban planning. The realistic 3D models of existing conditions or 3D conceptions of land development provide more efficient and effective implementation of the planning concepts compared to the traditional methods. The topic of 3D visualisation is becoming more and more popular and is discussed in foreign and national literature, where a strong need for the implementation of new solutions is highlighted. This paper presents possibilities of using geospatial data and GIS software for visualisation purposes of the existing and future terrain conditions.

1. Introduction

Public participation in spatial planning is a relatively new concept (Simiński 2011; Andrzejewska et al. 2005); however, it is extremely important in the individual stages of spatial planning, having an impact on the final character of the decisions made. Public participation may be perceived as a specific phase of democratic system development, leading to the emergence of a civil society (Simiński 2011). Over the years, the form of public participation in Polish spatial planning had been changing, but still hasn't got such good practice like for example in England. In Poland, public participation is defined by the Act of 27th March 2003 on Planning and Spatial Development. Even though the Act on Planning and Spatial Development defines the forms of public participation, for many authors of scientific publications its scope is still not precise (Simiński 2011; Andrzejewska et al. 2005). The issue of public participation in the spatial planning is widely discussed in both national and international literature, including in the Convention of 25th June 1998 on access to information, public participation in decision-making and access to justice in the environmental matters. According to Steinmann et al. (2004) realizing changes in public space and sustainable development strongly depends on involvement and responsibility of citizens, social organizations and private enterprises in a city or a region. As Craig and Elwood (1998) said maps and geographic information can play an effective role in the success of a community group. The Public Participatory Geographical Information Systems (PP GIS) deserves on special attention, which is a field of research that focuses on the use of

* University of Agriculture in Krakow, Faculty of Environmental Engineering and Geodesy, Department of Agricultural Land Surveying, Cadaster and Photogrammetry, Krakow / Poland.

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GIS by the general public and aims at involving the citizen in a decision-making processes (Steinmann et al. 2004).

According to Brown (2012) PPGIS research can be grouped into four general knowledge domains:

- the development, operationalisation, and measurement of spatial attributes for data collection,
- data collection and participatory methods including mail-based GIS surveys, facilitated workshops, internet applications, and mixed modes of collection,
- data analysis and interpretation including general spatial analysis methods and the development of new social landscape metrics,
- data integration and use in institutional decision-support systems.

Some of the authors of the publications point to the opportunities for using the modern visualisation techniques, in order to increase and improve the quality of that participation. Visualization is a powerful method for the representation of spatial data such as streets buildings, parks, or rivers (Steinmann et al. 2004). According to Andrzejewska et al. (2005), the public participation requires the implementation of new means of public communication, in which geovisualisation may be included. The implementation of communication means aims to, amongst others, help understand the content of plan both in graphical and descriptive forms; additionally, it is necessary to ensure the possibility for public participation on the stage of the plan's creation, as the currently used form of participation in Poland is only limited to submitting comments on the finished project. Andrzejewska et al. (2005) point out that the use of geovisualisation tools to a large degree may facilitate the communication, showing both positive and negative aspects of proposed changes, has a beneficial impact on the organisation of filed applications, increases the number of residents taking part in the process, and simplifies the reception of the presented solutions. As the authors Wu et al. (2010) said, 3D visualization is much more useful than traditional 2D map for urban planning purposes. According to Jazayeri (2012) the spatial representations of our world, are being increasingly described using 3D geospatial models, which are becoming more widely implemented around the world by organizational bodies such as governments, city planners and emergency services. There are many source of data for 3D modelling, but as Jazayeri (2012) mentioned over the past 10 years, the most significant development in 3D data acquisition has been in laser scanning, both airborne and terrestrial. Another, source of data for the 3D models can be high-resolution satellite photos with the possibility to tilt the optical system back and forth, aerial photos, ground-based photographs, data derived from the aerial laser scanning, or compilations of this data (Różycki 2007; Klejnberg 2010). Discussion about Level of Details distinguishes five types of 3D models with various detailing: Digital Terrain Model (0LoD), block model without type of roof (1st LoD), for which the source of data may be vector data in the form of polygons, model with the roof structure (2nd LoD), using high resolution satellite photos, and a model with the precision structure

of wall and roof (3rd LoD), based on aerial photos, aerial laser scanning data, or terrestrial laser scanning. This sources of data are useful, when big area is 3D modelled, but for single object terrestrial laser scanning, or terrestrial photogrammetry can be recommended (Vatan et al. 2009). Moreover, Klejnberg (2010), in addition to the block model, distinguishes the other forms of visualisation: a perspective view, photomontage, animation, two-dimensional map image, three-dimensional digital terrain model. According to Litwin et al. (2013) for the purposes of 3D visualisation the Digital Terrain Model in the form of GRID can be successfully used. As Jazayeri (2012) mentioned software developed from the private sector, such as CityEngine from ESRI, Bentley's Map V8i and Google Earth offer users the capability to create, visualise and measure 3D cities. CityEngine is such a tool, being a three-dimensional modelling software, specializing in the generation of 3D urban environments and the creation of complex parametric models from 2D datasets (Tsiliakou 2013). In this context the CityEngine software deserves special attention, because supports data such as Esri Shapefile, File Geodatabase (GDB), KML, and OpenStreetMap (OSM), allowing users to work with GIS features such as parcels, building footprints and street centre lines during constructing 3D urban landscapes (Jazayeri 2012).

Three-dimensional visualisation in forecasting the changes of spatial development as methods of strengthening the public dialogue in the process of spatial planning is widely discussed. One of the goals of spatial planning is to achieve the appropriate landscape. In view of Litwin and Piech (2013) the landscape shall be understood as the entirety of spatial elements formed on the surface of the Earth by nature and as a result of human activity. The preservation of the highest value of the landscape requires pre-planned actions, taking into account the environmental, cultural and aesthetic advantages. As noted by Siemiński, 3D visualisation may provide support for activities undertaken within the scope of spatial planning. The authors assume that such form of communication should facilitate the understanding of the spatial transformations for the wide group of recipients, additionally stimulating the public discussion (Simiński 2011; Hełdak et al. 2013). 3D Visualization of the spatial planning process, replaces the traditional two-dimensional development, thereby affecting the greater awareness of policy makers and the local community in terms of the proposed transformation of the spatial structure of the area (Wu et al. 2010). Little knowledge of the planning language among the recipients is a serious obstacle for the full residents' participation in the process of spatial planning. From study of SWOT (Vonk et al. 2007) they conclude that the current large diversity of PSS (Planning Support Systems), the lack of standards, and little usage in practice, indicate that PSS technology is still in an early and exploratory stage of growth. Furthermore, the actual state of notifying the residents of the content of the documents should be deemed as unsatisfactory (Simiński 2011). At the same time, he emphasises that publishing visualisations on the Internet creates new problems within the scope of interactive communication between the Internet user and the originator; hence new tools for solving those issues are needed. In addition, one must pay attention that the presented visualisations are properly justified – why such option is presented, and no other. Presenting the visualisation itself without its appropriate description may hinder

formulating the conclusions by the debaters (Simiński 2011). Simiński (2011), based on the conducted research, formulated conclusions, in which the use of 3D visualisation in the public discussion on the state of development is considered beneficial. This approach is favourably received by the disputers and deemed as useful. The use 3D GIS software such as ArcGIS, GeoMedia 3D, or QGIS and Google Sketchup software for the implementation of 3D models is also evaluated as advantageous would allow achieving better reproduction of the actual shape of the existing buildings. Currently used data, including the topographic map data and the digital terrain model obtained from the Central Documentation Centre of Geodesy and Cartography (CODGiK), are often insufficient for building the exact 3D models.

The use of data from the terrestrial laser scanning to provide support in spatial planning is also discussed by Hełdak et al. (2013), finding the use for this measurement technique in protecting the ecosystems in the decision-making phase. As basic advantages of the data obtained from the terrestrial laser scanning over the data obtained from the copies of master maps or cadastral map, Hełdak et al. (2013) give the accuracy of this data, its full objectivity, and the speed of acquisition. During the course of works aiming to formulate the spatial policy, the visualisation may be an argument supporting the best possible design solution (Hełdak et al. 2013).

Markiewicz (2012) in his work discusses aspects of integration of photogrammetric data for the purposes of generating 3D models of the urban space, highlighting that thanks to the integration of data acquired from the terrestrial and aerial laser scanning it is possible to create realistic three-dimensional models. According to the author, the integration of data from various photogrammetric sources aims to improve and supplement the lacking data in order to obtain a complete 3D model. To create a consistent final product, one must demonstrate a sufficient knowledge of relevant software and the possibility of its use in relation to individual data, as a universal one, allowing processing data from different sources, does not exist. Particular attention should be paid to the data formats, because lack of compatibility is a serious limitation in their common processing (Markiewicz 2012).

Wojkowski (2011) and Markiewicz (2012) additionally drew attention to the use of GIS systems as tools supporting geovisualisation, favourably affecting public participation in the process of spatial planning. According to Schaffert (2015) GIS can be needed especially for integration data, which are saved in various file format, has various scale, or different units. Wojkowski proposes to expand the current use of GIS systems in spatial planning. At present, it only comes down to gathering and presentation of data, although they should also be used as a tool assisting in the decision process. An important advantage of the GIS systems is management and processing of data from various photogrammetric sources; moreover, the possibility to perform a variety of spatial analyses makes the GIS systems extremely useful tools supporting the process of spatial planning (Markiewicz 2012; Wojkowski 2011).

To sum up, the 3D models and visualisations bring unequivocal benefits to the process of spatial planning, including public discussions. With their help, the plans become clearer and more comprehensible to the recipients. Furthermore, there is a possibility to publish such works on the Internet, which stimulates the activity of the local community. Each time, when undertaking planning works, the cost and appropriateness of the use of 3D visualisation should be estimated, taking into account that prepared once, it may serve multiple purposes, especially when it is equipped with the GIS database. A definite advantage of using the modern presentation forms is the development of skills for using modern technologies in the field of spatial planning, as well as increase of confidence of the public in relation to the local authorities (Simiński 2011).

2. Materials and methods

The implemented research project aimed to demonstrate the possibilities of use of the modern techniques of data acquisition and integration of that data in the GIS software for the needs of 3D visualisation, in order to increase the public participation in the spatial planning. The education building of the Faculty of Environmental Engineering and Geodesy on Balicka Street in Cracow was used as a research facility. As part of the works, the terrestrial laser scanning was performed; as a result, the point clouds were obtained. The measurement was made using the Z+F Imager 5006I phase scanner, and the point clouds were obtained in the local coordinate system from 19 measurement stations. The next stage of works was orientation of point clouds, which was carried out with the use of Leica Cyclone 8.0 software, based on the measuring one hundred and four control points on the façade of the building. The average alignment error equalled 7mm, the errors of individual links did not exceed 20mm, and thus the obtained result of orientation can be considered satisfactory for using this data to 3D modelling on 2nd LoD. Subsequently, the point cloud was cleared of measurement noise, unification was carried out, defining an average distance between the points on the level of 2mm, and the format .pts was saved, so that the import was possible to the Microstation V8i program.

Another stage of works was to create a 3D model of the building based on the orientated point cloud. For that purpose, the Microstation V8i program was used, based on the functionality of the *Solids Modelling* package. 3D modelling aims to convert the point cloud to a CAD form; such saved object can be then imported to the GIS software and perform spatial analyses in terms of spatial planning. The basis for 3D modelling is working on the top/ front/ left/ right views and appropriate definition of the sectioning through the point cloud allowing faithful reproduction of shape through the 3D model.

Before starting the modelling, the significant issue is to establish the level of detail that will characterise the 3D model. In accordance with the City GML standard there are 5 Levels of Detail. *Level of Detail 0* is represented by the Digital Terrain Model covered by orthophotomap; *Level of Detail 1* is defined as block model with flat roofs; *Level of Detail 2* is characterised by the distinction of the roof's geometry; *Level of Detail 3* is represented by the 3D model with reliably detailed elevation in which all elements are separated. Models that are

full architectural representation from outside and inside are marked as *Level of Detail 4* (Open Geospatial Consortium 2012). For the needs of spatial planning models with the level of detail 2 and 3 can be particularly useful. In the presented work the 3D model was created with the *Level of Detail* 2, which is sufficient for making sun shadow analyse.

3D model is an exact, thanks to the data obtained from the terrestrial scanning, representation of the education building of the Faculty of Environmental Engineering and Geodesy. The transformation of point cloud into the CAD model allows carrying out further works in the GIS programs, including ArcGIS and CityEngine.

The next stage of research work included efforts to design new 3D objects, taking into account the existing state, which is the 3D model of the education building. The works were performed using CityEngine software. For that purpose, the 3D model of the education building was imported into the program, as well as a fragment of a map downloaded from the Open Street Map for the same area. Import of the 3D model was possible after previously saving it in the *Collada* format. The option of export of the results of work to the *Collada* format is made possible by the Microstation V8i program. The system of coordinates of the Web Mercator (EPSG 3857) for the project was defined by the imported map fragment. According to authors Rosłan et al. (2013) Web Mercator system retains the shape of a relatively small object (important when displaying aerial imagery so as not to distort the square buildings, rectangular) and retain the directions (North is always at the top of the map). During the import two layers were selected: *highway* and *buildings,* which were further used in the design works. Using the available options of the *CityEngine* software new streets were designed, as well as the foundations of the new buildings.

Having defined places of the new buildings' foundations, the *rule file* was created, specifying basic parameters for the designed objects. The attributes: minimum of height, maximum of height, type of roof, and type of façade were defined. In the *rule file* the attribute of height was introduced, based on which the designed buildings may adapt the height within a range of 10–30m; the type of roof was defined for them as hipped roof with an inclination of 30 degrees. The level of detail for the newly designed buildings (Fig. 1) corresponds with the created 3D model of the education building.

In the next step, the proper georeference was given to the 3D model of the education building. Firstly, the 3D model was placed in a random location indicated with a mouse; then the recording method of the 3D building was converted from *model* to *shape.* Saving the 3D model in the form of a *shape* allowed implementing the new file of *new rule*.

```
A-->
r(scopeCenter,0,0,0)
alignScopeToAxes()
```

The *new rule* file defines the position of the coordinate axes of the 3D model of the education building parallel to the axes of the global system. Such defined coordinate system allows

using *move/ rotate* options for precise placement of the 3D model of the education building within the 2D area imported from the Open Street Map (Fig. 2).

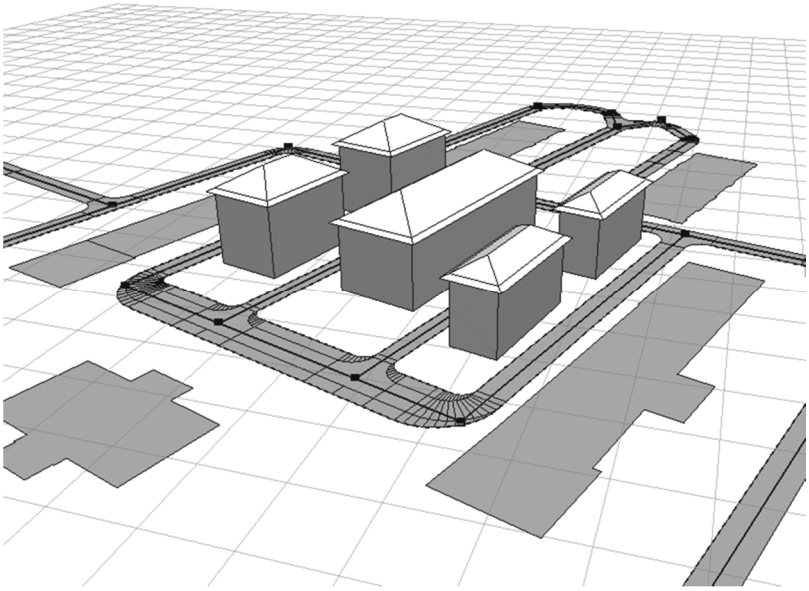

Figure 1: Newly designed buildings (Source: Own work).

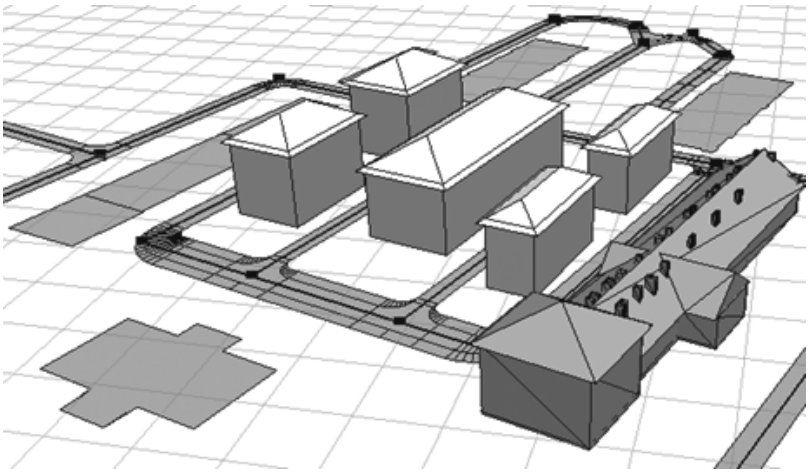

Figure 2: 3D model of the education building with an assigned georeference defined by file imported from Open Street Map (Source: Own work).

The last stage of works included import of the project from the *CityEngine* program to *ArcScene*. This can be used to visualize the effects of particular spatial conditions. To illustrate we carried out a spatial analysis on the overshadowing of the existing education building by the designed buildings, depending on the time of day and season of the year. Figure 3 shows the overall modelling process.

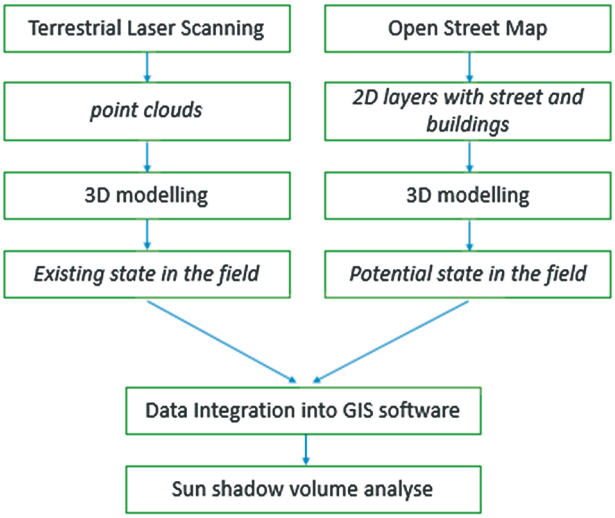

Figure 3: Workflow diagram describing modelling process (Source: Own work).

3. Outcome

The outcome of the sun shadow volume analyse is exemplified for two days and two hours. Figure 4 shows the result for the longest day in the year in Poland – 21st of June at 9.00 a.m. and Figure 5 for the shortest day in the year in Poland 21st of December - time: 9.00 a.m.

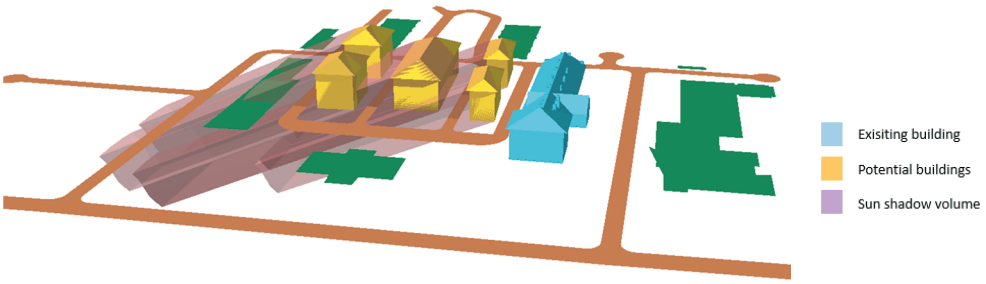

Figure 4: Shading of designed buildings on the education building, 21st of June, time: 9.00 a.m.

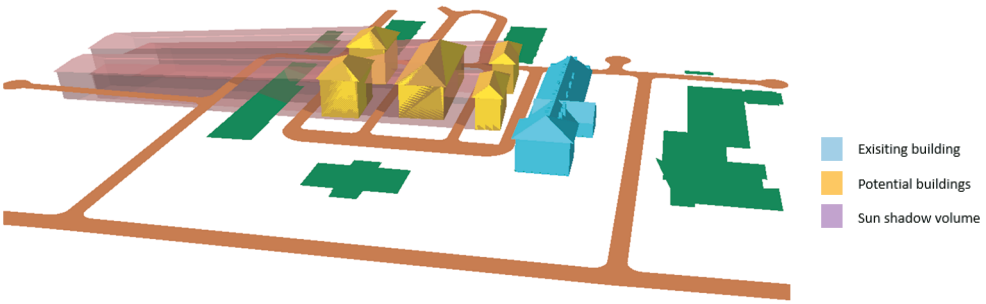

Figure 5: Shading of designed buildings on the education building, 21st of December, time: 9.00 a.m.

4. Discussion

The paper presents possibilities of 3D modelling using the data from the terrestrial laser scanning and 3D visualization. According to Wu et al. (2010) 3D visualization is much more useful than traditional 2D map for urban planning purposes. 3D Visualization of the spatial planning process, replaces the traditional two-dimensional development, thereby affecting the greater awareness of policy makers and the local community in terms of the proposed transformation of the spatial structure of the area (Wu et al. 2010). From the point of view of spatial planning the dominant aim is to combine the existing state with the designed one and presenting the results of work in the form of 3D visualisation. According to Andrzejewska et al. (2005) the 3D geovisualisation may constitute a new tool in a public communication. Presented research results show that using 3D geovisualisation significantly increases the readability of the developments, which then helps increase the public participation in spatial planning. According to the authors Różycki (2007), Klejnberg (2010) and Hełdak et al. (2013), the terrestrial laser scanning proved to be a suitable method of obtaining data for the needs of building the 3D models, ensuring high accuracy of data and relatively short time of its acquisition. Due to the fact that the laser scanner registers objects in their actual dimensions, the 3D models built based on that data are perfect reflection of the existing state in the field. 3D models, contrary to the point clouds, are characterised by the smaller size of data, and this allows their processing in the GIS programs. A significant issue is appropriate definition of the required *Level of Detail* of the 3D models; Microstation v8i software allows efficient modelling on each level of detail, as well as exporting data to formats supported by the GIS software. The most important aspect of the carried out research was to combine the existing state with the designed state. This task was completed using the CityEngine program, due to the possibility to import files in the *Collada* format, as well as a broad range of functions for creating new objects, such as streets or buildings. Presented in the paper spatial analysis specifying the degree of shading of the existing building by the designed buildings depending on the time and season of the year confirms the view of Siemiński (2011) on the subject of advantages of use of the ArcGis for the needs of the spatial planning forecasting. The implementation of project required work on several software, which in turn supports the view of Markiewicz (2012) that in order to create a uniform end product one must demonstrate a sufficient knowledge of relevant software and ability to use it in relation to individual data. The aspect one should pay particular attention to are the data formats, as lack of their compatibility may constitute a significant limitation.

5. Conclusions

Terrestrial laser scanning is a good method of acquiring the spatial data; spatial data recorded in the form of point clouds accurately depict the existing state on the field. Depending on the needs of use of data, one should make the right decision about choosing the appropriate type of scanner. For the needs of 3D modelling of urban space, it is recommended to employ the phase scanners, characterised by the smaller measurement range and higher resolution of the obtained data, which is of particular significance while modelling architectural details.

The resolution of scanning ought to be specified in relation to the *Level of Detail* of the 3D models we wish to achieve and analysed in terms of time of measurement and size of acquired data. Orientated and cleared point cloud is a realistic visualisation of the existing state; additionally, using geodetic measurement techniques we can assign it a georeference. Due to the accuracy of the TLS data the 3D visualisation can include the entire object or individual elements. GIS software available on the market does not allow for efficient work on the point clouds obtained as a result of the terrestrial laser scanning; therefore, it is necessary to transform individual components into the form of 3D models. The CityEngine program is a good tool for designing new objects, allowing import of many data formats, including the C*ollada* format also supported by the Google SketchUp software. The program allows creating the planning scenarios for new objects, such as streets or urban development, supplemented by the existing state in the 3D form. The big advantage is also compatibility with the ArcGis package. Using the extension of 3D Analyst in ArcScene allowed conducting the spatial analysis in the field of overshadowing the existing object by the designed buildings.

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Ayşegül Mengi*, Tayfun Çınar* and Ruşen Keleş*

Transformation of Rural Lands into Urban Uses: Impact Upon Environmental Assets in Turkey

Abstract

When the Republic of Turkey was proclaimed, most of the population was living in rural areas and the economy of the country depended mainly on agricultural activities. After the Second World War, because of economic policies, the rural areas were neglected. However, these areas have maintained mainly "rural character" until 2005, although they have lost their importance and no effort was made to ensure rural development. Following this date, the borders of the urban areas were extended through various legislative regulations to cover the rural areas. In other words, artificially, rural areas were declared as urban areas with no request or demand by citizens.

Municipal borders extended continuously. The milestone of converting all rural areas into urban areas artificially by top down policies has been the legislative regulation from December 2012. By this legislation, the number of metropolitan municipalities increased from 16 to 30 and the legal personalities of villages in these areas have been terminated.

During the last 10 years, urban land – especially in Istanbul and Ankara – has been used with rent seeking considerations in mind and urban economy became extensively based on plus-value in urban land. Shopping malls, multi-storey buildings and luxury residences have been constructed both in the old town and in the surroundings of urban centres to sustain economic growth through real estate investments. By these policies, rural areas with agricultural land, meadows and pastures were not only decreased in amount, but also deteriorated rapidly.

1. Introduction

The urbanisation process in Turkey has begun after the Second World War and has been accelerated during the 1950s and 1960s. This process has taken place in the form of migration from rural to urban areas in an uncontrolled and unplanned manner. There are significant reasons for migration from rural to urban areas, especially to big cities like Istanbul, Ankara and Izmir. Mechanization in agriculture, imbalances in the distribution of land ownership, fragmentation of agricultural lands into small pieces by heritage, accumulation of land by big farmers due to capitalism in agriculture, underdevelopment of rural areas and rural poverty can be identified as the most important reasons.

In 1923, when the Republic of Turkey was proclaimed, most of the population was living in rural areas and the economy of the country was dependent on mainly agriculture and

* Ankara University, Faculty of Political Science, Ankara / Turkey.

animal husbandry. However, rural areas were neglected because of the economic policies implemented.

The urbanisation process in the form of migration from rural to urban areas started in 1945. It had various negative economic, social and cultural impact on both urban and rural areas. For urban areas it had:

- Social impact: Urban population which cannot be integrated into the urban life.
- Economic impact: Due to urbanisation which did not take place in parallel to industrialisation, unemployment rate in urban areas increased and thus rural poverty was transferred into urban centres. Housing problems were aggravated by the creation of shanty towns.
- Cultural impact: Instead of urban culture, a new culture emerged in urban areas by the influx of migrants into urban centres.
- Spatial impact: The constant increase in urban population, and thus extension of urban areas, resulted in bottlenecks in the implementation of city development plans. This led to changes in the master plans and damaged the unity of plans by causing speculations in land.

The rural areas have also been negatively affected from economic, socio-cultural and spatial points of view. Economic underdevelopment in rural areas and poverty accelerated the migration from rural to urban areas. As a result of the wrong agricultural policies, the production of many agricultural products (wheat, sugar beet, corn, etc.) in Turkey was limited and animal husbandry came almost to an end.

Obviously, the migration from rural to urban areas had an impact on the environment, which is usually not emphasised when the impact of urbanisation in Turkey is discussed. The uncontrolled and unplanned urbanisation process led to pollution of environmental assets, such as air and water, and created other urban environmental problems. The increase in urban population in metropolitan cities caused incapacity in urban infrastructure. Furthermore, by the extension of urban areas, environmental assets such as productive agricultural lands, forests, shores, pasture and meadows were transformed into residential or industrial areas.

Although rural areas lost their importance, these areas maintained their "rural" character until 2005. However, with new legislative regulations, the borders of urban areas were extended to cover rural areas. In other words, rural areas were artificially declared as urban areas with no request or demand by citizens in urban or rural communities (see Mengi and Çınar 2015). Municipal borders that correspond to urban areas in Turkey were constantly extended.[1]

1 Villages in Turkey which represent rural areas are the places with a population of less than 2 000 inhabitants.

There are numerous municipalities and villages within the province which are defined as geographical and administrative units. The role and responsibilities of municipalities and villages differ from each other. Within provincial borders there are both urban and rural areas.

2. The Purpose of 2012 Law[2]

Turkey's administrative structure is inspired by the French model during the Ottoman era. In 1864, the state system was transferred into a provincial system and under each province two administrative structures, one representing central government and the other local government, were established. Local authorities in Turkey consist of special provincial administrations in provinces, municipalities, metropolitan municipalities and village administrations. In 2012, before the promulgation of Law numbered 6360, there were 81 provinces, 16 metropolitan municipalities, 2950 municipalities and 34283 villages in Turkey (Ministry of Interior 2014).

The enactment of the Law of December 2012 has been the milestone of converting all rural areas into urban areas artificially by top down policies. By this legislation, the number of metropolitan municipalities increased from 16 to 30 and the borders of metropolitan municipalities were extended up to the borders of the provinces. In return, the existence of the special provincial administrations in 30 metropolitan municipalities and the legal personalities of many small municipalities with rural characteristics were terminated. This created a huge impact on Turkey's administrative and local authorities' structure and on the urbanisation process. Another dimension of these changes is linked to environmental values which will be discussed below.

By the Law numbered 6360, 30 provinces out of 81 in Turkey have gained a two-tier metropolitan administration structure consisting of metropolitan municipality and district municipalities. The villages in these 30 provinces are converted into neighbourhoods attached to district municipalities. Although the rural areas merged with urban areas, they remained to have rural characteristics.

Table 1: The number of local authorities (2013–2014)

Year	Special Provincial Administration	Municipality	Village	Total
2013	81	2 950	34 283	37 314
2014	51	1 396	18 216	19 663

Source: Ministry of Interior, General Directorate of Local Administrations, 2014.

As it can be seen in Table 1, the number of each administrative unit decreased following the new legislation. Especially, the number of villages drastically decreased by reducing nearly

2 Law numbered 6360 published in the Official Journal dated 06.12.2012 numbered 28489.

half of them. This reduction in return equals to the extension of the surface of urban areas and increase in urban population.

Today, the urbanisation process has different characteristics compared to the past. In order to manage this process, extension of borders of urban areas was introduced as a new urban policy. The extension of urban areas has important results. The most important one is the value increase in urban land and the pressure of population on urban land. The need for urban services such as housing, education, health, transport, road, public square, parking area and open spaces increased due to population density. There is need for land for all these services. Extension of urban areas increases the need for such areas.

During the last 10 years, urban lands in urban areas – metropolitan areas – converted into enormous rent sources and urban economy became extensively based on the increase of plus-value in urban land. Shopping malls, multi-storey buildings and luxury residences were constructed or have been in construction both in the old town and also in the surroundings of urban centres to sustain economic growth through real estate investments. By these policies rural areas which consist of agricultural lands, meadows and pastures were deteriorated rapidly. Especially in Istanbul the third airport, the third bridge over the Bosphorus and giant projects as Canal Istanbul are the investments planned outside city centres in the areas of wetlands, forests, meadows and pastures. These will certainly affect the water resources negatively.

Following the Law numbered 6360, when the metropolitan area increase is considered, the borders of Izmir, which was already a metropolitan municipality before 2012, were the least extended by 122%, whereas the greatest extension was seen in Mersin by 2001%, Konya by 1770% and Erzurum by 1757%. In the new metropolitan areas the highest extension was seen in Hatay by 23189%, Muğla by 13044% and Aydın 10466%, and the lowest in Denizli by 1317% (Üçer et al. 2014:45).

3. The Environmental Impact of the 2012 Law

Areas within provincial borders consist of urban and rural communities contrary to municipalities and metropolitan municipalities. The rural areas outside urban centres include forests, meadows, agricultural lands, wetlands, seas, lakes, rivers, yards, gardens, as the areas within the provincial borders. The management of these areas are also left to metropolitan municipalities by Law numbered 6360.

The ratio of agricultural lands, forests, pastures and meadows put under the authority of metropolitan municipalities in 30 provinces varies between 62.2% (Mardin) and 98.5% (Hatay). Hatay (98.5%), Antalya (97.4%), Balıkesir (96.1%), Konya (93.2%), Malatya (93.1%), Muğla (91.4%), Eskişehir (91%) and Sakarya (91%) are the provinces where the ratio of rural areas is above 90% (Üçer et al. 2014:50).

It is also supported by official data that the areas which need protection such as agricultural land, pastures and meadows are neglected in Turkey and exploited for urban use and for various investments (industry, energy, transport, mining, etc.). The negative impact of this exploitation of agricultural production and animal husbandry, and thus on employment in

rural areas, gradually increases by the new Law numbered 6360. When not only economic but also ecological value of rural areas is considered, losing these areas will bring irrecoverable damage.

In this paper, the impact of Law numbered 6360 will be taken into account only on agricultural lands, pastures and meadows as rural areas.

3.1 Agricultural Lands

The agricultural sector as the main, or as it should be the main, element of Turkey's economy has left its share to the industry, trade and service sectors in recent years. The ratio of the agricultural sector in gross domestic product (GDP) was reduced to below 12% after 2005 whereas it was 24% in 1980 (Ministry of Environment and Forest 2007:247). The main reason of this reduction is the agricultural policies implemented. However, the increase in urban areas during the last 10 years has also had an impact on this reduction. It should be mentioned that agricultural land is not only the main element of the agricultural sector, but also a significant environmental asset.

According to Law numbered 5403 on Soil Preservation and Land Utilization, which came into force in 2005, lands are classified as absolute farming lands, special crop lands, cultivated farming lands and marginal farming lands. The common characteristics of these areas are that they cannot be used for any purpose other than agricultural production. However, the law specifies some exceptional uses as temporary shelter in natural disasters, natural gas and petroleum exploration and operation activities. In addition, it is considered as an exception to provide land for public investments in line with public benefit by the decision of Council of Ministers.

Table 2 illustrates the use of areas other than agricultural purposes in line with Law numbered 5403 on Soil Preservation and Land Utilization and Regulation on the Implementation of the Law on Soil Preservation and Land Utilization by the Ministry of Agriculture and Rural Affairs, in the period of 2001–2006 (Ministry of Environment and Forest 2007:248). As it can be seen in Table 2 below, the use of agricultural lands for non-agricultural purposes gradually increased.

Table 2: The areas used for non-agricultural purposes in Turkey year 2001–2006

Year	Permitted Area (Hectare)
2001	31,842.873
2002	198,817.071
2003	81,116.050
2004	57,019.903
2005	86,645.706
2006	151,659.246

Source: Ministry of Agriculture and Rural Affairs, General Directorate of Agricultural Production and Development, 2007.

The permissions on the use of agricultural land other than its purpose is also regulated by law and the number of these permissions is also very high.

Table 3: The permissions given by Law numbered 5403

Year	Number of Applications	Permitted Area (Ha)
2010	6,119	39,403.14
2011	7,489	40,247.11
2012	7,104	47,745.32
2013	5,872	34,491.27
Total	24,132	161,886.84

Source: General Directorate of Agricultural Reform, The Presentation on Agricultural Reform Data.[3]

It can be argued that the use of agricultural land other than its purpose, which has started in 2001, is expected to be increased by the extension of the borders of metropolitan municipalities. The agricultural lands will be within the borders of metropolitan municipalities and these areas will be used for urban services and investments as organised industrial districts, shopping malls and luxury residences for rent-seeking purposes.

3.2 Decrease in Pasture and Meadow Areas

Pastures and meadows are important environmental assets which are essential to the ecosystem. By the new legislation, extension of the borders of metropolitan municipalities puts these areas in danger like agricultural lands. Although the importance of these areas is always mentioned in Turkey, legal protection is not effective and in practice the quality and quantity of these areas are systematically decreasing. Furthermore, forest and meadow surface measurement has not been finalised and there is no reliable data about the size of these areas.

Table 4: Turkey's Pasture Areas

Year	Area	Percentage
1940	44 217 000	56.8
1950	37 906 000	48.6
1960	28 658 000	36.8
1970	21 748 000	27.9
1991	12 377 000	15.9
2010	8 200 000	

Source: Prepared in line with the Ministry of Agriculture and Rural Affairs Data (Mengi and Duru 2010:11).

3 http://tarim.gov.tr/sgb/Belgeler/SagMenuVeriler/TRGM.pdf (last visited 30/07/2014).

Even though the protection of these areas is secured by the Constitution, the legislative regulations do not ensure the conservation and development of these areas. According to the Law on Pastures, in exceptional cases, these areas can be used for construction of energy production units, mineral and petroleum exploration and operation activities, road construction, tourism investments and temporary shelter in areas prone to natural disasters. It can be argued that the use of pastures and meadows for other purposes will be accelerated by the adoption of the legislation regulating the extension of the borders of metropolitan municipalities. This in return will cause a negative impact on animal husbandry and on rural unemployment rates and will further trigger the migration of rural population to urban areas.

4. Conclusion

By the adoption of Law numbered 6360, 76% of the population in Turkey, which equals 58 million people, live within the borders of metropolitan municipalities.[4] The size of metropolitan areas equals 51% of the entire territory of the country. Thus, 76% of the population live in 51% of the area.

Approximately 96% of the land surface in Turkey can be defined as natural environment. 42.3% of this area is agricultural land and 54.1% is forest and semi natural areas. According to CORINE data, within Turkey's surface, 26 140 ha forest area, 13 230 ha agriculture area and 1 500 ha wetland are used other than their purpose for urban settlement, energy, tourism and transport investments (Ministry of Environment and Forest 2012:162–163).

As a result, it can be argued that during the last 10 years, urban land has been a source of rent and urban economy is entirely based on urban land rent in metropolitan areas, especially in Istanbul and in Ankara. Shopping malls, multi-storey buildings and luxury residences have been constructed both in the old town and in the surroundings of urban centres to sustain economic growth through real estate investments. A new urban policy of declaring rural areas as urban areas came into force by Law numbered 6360. However, by this legislation there has been no mechanism anticipated for the protection of these areas in 30 provinces where 90% of the land has rural characteristics. For this reason, it will not be an exaggeration to expect that agricultural lands, pastures and meadows, as the most important values of rural areas, will be in the process of rapid dilapidation.

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Meltem Yılmaz*

Human Aspects of Urban Transformation

Case studies from Ankara and Bogota

Summary

In this paper, the concept of urban renewal will be analysed and discussed on two case studies that have been evaluated according to human and environment benefit. The concept of urban renewal is being used in Turkey more frequently during the last several decades. The need to implement upgrading or renovation projects in squatter settlements was the main motive behind it. The need originates from the pace and patterns of urban development in Turkey, and particularly rural to urban migration. Slums and squatter houses are the formations which possess most of the physical and socio-economic qualities attributed to marginal populations. A shift was realized by the Metropolitan Municipality of Ankara during the 1990's from the preparation of development and improvement plans to the preparation of urban renewal projects. The Municipality of Ankara has undertaken to carry out a clearance project along the highway in the north of the city connecting the centre of the city with the Esenboğa Airport that was named as Protocol (VIP) Road. The Urban Renewal Project of the Northern Access of Ankara creates certain problems since it did not consider the social and economic conditions of the peoples involved. In Latin America, in Bogota and Medellin cities, real human focused in-site urban renewal projects applied starting from a friendly, efficient and sustainable transport system connecting people to the city. An inclusive approach has been maintained for upgrading the slum areas at the periphery of the cities of Bogota and Medellin. The application of 'value capture' played an important role in financing the renewal projects in Bogota and Medellin. It is a system which serves for public benefit by taking an amount from the plus value that gained by the infrastructure investments of the state. Sheltering is one of the main human rights of the people in the world and they have the right to live in his/her place without being forced to move by any means.

1. Introduction

This paper aims to compare the approaches to the concept of urban transformation both in Turkey and in Colombia. The capital cities of both countries have been investigated and analysed; Ankara and Bogota. The related research has been done by the observations in place; conversations with the people in management and with the residents. Besides, the written documents investigated and the construction applications followed. Both cities are the capitals and they include different urban transformation approaches. Because of that reason both capitals are chosen for the current comparative analysis. These two cities are selected in order to compare the tools used for the renewals of the depleted parts.

* Hacettepe University, Faculty of Fine Arts, Department of Interior Architecture and Environmental Design, Ankara / Turkey.

The concept of urban transformation is being used in Turkey more frequently during the last several decades. The need to implement upgrading or renovation projects in squatter settlements was the main motive behind it. Although possibilities were provided by various legislation to carry out urban transformation projects in metropolitan cities, economic, social and even political considerations prevented central and local governments until recently from engaging themselves in such endeavours.

The need originates from the pace and patterns of urban development in Turkey, and particularly rural to urban migration. Throughout the second half of the 20th century a rapid urbanization characterized the development process all over the world, including the developing countries. Turkey is one of the countries facing the problems brought about by rapid urbanization mainly due to its structural features. However, urbanization in Turkey had also its own peculiarities. In addition to its features such as its extent, pace and imbalances in the geographical distribution of population and economic activities, Turkey's urbanization manifests itself as an essentially demographic phenomenon, a constant flow of population from rural to urban centres, which did not cause an essentially rapid industrial development creating extensive employment opportunities in metropolitan centres to justify its pace. Instead, a substantial portion of the population migrating to cities had a chance to begin working in a variety of employments which is called the "informal sector".

The main reasons for rural-urban migration are identified as high population growth, mechanization of the agricultural sector and uneven economic ban reasons. Development which have caused disparities among geographical regions and between rural and urban areas. In this respect, while the share of urban population in the total was 25.1 percent in 1960, it rose to 55.4 percent in 1990, and to 76.0 percent in 2013.

Rapid urbanization created numerous bottlenecks in meeting the increased service needs of the migrants as well as those of the existing inhabitants of the cities. These included housing, slum upgrading, urban regeneration transportation, urban infrastructure, environmental protection, public health and education, security, and the like. It was assumed for a long time that most of such unmet needs could be attributed to the imperfections of the market mechanism. Finally, it was realized that uneven income distribution was the main variable causing the crisis and therefore long-term measures had to be taken to improve the situation.

Socio-economic marginality seems to be the major reason for huge emergence of squatter settlements in metropolitan centres of Turkey. 50 to 65 percent of the urban population of such cities as Ankara, İstanbul, İzmir still lives in squatter settlements. Despite the fact that squatting was generally regarded a rational action of the homeless poor, attempts have been made to indicate that the expenditures made for building squatter houses were, to a greater extent, a waste on the part of the national economy. If repetitive and sink costs are taken into consideration one could undeniably argue that that squatting is not a cheap technique of meeting the housing needs of the poor (Yılmaz 2008).

The Dictionary of Town Planning (Keleş 1998) defines "the gecekondu" (built overnight house, Figure 1), as a dwelling which is constructed without any building licence, in

contravention against the building and construction regulations on the lands owned by public authorities or private individuals and against the will of the landowner. They are used by the poor and by lower-income families which the State or local authorities are unable to meet their housing needs. These are called elsewhere as "spontaneous", "illegal", "unauthorized" or "uncontrolled" types of dwelling and settlement, and they are, in principle, distinguished from either slums, which are also regarded as non-conventional, or from conventional public or private type of housing.

Figure 1: Gecekondu scene from Ankara (Source: Yılmaz 2015).

Slums and squatter houses are the formations which possess most of the physical and socio-economic qualities attributed to marginal populations. They reflect those characteristics in more pronounced and aggravated measures of magnitude. Although they are often used in the literature interchangeably, the terms of "slums" and "squatter settlements" are entirely different concepts (Keleş 1988).

2. Urban transformation project of the city of Ankara

A shift was realized by the Metropolitan Municipality of Ankara during the 1990's from the preparation of development and improvement plans to the preparation of urban transformation projects. The Municipality of Ankara has undertaken to carry out a clearance project along the highway in the north of the city connecting the centre of the city with the Esenboğa Airport that was named as Protocol (VIP) Road. This project was realized by the enactment of a special law, namely the Urban Transformation Law concerning Northern Access to Ankara of 2004 (No: 5104) and the Law of 2006 (No:5481), amending the said law. These legislations enabled the City of Ankara to tear down all the gecekondus on both sides of the main road towards the main road to the Airport and to transfer the vacated lands to the municipality to be used according to a new urban design project to be prepared by the City of Ankara in cooperation with the Mass Housing Administration (Figure 2).

This part of the city deteriorated to become the most underdeveloped residential sections of the city. Nevertheless, as the area lies on the highway that connects Ankara to other cities

and lies close to the Esenboğa Airport, it has become an area for important industrial establishments. The construction of a two-way highway between the airport and the city centre furthered the importance of the northern axis. On both sides of the highway appeared illegally constructed squatter settlements. During the process of industrialization which began during the 1970's, establishments in specialized sectors, like medicine, electronics, furniture, printing, which needed quick and easy access to the airport, selected the land on this axis as their place of operation.

Towards the beginnings of the 1980s, the area had lost its physical attractiveness and its appearance got disfigured. Consequently, it became a must to conduct some work in order to achieve a series of revitalization, re handling and rehabilitation for the area. A project for this purpose was launched jointly by the Metropolitan Municipality of Ankara and TOKİ (Mass Housing Administration) and its implementation started in December 2004. It was planned to demolish the buildings in the area and replace them on a larger land, with 18.000 dwellings, two five-star hotels, cultural buildings, recreational areas, educational and sportive facilities, parks and green areas.

Figure 2: Tearing down the gecekondus for urban transformation Project (Source: Mendilcioğlu 2011).

Within this framework, the ownership rights of 115 hectares of land in the area that belonged to different public authorities and institutions were transferred free of charge to the Metropolitan Municipality of Ankara, according to the Law numbered 5104. The remaining land was expropriated in accordance with the agreements separately signed with the other owners of the land, houses, work places and industrial establishments, being registered or not at the Land Registry (Mendilcioğlu 2012).

The agreements signed have evidence that the entitled parties receive houses or work places in defined square meters equivalent to what they owned prior to the implementation and that they receive rental assistance during the construction period to prevent any grievances. Even though the project will bring some contemporary characteristics to the area in terms of infrastructure and superstructure, it would not be exaggerated to assume that the residents of the area may be regarded as victimized from social and economic perspectives.

The In-site observations demonstrate that the people whose houses were demolished and who are to receive in return an apartment flat complain about the rapidly rising rents in neighbouring communities like Mamak due to a rising demand. Against considerably high rents, the symbolic rental assistance they are paid remains insufficient. A further economic difficulty is posed by the prices of the houses constructed by TOKİ for the former land and house owners.

This created financial difficulties for the people of which great majority work for the private sector for quite low levels of remuneration. The people, while they lived in their squatter houses, used to receive a certain amount of heating assistance, but once they moved into their new houses, this assistance was discontinued. Their new houses are hosted by natural gas which brings high-sum invoices to be paid for the heating costs of the new home. On the other hand, the rights of the people who lived in the slum as tenants were not even considered. As the houses were demolished such people had to move out to other districts where rent prices floated at much higher rates. When we review the matter from a socio-cultural perspective, it is observed that the house owners are unhappy and not pleased with the place they are now living at. For example, the people who used to have cordial and strong relationships with their neighbours in their former communities and who are now living at Karacaören (*City of Teeebessüm* or *Smiling City*), stated that they are experiencing difficulties in adapting themselves to the new cosmopolitan structure of apartment house life-style (Mendilcioğlu 2012).

Another factor that appears to displease and causes difficulties for the residents of the apartments is the plan and layout of the house. In the layout plans of flats even a separate stocking area (e.g. for coal) is allocated for each family, but they are placed at the back, thus creating problems in their utilization. Additionally, the residents of the Karacaören (*City of Tebessüm*), inform that they also have trouble in reaching schools and job-sites, as the TOKİ housing area is far from to the centre of Pursaklar and the schedules of the public transportation vehicles are very limited.

Consequently, despite all the constructive and contemporary approaches adopted to constitute its objectives while it was structured, the Urban Renewal Project of the Northern Access of Ankara creates certain problems since it did not consider the social and economic conditions of the people involved. Facts such as the distance between the houses to various centres; the high heating expenses; the heavy loan back-payment conditions; placed the people of the area under difficulties and caused the project to deviate from its originally intended objectives.

On the other hand, the people formerly living in squatter settlements felt estranged from their new residential locations which would bring forth another socio-cultural problem.

3. Principles of value capture

Value capture refers to the process by which a portion of increments in land value attributed to "community interventions" rather than landowner actions, are obtained by the public sector and used for public services.

These unearned increments may be captured indirectly through their conversion into public revenues as taxes, fees, exactions or other fiscal means, or directly through on-site improvements to the benefit at large.

Value capture may raise the taxes on land impacted by infrastructure projects and as such it can serve two purposes:

a) It removes the invitation on titleholders to speculate and,

b) it raises building costs high enough that there is immediate reason to try to develop unused lands.

Value capture funding may be a way forward, with property owners contributing a portion of the infrastructure cost. Of course, such contributions need to be equitable.

From the developer and community's point of view, they must be easily understandable, collectable and not constituting economic disincentive (discouragement) that penalise employment and development. It is essential that value capture mechanisms do not contradict policies seeking to encourage development at localities well served by public transport.

Value capture funding is known as betterment tax or "şerefiye" (Turkish word for value capture) in such countries as the United Kingdom and Turkey. Various tools are used in order to ensure capturing incremental values in land by public authorities. Some of these tools have been and still are being used in Turkey. The first is land use planning. A second tool is provided by the Article 18 of the City Planning Law which enables city administrations to capture up to 40 percent of a certain land parcels, without any payment, in order to realize within city centres, such public services as roads, open spaces, schools, police stations, religious buildings, etc. A final group of tools, which are also used in Turkey includes such taxes as real estate or taxes on value increases in urban land expropriation. Although the tax on value increases had been introduced and implemented for some time in the past, it has not been put into the Law on Municipal Finance of 2484 at the beginning of the 1980's. We must underline the fact that a draft law is prepared and is about to be put in the agenda of the National Parliament, allowing public authorities to capture a certain share of the increases in land values as a result of public actions. Recent large-scale projects on urban transformation put into effect by Mass Housing Administration – TOKİ in cooperation with municipalities, can be regarded as a new tool for value capture.

Value capture refers to the recovery by the public of the land value increments (unearned income) generated by actions other than the landowner's direct investments. Although all such increments are essentially unearned income, value capture policies focus primarily on the increment generated by public investments and administrative actions, such as granting permissions for the development of specific land uses and densities. The objective is to draw on publicly generated land value increments to enable local administrations to improve the performance of land use management and to fund urban infrastructure and service provision (Smolka 2013: 8).

The notion is that benefits provided by governments to private landowners should be shared fairly among all residents. The principle that no citizen should accumulate wealth that does not result from his own efforts is known as "unjustified enrichment with no cause". A typical value capture application would have the government recover only that portion of land value increases created by its direct interventions. Any case that adds value to the landowner's land has to be shared with the public. In such cases, the property owners did nothing directly to enhance their land values.

Accordingly, value capture is the process by which some of the land value increments attributed to government or community effort are mobilized, either through their conversion into public revenues as taxes, fees, betterment contributions, and other fiscal means, or through the provision on-site land improvements that benefit the community.

4. In-site urban transformation in colombia

Bogota is the capital city of Colombia. Bogota is the largest and most populous city in the country. The inclusion of its metropolitan area, the municipalities such as Chia, Cota, Soacha, Cajica and La Calera, brings its population to well over 7 million people. Bogota is the educational, cultural, commercial, administrative, financial and political centre of Colombia (Bogota is the largest and most populous city, Figure 3).

Bogota lies 2640 meters above sea level on a plateau of the eastern mountain range of the Andes and is the third highest located capital city of the world. (http://www.newworldencyclopedia.org/entry/Bogota, Colombia).

Urbanization in Latin America is associated with strong pressure for the supply of serviced land, resulting in significant changes in land values that are distributed unequally among landowners and other stakeholders.

Urbanization in Latin America has produced a series set of urban problems ranging from vast, often illegally occupied areas with minimal urban services to illimitable disregard for building and land use regulations in wealthier neighbourhoods in some cities. Rapid urbanization over the last century led to the emergence of a vigorous land market, and windfalls resulting largely from public interventions reinforced strong landowning interests. When services in those areas that can support higher densities creates significant increases in land value. These linkages between services and prices allow ample room for practices such as fiscal and human resources are relatively scarce, the provision of urban infrastructure and

Figure 3: Bogota is the largest and most populous city (Source: Yılmaz 2013).

active land speculation, clientelism and other kinds of influence (including corruption) between public and private interests (a square in front of Rosairo University, Bogota, Fig. 4).

Colombia is notable in Latin America for its unique and long-standing experience on applying value capture instruments, which are considered beneficial fiscal planning mechanisms. Colombia has developed a fiscal culture on accepting the value capture instruments as a legitimate revenue-raising mechanism.

Figure 4: A square in front of Rosairo University, Bogota (Source: Yılmaz 2013).

The most comprehensive and systematic examples of value capture legislation in Latin America are found in Colombia's Law 388 of 1997 and Brazil's Statute of the City of 2001. Law 388 (1997) in Colombia addresses charges for changes in building rights through the Participation en Plusvalias instrument which provides a main source of income. Some administrative actions such as zoning, density planning and rural to urban land conversion cause an increase of land values. The law's Article 74 specifies the sources of these benefits as the conversion of rural land to urban uses, changes in zoning and density, and the rate of land occupation. Article 79 states that local or district councils may share from 30 to 50 percent of the plusvalias. These land value increments may also be subject to partial recovery by the public. The revenue is designated primarily for the provision of social housing and infrastructure in underserved neighbourhoods, as well as for public works of general interest (Barco and Smolka 2010).

According to the law 388, all municipalities have to design and develop a 10 years master plan (Plan de Ordenamiento Territorial – POT) and define plusvalue as a main source of income of the master plan. The Law establishes three administrative conditions for the application of value capture as a part of the POT:

a) The category change of the land; especially when rural land turns into urban as a result of plan decisions.

b) The authorization of the increase in density in an area.

c) The change in use, especially from residential to commercial use.

It is important to indicate that, value capture is not a tax, a contribution or a fee, but rather a mandated right of the public to 'participate' in the value generated by government functions to evaluate urban development. For example, contribution of valorisation has been used for the construction of new streets in Bogota, since 1969 (de Botero and Smolka 2000).

5. Concluding remarks

Urban transformation practices in Turkey and Colombia differ considerably from each other in terms of their socio-economic and environmental characteristics. Compared to the Turkish case, in Colombia during the transformation process the human aspects are considered more satisfactorily. Similarly, from a legal point of view, the respect of human rights in addition, the importance attributed to needs of public participation is significantly more discernible in the urban transformation projects carried out in the Colombian cities.

Both case studies of urban transformation processes demonstrate the importance to ensure respect for the right to housing that is guaranteed universally by the International Law. Housing is regarded as one of the fundamental human rights as defined in the Universal Declaration of Human Rights (1948, UN) and in the Covenant of Social, Economic and Cultural Rights of the UN (1966).

Experiences both in Turkey and Latin American cities identify that although numerous projects have been implemented with certain degree of concern for the right to housing, it seems

that there are still lots to do in both countries for the perfect fulfilment of this fundamental human right. Social, economic, cultural and environmental aspects of the urban transformation have to be integrated fully to the decision-making processes at central, regional and local levels. An integration with city development plans as well as with macro principles of each social and economic sectors is needed. Particularly, the prevailing approach regarding urban transformation projects as simple construction projects detached from the master plans of the cities has to be definitely abandoned. Similarly, environmental and ecological dimensions of transformation activities which seem to be largely neglected have to be given consideration at all stages of the planning process. Finally, it should be stressed that for a more effective implementation of urban transformation projects, the eradication of the urban poverty itself should definitely be regarded as the – basic precondition.

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Meltem Yılmaz* and Ruşen Keleş**

The Role of Local Authorities and the Public for the Protection of Natural Assets

The Case of Eymir Lake (Ankara, Turkey)

1. Introduction

Despite all the efforts to replace unplanned, spontaneous and haphazard development by planned attempts to rationalize the urban development process, Turkey is still facing an unbalanced, unhealthy and unplanned urbanization. An increasing number of urban development projects is prepared and put into practice during the last decade by the central government and by the local authorities, in addition to the construction activities undertaken by landowners themselves.

As Ankara is the State Capital of Turkey, the Metropolitan Municipality of Ankara and its surroundings are affected in a negative manner by the urbanization. In addition to the determination of the central government to encourage and support the construction sector, and the centralization of all planning powers, the Mayor of Ankara and the City Council use all planning powers available to them to initiate new construction works which will finally destroy certain unique natural areas of the city.

The Eymir Lake and its surroundings are the most recent examples of this anti-environmental attitude. The right to use this lake as a recreation centre was given during the 1960's to one of the most prestigious universities of Turkey, namely, to the Middle East Technical University (METU).

First of all, the Article 57 of the Turkish Constitution, concerning the right to environment, along with citizens, charges the State at the same time with the duty to protect the environment and to prevent its pollution. The State apparatus includes certainly local self-government. In other words, as a part of the State machinery local authorities too are required to carry out the same responsibilities. On the other hand, according to the Article 63 of the Constitution, the State ensures the protection of cultural, historical and natural values and takes measures for their preservation and improvement. Local authorities, as autonomous legal entities, carry out numerous public services of local nature, including the protection of environmental values. This responsibility originates from the Constitution, national legislation regarding the functions, competences and duties of local authorities as well as the requirements emanating from the rules imposed by international treaties to which Turkey has become a party especially during the last four decades. They are mainly initiated by

* Hacettepe University, Fine Arts Faculty, Turkey.

** Ankara University, Faculty of Political Science (em.) / Turkey.

specialized agencies of the United Nations, such as UNESCO and UNEP, and certain legal instruments of the European Union and the Council of Europe, including the Ramsar Convention of 1972 and the European Landscape Convention of 2000. In view of all these ratified legal documents encompassing important principles, local authorities have no other choice to do their best for the preservation of landscape (Keleş, 2014:38–43).

Although the right to private ownership of mobile and immobile property is guaranteed by the Article 35 of the Constitution, it can be limited by the consideration of public interest. Numerous laws, like the Civil Law, the Law on the Encouragement of Tourism, the Law on the Protection of Cultural and Natural Assets, the Law on Environment, the Law on the Bosphorus, Urban Development Law, the Law on the Protection of Coastal Areas, the Law on Pastures, and the Law on Land Use and the Protection of Soils possess important clauses regarding the restriction of the right to private property.

The City of Ankara, like all other metropolitan municipalities in Turkey, has the duty to protect the environment as a whole, agricultural sites and water reserves, and to support afforestation activities, in accordance with the principle of sustainable development. In addition to these, preservation of the historical tissue, elements of cultural and natural landscape is within the scope of responsibilities of the cities. Since such functions, duties and competencies are not exclusively left to local authorities, the Central Government, namely the concerned ministries, have to cooperate with metropolitan municipalities, in order to carry them out. It is assumed that such a shared responsibility would constitute a certain safeguard for the protection of such values.

2. The Case of Eymir Lake

Although this assumption seems to reflect a theoretically right expectation, reality is most of the time quite different. Because factors other than objective criteria used normally for the performance of local public services, in other words political considerations, seem to influence considerably the decisional behaviour of the City of Ankara.

The location of Eymir Lake is at a distance of nearly 20 kilometres from the centre of the city. The use of the Lake and its surroundings is left to the Middle East Technical University by the Treasury to be used as a recreation centre (see Figure 1). The Lake is at the same time nourished by nearly a dozen of small rivers. Negative interventions in either the Lake or its surrounding countryside might have the potential to reduce its water capacity and to destroy its ecological richness (Yılmaz, 2010:154,155). That is the reason why Ankara Metropolitan Municipality and the Middle East Technical University have cooperated during the 1990's to develop a Project of Water Resources and Environmental Management for the protection of Eymir Lake as a whole.

The Eymir Lake is situated within the İmrahor Valley where the main use of land is agriculture and forestry. Rapid urbanization of the region and the relatively short distance from the district centre of Gölbaşı make Eymir Lake face a serious risk of dilapidation. Enlargement of residential settlements around the Lake and at the same time the rapid increase in the

number of industrial establishments constitute a real threat to the future of the lake (see Figure 2).

Figure 1: Recreational use of Eymir Lake (Source: Yilmaz, 2012).

Figure 2: The residential high blocks around the lake (Source: Yilmaz, 2012).

So far the Middle East Technical University, as the user of the Lake and its surroundings as a public trust, has made a great effort not to change the basic land uses around the lake. That is the reason why the area has been successfully used as a recreation centre during the last four decades (see Figure 3).

However, nowadays both the Metropolitan Municipality of Ankara and the Central Government are inclined to change the rules governing the land use status of the area. They both expect to gain from the increase of the rent (exchange value) in the area and to allow the inhabitants to share it. Such a stand is certainly contradictory with the principle of sustainable development which requires taking into consideration the rights of future generations over all environmental values including the landscape (see Figure 4).

Figure 3: Recreation centre (Source: Yilmaz, 2012).

Figure 4: High residential blocks around the lake gaining rent by having view to Eymir Lake (Source: Yilmaz, 2012).

There have been several attempts in the past to shed green light to construction and industrial development in this part of the city. For instance, at the beginnings of the 1990's, Special Environmental Protection Agency (Özel Çevre Koruma Kurumu; *merged into the*

Ministry of Environment and Urban development in 2011) had worked out a Master Plan for the Protection of the Environment (Scale: 1:25.000) by which it facilitated the construction in the agricultural lands of certain category. Similarly, the Municipality of Ankara, through a Master Plan adopted in the same years, eased the conditions for building on agricultural land of the same category. New rules regarding the land use controls and urban development brought about by these attempts were not compatible with the Article 9 of the Environmental Law that was in effect since 1983 (Yılmaz, 2010:198).

Recently, the Metropolitan Municipality of Ankara insistently brought to the City Council frequent proposals for amendments in the city master plan in order to further change the balance between the goals of development and protection in favour of the first. The average number of plan amendments reach annually several hundreds. One can rightly ask then why the master plan was adopted, if it was going to be amended so frequently. Not only the number of amendments, but also their content was extremely important because most of them were concerned with changing the strict rules as the safeguards for the protection of fertile agricultural land, natural landscape, and other natural resources.

Construction in such valuable lands with the purpose to meet the needs of higher-income groups was the main target of the Ankara Metropolitan Municipality. When talking about "opening these areas into the public", there was simply meant construction of high-rise residential buildings expected to take place in those areas (see Figure 5; Şengül, 2015:10–11).

Figure 5: Construction of high-rise residential buildings for higher-income (Source: Yılmaz, 2015).

In order to realize this aim of the City, there were two pre-conditions: First was certainly to change the decision of the government taken during the 1960's to leave the right to use of the Eymir Lake to the Middle East Technical University. The second was the need to amend the land-use rules in the previously adopted City Master Plan, which attributed great importance to the preservation of natural landscape and agricultural lands. With respect to this latter precondition a recent development which occurred recently does not leave any

place for optimism. Because, according to the Law on Metropolitan Municipalities, there is a division of labour between the upper level (metropolitan) and lower level (district) municipalities in terms of the competencies regarding the preparation of the master plans, and the upper level municipalities are empowered to work out the metropolitan master plans which are binding for the district (lower level) municipalities. The Metropolitan Municipal Council has recently approved a master plan covering the İmrahor Valley where the Eymir Lake is situated. This new plan allows the construction of a high-rise residential settlement that is called Altın Oran (Golden Oran) together with a Diplomatic Hotel to be used to host high-level foreign guests. This development will certainly affect the natural character of the region adversely and will threat the environment as a whole.

The lake of Eymir and its surroundings have kept their attractiveness up to now (see Figure 3). The reason for this is that these areas have been in the use and control of the Middle East Technical University as explained above. The protection of the land as a whole ensured the conservation. Land ownership around the Eymir Lake is undivided. Thus, conversion of this land into smaller urban land subdivisions has been avoided (Yılmaz, 2010). However, during the last two years, the Metropolitan Municipality of Ankara made a constant effort to take the right of use of the Eymir Lake out of the METU. Its target is to allow construction around the lake, thus helping the creation of a rent-seeking society.

It seems that an Environmental Impact (Çevresel Etki Değerlendirmesi) Report has also been prepared to allow the city administration taking into consideration the advantages and disadvantages of the proposed development, but it paved the way to acting with more flexibility for changing the character of the area. Although the stakeholders expecting great benefits from increasing land values support the move of the Ankara Metropolitan Municipality, we must emphasize, in this context, that stakeholders of such important projects that may affect the whole city are not be regarded only as those living nearby. Such radical changes interest all inhabitants of the city. Therefore, before the decision of the City Council is taken, a referendum on the suitability of the Project was definitely needed (Şengül, 2005:11). This is required also by the provisions of the European Charter of Local Self-Government to which Turkey is a Party.

On the other hand, Turkish Municipal Law (No:5393) of 2005 (Arts.13, 76, 77) entitles the citizens to be informed about the works of the municipality and to participate in the decision-making processes, either personally or through such civil organizations as Advisory Council of the City (Kent Konseyi). In addition to these rights, the Law empowers the municipality to carry out public opinion polls and referendums in any matter that interests the inhabitants closely (Keleş, 2012:227–234). There is no doubt that successful implementation of such legal norms depend to a large extent on the consciousness of citizens and environmental concerns of the inhabitants.

There are successful experiences in some other European countries combining the needs of present generations with the rights of future generations to enjoy socio-economic and psychological benefits of natural and cultural landscapes. As stated by Van der Valk (2009),

"During the twentieth century, the Dutch landscape has gone through a drastic transformation due to the combined forces of industrialization, urbanization, post-war reconstruction, land consolidation, road construction and water management. This has caused uniformity at ever greater increases of scale. Over the second half of the century, the Netherlands has rapidly transformed itself from an agricultural nation into a trading nation and an informational society based on the exchange of knowledge and goods" (van der Valk, 2009:41). Undoubtedly the discretion of imposing order in land use and development in the Netherlands has been attributed to government. Because "rational parcellation of reclaimed land, compact towns and a tight network of trunk roads are tokens of government intervention. Organization of space is regarded as a public concern that cannot be simply left to the mercies of society" (van der Valk, 2009:41). Undoubtedly, rational development planning implies "horizontal collaboration between the various departments (culture, environment, spatial planning, economy, education, agriculture, etc.), systematic collaboration between professionals (architects, town planners, developers, engineers, archaeologists, conservators, naturalists, sociologists, anthropologists, geographers, lawyers, etc.) and participation of the public." (Déjeant-Pons, 2009:13).

The Article 30 of the Environmental Law provides an opportunity to the public according to which those either affected by or informed about a certain activity that damage the environment may recourse to the government and ask taking necessary measures to stop those activities. There is no doubt that effective implementation of such a clause requires an elevated level of environmental awareness in the public. In addition, such demands may be taken into consideration more seriously when they are submitted to the governmental authoriies not personally but in an organized manner, namely as professional organizations, associations, foundations, cooperatives, etc. Finally, either personally or as civil society organizations, the public should be able to use all possibilities to protest against such activities within the framework of the complementarity of the legal rights (Keleş, 2012:180–184). They should be able to fully use all kinds of instruments of civil disobedience. The final step is of course taking the issue to the courts.

In the final analysis, environmental values can be safeguarded appropriately by the will of the public which is formed essentially by formal and informal educational channels. Direct and indirect involvement of the local people is the best guarantee for the protection of nature. Unless all measures are taken in this regard, even though formally elected by the voters, attitudes of the representatives of local authorities or national governments may be deprived of legitimacy.

3. Concluding Remarks

Land ownership is one of the internationally recognized fundamental human rights. As such, it requires that this right should be used with due regard to the benefit of the present and future generations. Considerations of public interest constitute the social and cultural foundation of the right of land ownership. Since it is not an absolute right, all owners of the

land, being private individuals or public authorities, must act with maximum care for the protection and preservation of natural and cultural land use patterns.

The case of Eymir Lake in the metropolitan city of Ankara is one of the best examples expressing the need for a struggle between environmentally conscious public, civil society foundations, universities and professional organizations on one hand, and the rent-seeking city managers who are simply concerned with short term economic and political benefits to be gained from manipulations regarding land use patterns at the expense of future generations, on the other hand. Within this context, the difference between the use and the ownership of the land, either by public authorities and private individuals, becomes crucially important.

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Nikolay Volovich*

Zum Stellenwert der Bodenpolitik

Die Krim seit dem Anschluss an die Russische Föderation

1. Einleitung

Theorie und Praxis des 20. Jahrhunderts haben uns gezeigt, dass die Entwicklung von Gesellschaften (Firmen oder Staaten) von zahlreichen Bedingungen abhängit. Nur in Ausnahmefällen ist die Verhaltensweise der Sozialgruppen rational oder streng ökonomisch determiniert. Untersuchungen der Theoretiker der „Institutionenökonomie" (Coase 1937; Coase 1960; Demsetz 1967; Williamson 1979) haben nachgewiesen, dass vor allem kulturelle Traditionen und Einschränkungen hinsichtlich des Informationszugangs zu Märkten eine wichtige Rolle in der Entwicklung der Gesellschaften spielen. Damit werden auch die Möglichkeiten der politischen Entscheidungen auf den unterschiedlichen Staatsebenen eingeschränkt.

Beim Bodenmarkt zeigt sich diese Erkenntnis stärker und öfter als bei andere Formen des sozialen Lebens, auch in Europa. „Die auf Traditionen und kulturellen Gegebenheiten beruhenden Ländersysteme, insbesondere die Planungssysteme, stehen einer weitereichen Harmonisierung entgegen. Positive Effekte sind nur von einzelnen, kleineren Maßnahmen zu erwarten …" (Dieterich et al. 1993, 30).

Die Wissenschaftler ignorieren häufig die Realität, dass die Politiker die kulturellen Besonderheiten sehr oft missbrauchen, um ihre eigene Unfähigkeit zu verwischen. Die Geschichte hat mehrere Beispiele dafür, dass die politischen Verantwortungsträger Reformen durchführen, die demokratischen und marktwirtschaftlichen Bedingungen und Prozessen wesentlich widersprechen. Auch die modernen Globalisierungsprozesse zeigen auf, dass wir den Verbrauch von Naturresourcen nur mit politischem Willen verringern können. Die kulturellen Unterschiede sind nicht wichtig – vielleicht als Ausnahme die Sicherung des traditionellen Naturlebens der Amazonas-Indianer oder der Inuits am Polarkreis.

Einen weiteren Nachweis, dass die politischen Kräfte nicht die kulturellen Traditionen, sondern eine eigene Vorstellung über ihr politisches Überleben implementieren, liefert uns die Geschichte der Halbinsel Krim. Der Übergang der Krim im Jahr 2014 von der Ukraine zu Russland war eine rein staatspolitische Entscheidung. Derzeit ist unklar, wie es zu dem blutigen Konflikt zwischen Russland und der Ukraine, der sich in einen wahrhaftigen Bürgerkrieg in der Ostukraine verwandelt hat, kommen konnte.

Dazu stellen sich folgende wissenschaftliche Fragen, welche in diesem Beitrag beantwortet werden:

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* Financial University Moscow, Faculty of Finance and Economics, Property Valuation and Management / Russian Federation.

- Waren zum Zeitpunkt des Übergangs (im Jahr 2014) Unterschiede bezüglich der Bodenpolitik zwischen der Ukraine und Russland bedeutend, und wenn ja, entstanden daraus Konflikte?
- Haben die Bevölkerung und die Unternehmen auf der Krim jetzt mehr Probleme mit dem (russischen) Staat?
- Wie reagiert der Bodenmarkt auf die neue Situation?

Zu Zeiten der Sowjetunion (UdSSR) entwickelten sich die beiden Republiken Russland (Russische Sozialistische Föderative Sowjetrepublik) und Ukraine (Ukrainische Sozialistische Sowjetrepublik) als ein einheitlicher wirtschaftstechnologischer Komplex. Die Entwicklung der Politik in der Ukraine und in Russland hat nach dem Zerfall der Sowjetunion zu einer schwerwiegenden Krise in der Beziehung zwischen den beiden Ländern geführt. Obwohl der Ausgangspunkt hinsichtlich der Bodenpolitik beider Länder beim und auch nach dem Zerfall der UdSSR gleich war – anfangs: sozialistische Beziehungen ohne Privateigentum und ohne freien Immobilienmarkt, später: gleiche deklarierte Ziele der Staatspolitik wie der freie Markt und das Eigentum an Grund und Boden – gibt es seit 2014 eine krisenhafte Beziehung (einen sog. „hybriden Krieg") zwischen der Ukraine und der Russischen Föderation. Eine entscheidende Ursache für die krisenhafte Entwicklung liegt wohl darin, dass die russische Wirtschaft als Teil des globalen Markts sehr von der Förderung der lithosphärischen Rohstoffe abhängt, wohingegen die Ukraine seit jeher ein industriell geprägtes Land ist, mit gleichzeitig wirtschaftlich bedeutender Landwirtschaft. Hinzu kommt die wesentliche Rolle der Ukraine als Transitland zwischen der EU und Russland. Kulturelle oder wirtschaftliche Besonderheiten dürften keine wesentliche Rolle bei der Entstehung des Konfliktes gespielt haben. Es gibt mehrere Länder der ehemaligen Sowjetunion, bei welchen diese beiden Faktoren bedeutender waren.

2. Grundeigentum

2.1 Bodenreform

Nach dem Zerfall der UdSSR hat die in Russland durchgeführte Bodenreform für alle Liegenschaften private Eigentumsrechte geschaffen, mit Ausnahme von Rechten an strategisch wichtigen mineralischen Rohstoffen. Alle bedeutenden Betriebe wurden von Oligarchen privatisiert. Auch der Normalbürger in Russland hat kostenlos das Eigentum an den staatlichen Apartments der Sowjetzeit und an Ackerland der Kolchosen erhalten. Bis auf einige Fälle, wie etwa für „strategische Betriebe" oder für Ackerland, gibt es für Ausländer keine Verbote zum Eigentumserwerb (LGBRF 2001). Die letzten 10 Jahre, die von hohen Ölpreisen gekennzeichnet waren, brachten erhebliche Einnahmen für den Staat, wodurch dieser gefestigt wurde.

In der Ukraine hat es nach der Auflösung der Sowjetunion eigentlich keine Bodenreform gegeben. Die Mehrheit der Bevölkerung hat im Zuge der Privatisierung der Betriebe wenig bekommen. Die Bauern konnten das Ackerland lediglich pachten (LGBUK 2001).

2.2 Eintragung von Eigentums-Rechten

Die Art und Weise, wie Rechte an Immobilien registriert werden, wird in beiden Ländern ständig neu geordnet. In beiden Ländern ist allerdings für den Geschäftsverkehr die Eintragung der Rechte an Grundstücken und Bauten ins Register notwendig. In der Ukraine befindet sich die für die Registrierung dieser Rechte zuständige Institution unter Kontrolle des Justizministeriums, in Russland ist sie dem Wirtschaftsministerium unterstellt. Es ist festzuhalten, dass nach einer tiefgreifenden Änderung der Grundbuchgesetzgebung im Jahr 2013 die Ausstellung von Eigentumsurkunden in der Ukraine nur mehr durch Notare erfolgen kann. Dies geschieht üblicherweise innerhalb eines Tages. In Russland benötigt die Eintragung der Eigentumsrechte bis zu zwei Wochen.

2.3 Besteuerung und Bewertung von Grundeigentum

Auch die Steuersysteme sind unterschiedlich aufgebaut. Zwar ist die Grundsteuer im Wesentlichen gleich ausgestaltet, allerdings gibt es in der Ukraine im Gegensatz zur Russischen Föderation mehrere Befreiungsmöglichkeiten. Auch die Berechnungsgrundlage ist in beiden Ländern verschieden. In Russland gibt es eine Bewertung für die Grundstücke und für die Mehrzahl an Gebäuden (Twaroch und Wessely 2015). Durch diese soll der Ertrags- bzw. Substanzwert an den Verkehrswert angepasst werden. In der Ukraine wird die „Bodensteuer“ aus einem normativen Wert pro m² ermittelt, der von der Nutzungsart und der Lage der Immobilie abhängt. Die Basissätze legt die Regierung in Kiew fest. Des weiteren entfällt in Russland die Schenkungs- und die Erbschaftssteuer für Verwandte, und es gibt auch keine Umsatzsteuer im Immobilienverkehr. Dies im Gegensatz zur Ukraine, wo die Grundstückstransfersteuer 1% beträgt.

3. Immobilienmarkt in Russland und in der Ukraine

Die Regulierung des Immobilienmarktes in Russland und in der Ukraine geht von zwei grundsätzlich verschiedenen Ideen aus. In Russland versucht der Staat stets, die Macht der regionalen Oberschichten unter Kontrolle zu bringen, wohingegen die Entwicklung in der Ukraine zu mehreren regionalen Oligarchiegruppen geführt hat. In Russland ist die Bodengesetzgebung stark auf das Privateigentum hin ausgerichtet (BGBRF 1994; BGBRF 1996). Für die russische Zentralregierung war es wichtig, nur das Eigentum an wichtigen Rohstoffen zu behalten. Diesem Ziel sind auch die Territorialplanung (Raumplanung) und die Flächenwidmungs-Gesetze untergeordnet. In der Ukraine ist dies grundsätzlich unterschiedlich. Die örtlichen Behörden können Eigentumsfragen, wie etwa die Überführung von Grundstücken aus dem privaten Eigentum, in manchen Fällen auch ohne Entschädigung, selbstständig durchführen. Unterschiede gibt es in der russischen und in der ukrainischen Land-Gesetzgebung auch bei den Arten von Bodenrechten (z. B. gibt es in Russland kein Emphyteusis[1] und kein Superfizies[2]) bei den Kategorien und bei den Nutzungsarten der Grundstücke.

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1 Erbbaurecht, ein dingliches Recht zur Nutzung eines fremden Grundstücks für landwirtschaftliche Zwecke.

2 Vererbbares Erbbaurecht.

4. Entwicklungen des Wirtschafts- und Sozialsystems auf der Krim seit März 2014

Im März 2014 ist die Krim an die Russische Föderation angeschlossen worden. Beide Seiten haben diesen Anschluss unterschiedlich gesehen: die Ukraine als Eroberung durch die Russische Föderation und Russland als freie Entscheidung der Bevölkerung in einem Referendum nach dem Putsch in Kiew. Die Unterschiede der Bodenrechts-Systeme der beiden Länder waren nach dem Krim-Anschluss eine wesentliche Herausforderung. Diese nunmehr neue Region der Russischen Föderation brauchte dringend eine spezielle Gesetzgebung, insbesondere ein neues Registrationssystem an Immobilien, welches die föderale Regierung erlassen hat (GSS 2014; GRK 2014).

4.1 Immobilienpreisentwicklung

Wie reagierte nun der Immobilienmarkt auf diese Situation? Selbst auf der Krim spielt er eine besondere Rolle, weil das gute Klima, das Meer, die schöne Landschaft, die freundliche Bevölkerung und die reichhaltige Geschichte seit jeher ein „Paradies" für Russland bedeuteten. Unmittelbar nach der Vereinigung der Krim mit der Russischen Föderation sind die Immobilienpreise um bis zu 30% sowie die Preise für unbebautes Bauland um bis zu 50% gestiegen. Zunächst hat es Erwartungen gegeben, dass die wohlhabenden Russen in den Immobilienmarkt einsteigen würden. Dies haben sie anfangs auch tatsächlich getan, doch ist die Lage seit den Sanktionen der USA und der EU und der damit auch verbundenen Abwertung des Rubels komplizierter geworden. Obwohl die russischen Staatsbürger aus den östlichen und den nördlichen Regionen gern auf die Krim übersiedeln möchten, haben Wirtschaftskrise und das Zinsniveau die Nachfrage fallen lassen. Jetzt ist es in vielen russischen Regionen viel schwieriger geworden, Wohnungen zu verkaufen, um das damit erwirtschaftete Geld dann auf der Halbinsel Krim zu investieren.

Erst in zwei Jahren wird eine Bewertung des Immobilienmarktes möglich sein, wenn die Dynamik der Preisentwicklung auf Basis der Devisenkurse in Kiew, Moskau, Krasnodar (die Hauptstadt der benachbarten Region) und in Simferopol (die Hauptstadt der Krim-Republik) miteinander verglichen werden kann.

In Moskau ist der Markt für durchschnittliche Wohnimmobilien (zum Beispiel Apartments auf Dollarbasis) seit März 2014/15 um 50% eingebrochen; Ähnliches gilt für Krasnodar und Kiew. Allerdings sind in Simferopol die Dollarpreise seit dem Anschluss der Krim zur Russischen Föderation lediglich um 20% gefallen und damit im Verhältnis zu Rubel oder Griwna höher als vor dem Referendum. Damit lässt sich die große Nachfrage nach Wohnimmobilien begründen, zusätzlich verstärkt durch die verringerte Anzahl an Wohnungsbauten (im Jahr 2015 etwa 70% der Fertigstellungsanzahl von 2013).

4.2 Auswirkungen auf den Devisenmarkt

Die beiden Märkte – in Russland und in der Ukraine – sind so eng mit dem Devisenmarkt verbunden, dass die Sachverständigen oft fast lineare Zusammenhänge mit nationalen Devisenkursen sehen. Die beiden Devisen – der Rubel und die Griwna – zeigen schon seit zwei Jahren deutliche Abwertungstendenzen gegenüber dem Dollar und dem Euro. Beide

haben in den letzten Jahren etwa die Hälfte ihres Wertes verloren. Die Griwna ist gegenüber dem Rubel stärker gefallen: am 18. März 2014 hat eine Griwna 3.7 Rubel gekostet und Anfang 2016 ist sie nur mehr 3.1 Rubel wert gewesen. Das ist bedeutend, weil Russland Ende 2015 ein Gesetz erlassen hat, in welchem die Rückzahlung aller Schulden an die ukrainischen Banken und an andere Finanzinstitute auf der Krim auf das Datum 18. März 2014 reglementiert ist. Im russischen Gesetz ist dafür ein fester Wechselkurs angegeben – 36.6 Rubel zu 1 USD und 50.9 Rubel zu 1 Euro (das war nur am 18. März 2014 aktuell, Anfang 2016 hat sich der Währungskurs schon in Richtung 71 und 80 Rubel zu Dollar und Euro geändert). Man muss sagen, dass die Bankinvestoren ihre Rückzahlungen auf der Krim auch zum Kurs vom 18.03.2014 erwarten. Doch derzeit weiß niemand, wieviel die Bevölkerung und die Unternehmen den ukrainischen Banken schulden. Diese Banken selbst geben an, dass etwa 80% aller Kredite für Immobilien damals in Dollar oder in Euro vergeben wurden. Damit haben die Kreditnehmer auf der Krim wesentliche Vorteile gegenüber den anderen Regionen in Russland, wo bis heute Dollarkredite zum realen Kurs zurückgezahlt werden müssen. Vorteilhaft ist auch die Stornierung von Zahlungen der Zinsen und Finanzstrafen auf der Krim seit dem Anschluss der Halbinsel an Russland.

4.3 Entwicklung des Staatshaushalts

Es bestand die Notwendigkeit einer Harmonisierung der auf der Krim bestehenden Wirtschaftspolitik mit der russischen Gesetzgebung. Zunächst hat die Regierung der Russischen Föderation versucht, die Krim (die Republik Krim und Sewastopol als so genannte „Stadt von föderaler Bedeutung“) durch ein eigens für diesen Zweck geschaffenes „Krim-Ministerium“ zu verwalten, wobei man zwischenzeitlich wieder zum bereits durch die regionalen Krim-Behörden praktizierten Verwaltungsmodell zurückgekehrt ist.

Die Einnahmen der Republik Krim (ohne Sewastopol) für das Jahr 2015 beliefen sich auf 25,6 Mrd. Rubel und lagen damit etwa 10% über den Prognosen. Die größten Einnahmen bringt die Steuer auf das gestiegene Einkommen der natürlichen Personen (mehr als 12 Mrd. Rubel im Jahr 2015). Die Ausgaben des Haushaltes der Republik betrugen 94 Mrd. Rubel; geplant waren tatsächlich 105 Mrd. Rubel. Diese Minderausgaben von insgesamt 89% zeigen, dass es für die Angestellten der neuen Region noch schwer ist, alle Anforderungen der russischen Ministerien umzusetzen, entspricht doch diese enorme Differenz den bisher nicht verwendeten Zuschüssen aus dem föderalen Budget.

Für die Halbinsel sind im föderalen Budget für die nächsten 5 Jahre etwa 15 Mrd. Euro eingeplant. Es geht um ein spezielles Regierungsprogramm „Die sozial-wirtschaftliche Entwicklung der Republik Krim und der Stadt Sewastopol bis zum Jahr 2020“, was auch die Entwicklung von Verkehrs- und Technischer Infrastruktur beinhaltet. Alle diese Pläne geben den Investoren die Hoffnung, dass der Immobilienmarkt auf der Krim auch die derzeitige Wirtschaftskrise in Russland positiv nachhaltig überlebt.

Diese Investitionen sind dringend notwendig, weil die gewöhnlichen Wirtschaftsbeziehungen auf der Krim bereits seit 2 Jahren eingebrochen sind. Auch die Arbeitslosigkeit ist auf der Krim zurzeit hoch. Der Großteil der Strom- und Wasserversorgung der Krim erfolgt aus

der Ukraine. Auch die gesamten Eisenbahn- und Straßenverbindungen sind nur durch die Ukraine möglich. Die Wasserversorgung der Landwirtschaft ist derzeit ein großes Problem, was den Anbau von landwirtschaftlichen Produkten wie etwa Reis beeinträchtigt.

5. Bodenrechtliche Änderungen

Was hat nun die russische Regierung gemacht, um in der Stadt von föderaler Bedeutung Sewastopol und in der Republik Krim veränderte Bedingungen auf den Immobilien- und Grundstücksmärkten zu schaffen?

5.1 Steuerreform

Am einfachsten war es, das Steuersystem (neu) zu organisieren. Allerdings ist derzeit ein Moratorium für eine neue Immobiliensteuer eingetreten. Erst im Jahr 2018 ist mit einem Massenbewertungssystem für Boden und Bebauungen zu rechnen. Auf der Krim bleibt damit bis auf weiteres ein normativer Wert für die Berechnung der Bodensteuer, der in Russland schon seit 2006 nicht mehr gebräuchlich ist. Für juristische Personen gibt es seit 2015 eine Vermögenssteuer, die sich an historischen Werten (Bilanzwerten) orientiert. Die natürlichen Personen zahlen wie auch zu Zeiten der Ukraine eine Wohnungssteuer – nur seit dem Anschluss in der Währung Rubel. Probleme gibt es mit der Einkommensteuer beim Verkauf der Immobilien durch die jeweiligen Eigentümer. Da die Ukrainer auf der Krim nun als Ausländer gelten, beträgt der Steuersatz der Einkommensteuer beim Verkauf von ihren Immobilien 30%. Im Gegensatz dazu beträgt der Höchstsatz für die russischen Staatsbürger 13%. Dies scheint zu hoch und zudem fragwürdig zu sein. Die Ukrainer hoffen auf eine Änderung im Jahr 2016.

5.2 Registrierung der Rechte an Grundstücken

Als viel schwieriger hat sich die Umstellung des Registrierungssystems von Eigentumsrechten an Immobilien erwiesen. Es hat fast ein Jahr gedauert, bis die Zentralregierung in Moskau entschieden hat, ein eigenes Registrationssystem für die Krim zu schaffen. Obwohl für „alte“ Regionen ein zentrales Register (der Föderale Dienst „Rosreestr“) für alle Rechte an Immobilien (Flurstücke, Gebäude, Einrichtungen und Räumlichkeiten) existiert, befindet sich in der Republik Krim und der Stadt Sewastopol dieses Register in der Verwaltung der Regionen („Krimreestr“). Um den Verkehr mit Immobilien zu beleben, wurden für die Krim einige Sondergesetze verabschiedet. Laut diesen Gesetzen ist es erforderlich, dass die Alteigentümer ihre seit Zeiten der Ukraine existierenden Rechte zunächst im „Krimreestr“ eintragen und dann in einem zweiten Schritt die Verkaufsverträge schließen. Im ersten Schritt sind die bestehenden ukrainischen Urkunden, technische Inventarisationsdokumente von Gebäuden oder Räumlichkeiten, spezielle Nachweispapiere an Flurstücken von örtlichen Gemeinden und die neuen Katasterpässe der Immobilien dem „Krimreestr“ vorzulegen. Probleme ergeben sich bei der Akzeptanz aller Verkehrsfälle auf der Krim durch die zentrale ukrainische Regierung in Kiew. Umgekehrt akzeptiert die russische Gesetzgebung bis heute keine ukrainischen Registrierungseintragungen, außer solche, die nach dem

Anschluss der Krim-Halbinsel von „Krimreestr“ ausgegeben worden sind. Konflikte mit den verkaufenden Eigentümern und bei Erbschaftsfragen sind damit vorprogrammiert.

Unter diesen erschwerten Bedingungen ist eine Entwicklung des Wirtschafts- und Sozialsystems nicht einfach. Die Region ist auf neue Bebauungen angewiesen. Dazu fehlt auf der Krim ein Raumplanungssystem, und es kann jahrelang oder sogar Jahrzehnte dauern, solch ein System aufzubauen. Hinzu kommen noch andere Ursachen wie etwa zahlreiche Alteigentümer (z.B. besonders mächtige ukrainische Oligarchen), die die neuen Machtverhältnisse auf der Krim sabotieren.

5.3 Eigentumszuteilung

Sofort nach dem Referendum und dem Anschluss zur Russischen Föderation haben die neuen Regionalregierungen auf der Krim entschieden, dass das gesamte ukrainische Vermögen auf der Krim in das Eigentum der Republik Krim sowie der Stadt von föderaler Bedeutung (Sewastopol) übergehen sollte. Danach wurden mit speziellen Gesetzen strategische Objekte (z.B. Infrastrukturobjekte, Banken oder besondere Industriebetriebe, aber auch Häfen und Flughäfen sowie das Tankstellennetz) aus dem privaten Besitz in das öffentliche Eigentum der Regionalregierung – ohne Entschädigung – überführt. Dazu gehören auch Gesundheitseinrichtungen und Hotels wie z.B. das berühmte Erholungsheim in Foros, wo während des Putsches 1991 der damalige Präsident Gorbatschow verhaftet wurde. Offiziell hat die Russische Föderation von diesen Vermögensobjekten nur einen kleinen Teil als föderales Eigentum erhalten, zum Beispiel das Archäologiemuseum Hersones oder die Krim-Eisenbahn (KZD). Man darf auch nicht vergessen, dass die Rechte russischer Unternehmen und russischer Bürger zu den Zeiten der Ukraine wie auch besondere Sicherheitsrechte der russischen Schwarzmeerflotte mit voller Infrastruktur durch den zwischenstaatlichen Vertrag gewährleistet wurden.

Es sei betont, dass einige unter den etwa 250 für die Wirtschaft strategischen Privatobjekten, die in der Krimrepublik ohne Gerichtsurteil und Entschädigungen enteignet und nationalisiert worden sind, auch russischen Staatsbürgern gehört haben (vor allem Offshore-Firmen). Das russische Verfassungsgericht hat am 10.03.2016 kein Urteil gesprochen, als die russischen Inhaber der Firma „Krimhleb“ („Krimbrot“) gegen ein solches offensichtlich verfassungswidriges Gesetz Klage eingereicht hat. Offiziell hieß es, dass der Kläger keinen Nachweis über seine Rechte am Vermögen vorgelegt habe (VGE 2015). Aber es ist klar, dass solche Fragen der Regelung aller Prozesse der Nationalisierung und Umverteilung des Eigentums für das russische Gerichtsystem zu streng sind. In einigen Fällen erklärte die Krimregierung, dass enteignetes Vermögen zwangsversteigert werde, um die alten Verbindlichkeiten der Inhaber (insbesondere der Banken als Gläubiger) zu decken.

Früher hat das Verfassungsgericht der Russischen Föderation selbst bestätigt, dass der Anschluss der Republik Krim an die Russische Föderation und damit die Herausbildung neuer Rechtssubjekte im Bestand der Russischen Föderation – die Republik Krim und die „Stadt mit föderaler Bedeutung“, Sewastopol – ein besonderer Fall ist, der spezielle Maßnahmen erfordert. Diese sollen gewährleisten, dass die Umsetzung der materiellen Rechte

der Bürger und Eigentümer gewährleistet ist (Definitionen vom 25.2014, Nr. 2155-O und vom 24. März 2015, Nr. 653-O).

Als Folge darauf haben die bisherigen ukrainischen Eigentümer damit begonnen, Klagen auf Entschädigung durch die erlittenen Enteignungen beim Internationalen Strafgerichtshof (ad hoc) in Den Haag einzureichen. Zusätzlich wurden zu diesem Zweck Petitionen beim Europäischen Parlament in Straßburg eingereicht. Die ukrainische Regierung selbst hat entsprechende Klageschriften eingereicht. Die Rede ist von einer beantragten Entschädigungssumme von mehr als 100 Mrd. US-Dollar. Obwohl die russische Regierung die Zuständigkeit nicht anerkennt, ist klar, dass solche Prozesse angestrengt werden. Die Kläger weisen vor Gericht nach, dass die internationalen Verpflichtungen von Russland verletzt sind, weil die Eigentümer keine „gerechte" (angemessene) Entschädigung erhalten haben. Welche Präzedenzen das Gericht schafft, ist unklar, ebenso wie auch die Dauer dieser Prozesse schlichtweg unvorhersehbar ist.

Die neuen regionalen Regierungen unter Unterstützung der Russischen Föderation haben somit eine erhebliche Vermögensumverteilung durchgeführt. Oft sind die (Eigentums-) Rechte an diejenigen Personen übergegangen, die beim Referendum im Jahr 2014 eine wesentliche Rolle gespielt haben, beispielsweise ein Motorradklub aus Moskau, der in Sewastopol von dem Gouverneur 300 ha Land fast umsonst bekommen hat. Auch für mehrere Flurstücke am Schwarzen Meer haben Bauherren Baurechte für Mehrfamilienhäuser bekommen, obwohl Abgeordnete des Regionalparlaments in Sewastopol dagegen votiert haben. Aber die Untersuchungen zeigen gleichzeitig, dass mehrere wertvolle Grundstücke ukrainischer Oligarchen und Politiker, die dem Clan des Ex-Präsidenten Janukowitsch angehören, schnell ins neue Immobilienregister (Krimreestr) eingetragen worden sind.

5.4 Immobilienfinanzierung

Ein besonderes System wurde für die Immobilienfinanzierung auf der Krim geschaffen. Wegen der Sanktionen funktionieren auf der Halbinsel die bekannten Banken offiziell nicht mehr. Nunmehr sind speziell gegründete Banken tätig, die aber auf dem privaten Markt nur eingeschränkt aktiv sind, weil eine entsprechende Rückversicherung fehlt. Die größte Bank „RNKB", die im Eigentum der russischen Staatsbank („Bank Moskau") war, wurde wegen Risiken der EU-Sanktion gegen Russland im Jahr 2014 an private Personen verkauft. Jetzt ist die „Föderale Agentur für die Verwaltung von Staatsvermögen Russlands" wieder Alleineigentümer dieser Bank. Die Kredite haben bislang lediglich Militärangehörige, Staatsangehörige und Sozialprojekte wie das „Mutterkapital" erhalten. Die einfache Bevölkerung oder Unternehmen erhalten keinen Zugang zu Krediten. Ein Grund dafür ist das fehlende Registrierungssystem für Immobilien. Damit ist eine Eintragung von Dienstbarkeiten nicht möglich. Zusätzlich wird eine Immobilienfinanzierung durch die Banken aufgrund der fehlenden Gesetzgebung erschwert.

Nach dem Anschluss der Krim zu Russland hat der russische Präsident Putin angeordnet, dass die Kreditnehmer der ukrainischen Banken ihre Verbindlichkeiten nicht mehr bedienen dürfen. Das Vermögen bleibt bei den Kreditnehmern. Um korrekt zu sein, muss man

sagen, dass die Ukraine Ende 2015 auch für Rückzahlungen der Staatskredite in Summen von mehr als 3,5 Mrd. USD ein Moratorium eingeführt hat, um später diese Verbindlichkeiten nach dem Abkommen mit dem IWF (Internationaler Währungsfonds) zu reduzieren. Und dies geschah in der Tat: Anfang 2016 hat die russische Zentralregierung entschieden, dass ukrainische Banken und Investoren einige der ursprünglich verloren geglaubten Kredite doch zurück erhalten sollen. Aber wie dies passieren soll – und vor allem wann – weiß derzeit niemand. Die Rückzahlungen an die ukrainischen Banken können nur durch russische Sonderfonds erfolgen. Aber im Gesetz ist nicht erwähnt, wie die Hypotheken in sämtlichen Registern gelöscht werden. Als Ergebnis könnte der föderale russische Staatshaushalt für die Verbindlichkeiten haften. Anfangs 2015 hat die größte russische Staatsbank „Sberbank", die in der Ukraine seit jeher sehr aktiv war, die Schulden der Kreditnehmer umstrukturiert.

6. Resümee und Ausblick

Die derzeitige Situation bereitet den Privatpersonen und Unternehmen sowie allen öffentlichen Behörden und Politikern auf der Halbinsel Krim zahlreiche Schwierigkeiten, weil es an einem transparenten Rechts- und Verwaltungssystem fehlt. Ein Funktionieren des Immobilienmarktes ist nur mit Hilfe der für diese Regionen vergleichsweise erheblichen finanziellen Mittel möglich, die der Staatshaushalt ausgibt und dadurch alle Investitionen direkt finanziert. Das ist aber nur im relativ kurzen Zeitraum möglich, weil auch die Möglichkeiten für derlei Finanzierungsmodalitäten durch die Wirtschaftskrise immer geringer werden. Die private (Finanzierungs-)Initiative ist wesentlich begrenzt, weil die Rahmenbedingungen dazu fehlen. Solche Regelungen würden bedeuten, dass die Bürger, die Unternehmen und auch die regionalen und örtlichen Beamten mit weniger Problemen konfrontiert wären und stattdessen Maßnahmen gegen Korruption und Ungerechtigkeit unternehmen könnten. Aber das brauchen die Bürger beider Staaten – in der Ukraine und in Russland.

Moderne Gesellschaften, in denen die Globalisierung über Nationalgrenzen hinweg funktioniert, brauchen einen Immobilienmarkt einschließlich der Anerkennung von Privateigentum (vor allem Eigentums- und Besitzrechte an Grundstücken) und gute Beziehungen zwischen den Staaten.

Der Fall der Krim zeigt, wie kompliziert derartige Fälle für die Regierungen, für die Gesetzgebung und für die Rechtsprechung sind. Keine solchen Herausforderungen kann man nur mit Geld (allein) lösen. Die Schaffung eines bodenpolitischen Übergangsmodells – wie auf der Krim – ist schwieriger, als die Politiker dies am Anfang gedacht haben. Aber die Wirklichkeit ist immer komplizierter (als die Politiker im Vorhinein annehmen).

In jedem Fall muss die Wissenschaft alle Anstrengungen unternehmen, den Staat bei seiner Aufgabe „das Recht auf Eigentum und den Schutz von Eigentum zu sichern und klare Rahmenbedingung für Rechte, Beschränkungen und Verpflichtungen zu schaffen"(Twaroch und Wessely 2015), zu unterstützen. Aber der Fall der Krim zeigt auch auf, dass die Frage des Schutzes von Eigentümerrechten in einer modernen Gesellschaft nicht nur als Aufgabe

der Politiker in einzelnen Ländern gesehen werden kann. Globale Strategien, rechtliche Rahmenbedingungen („rule of law“) und länderübergreifende Maßnahmen sind hier notwendig.

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Andreas Hendricks*, Thomas Kalbro**, Marie Llorente***, Thierry Vilmin*** and Alexandra Weitkamp****

Public Value Capture of Increasing Property Values – What are "Unearned Increments"?

A comparative study of France, Germany and Sweden

Abstract

The increment of land values is determined by land-use regulations, land management, public investments in internal and external infrastructure, private investments (e.g. buildings) and the general economic development. Very much debated is the concept of *public value capture,* which can be seen as a method or a strategy to capture value increase to use it for specific purposes.

The purpose of this paper is to give an overview of the *methods* that are used for public value capture of unearned increments in France, Germany and Sweden. The used classification of direct and indirect models for value capture focuses on the subject of the instrument. Pursuant to our classification indirect models base upon taxes on the whole real estate while the direct models contain mandatory or voluntary proceedings to absorb a part of the value increase as well as taxes that are referred to a specific part of the value increase (e.g. capital gain tax).

In Sweden, the value capture is currently mainly focussed on refinancing of internal infrastructure and the legal restrictions are binding for mandatory as well as voluntary proceedings. France and Germany have basically similar systems. The development by agreements offers the possibility for the municipality to capture a big part of the price increase for specific purposes. The main difference is the value capture in case of mandatory proceedings. In Germany, it is explicitly assigned to value increase due to reallocation and internal infrastructure. In France, the affected land owners have to pay up to 20% of theoretical costs of construction of permitted buildings. This amount may cover the costs of infrastructure, but oftentimes it does not.

1. Introduction

Land and its value play a crucial role for social activities and development. Therefore increasing property values have deep social, economic, and distributive-justice implications

* Universität der Bundeswehr München, Institute of Geodesy / Germany.

** KTH Royal Institute of Technology, Stockholm / Sweden.

*** Marie Llorente: Centre Scientifique et Technique du Bâtiment; Thierry Vilmin: Sciences Po / France.

**** TU Dresden, Geodetic Institute, Chair of Landmanagement / Germany.

(Alterman 2012). Historically this has raised fundamental questions.[1] Is the economic value increase a private property or a social good? Do governments have the right to reap some (or all) of the increment in value? Are property owners responsible for the externalities of the development of their land and should they thus internalize the costs of mitigating the impact? Still the issue is very much debated in relation to the concept of *public value capture,* which can be seen "as a method or a strategy to capture value increase to use it for specific purposes" (de Wolff 2007)[2].

One starting point to address the distributive-justice problem of dividing value increase between private property owners and the governments is the concept of *unearned increment*. A general definition of the concept can be formulated as

> *"… an increase in the value of property through no work or expenditure by the property owner."*[3]

What is then the work or expenditure by the property owner? Obviously, land values are determined by a number of factors, i.e. it is a result of both public and private investments and actions. In order to "sort things out" Hong and Brubaker (2010) have divided the roots of increasing values into five main categories:

(1) the original productivity of the land, the value of current land use

(2) changes in land-use regulations, extension of property rights

(3) public investments in infrastructure and social services

(4) private investments that increase land value

(5) population growth and economic development

In this paper we share the view of Ingram and Hong (2012), who argues that a conceptual delineation of these five elements of land value and their ownership can facilitate the discussion of who should capture what. If we apply the five elements to a property development situation, we can construct the following Figure 1.[4]

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1 The issue of land values and its distribution has been analysed by many great scientist from the 18th century and onwards. The theory of location and ground rent had its origin with considering of argrarian use of land. The work of Adam Smith, David Ricardo and Johann von Thünen could be stated as very important. Later on John Stuart Mill, Silvio Gesell, Adolf Damaschke and Henry George made valuable contributions to this field.

2 There are many related and similar terms in this field: 'betterment', 'unearned increment', 'plus value', 'windfalls', 'givings' and 'cost recovery', each of them denoting different variants of how the public might capture economic value increase of private land property. We follow here Alterman's proposal (2012: 762–763) by using the term 'value capture' as a generic termem potentially embracing all these concepts.

3 Se e.g. World Bank, UN and Webster's New World College Dictionary (2010).

4 This presentation of "value-steps" has been used by e.g. F.K. Christensen (2011), When Property Value Changes During Urban Development – Model and Factors, and E. Dransfeld and W. Voss (1993), Funktionsweise städtischer Bodenmärkte in Mitgliedstaaten der Europäischen Gemeinschaft – ein Systemvergleich.

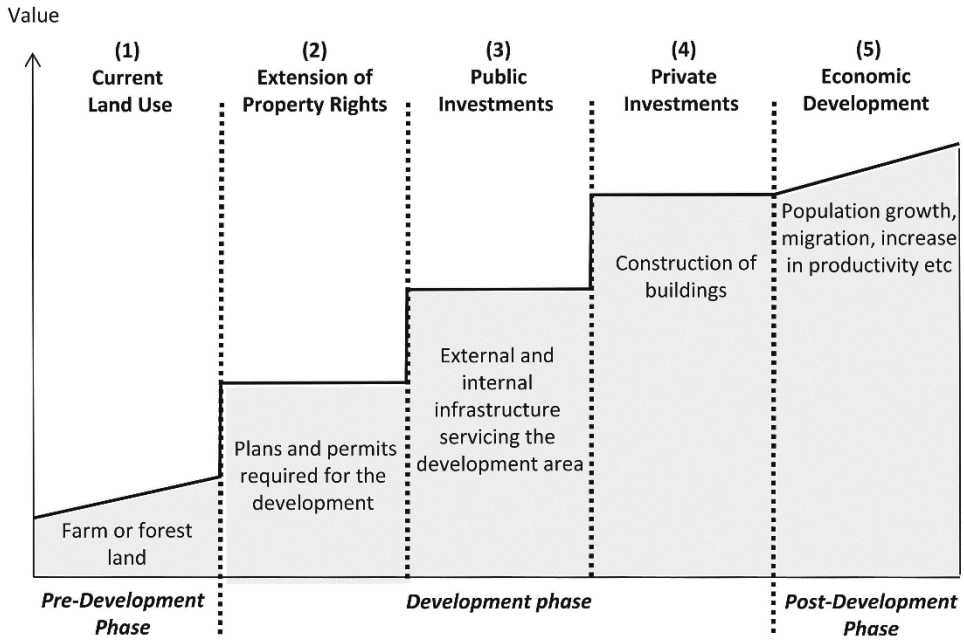

Figure 1: Value Steps of Property Development.

In the "pre-development phase" the property value is based on the current land-use, e.g. farm, forest or derelict urban land.

The "development phase" contains three principal measures and activities which influence the property value.

- A change of land-use normally requires some form of permission from authorities, i.e. extension of the property owners right. This regulatory system differs between countries, but often it is based on land-use plan(s) and subsequent permits.
- Individual properties must be supplemented with public infrastructure. We can then make a distinction between "internal infrastructure" servicing only the development area (roads, water & sewage etc.) and "external infrastructure" for larger areas (main roads and parks, schools etc.).
- On individual properties it is the owners' responsibility to construct buildings and facilities with their own investments.

The value increase due to a specific government decision like specific types of land-use regulatory decisions or the execution of public infrastructure can be also classified as betterment. It is a term that is especially used in Britain and the former colonies. It can be further divided in the subtypes "development-right based betterment" and "infrastructure-based betterment". Infrastructure-based betterment levies are historically the earliest form of betterment capture (Alterman 2012).

When the property is completed the "post-development phase" begins. Value increase in this phase is determined by e.g. population growth, migration, increase of societal productivity.

In real live these activities do not necessarily follow this order as they might overlap or even precede each other in different sequences. E.g. agricultural land already rezoned for housing (property owner's rights are already extended) might remain undeveloped for years and its economic value might increase further due to general economic factors while the owner is still farming it, perhaps waiting for larger value increases. Or land already built might profit from the construction of public infrastructure by the municipality and/or from general economic factors, before the owner decides to sell his property.

The purpose of the paper

From experience we know that countries have different approaches to the issue of value capture. Based on the model described above we will enlighten the situation in France, Germany and Sweden. More in detail the aim of the paper is to:

- give an overview of the *methods* that can be used for public value capture (section 2)
- describe the methods and the extent of public value capture in France, Germany and Sweden (sections 3–5)
- analyse and summarize similarities and differences between the three countries against the background of value capture methods and the concept of unearned increment (section 6).

2. Different models for the value capture of developed building land

In the literature can be found different classifications of value capture based on its purpose or its outcome. A very interesting classification for a theoretical or philosophical analysis is given by Alterman (2012). Following her classification "direct instruments for value capture are policies that seek to capture all or some of the value rise in real property under the explicit rationale that it is a legal or moral obligation for landowners to contribute a share of their community-derived wealth to the public pocket". On the other hand, "indirect instruments do not seek to capture the added value for its own sake, because it is 'unearned', but in order to generate revenues (or in-kind substitutes) for specific public services. […] The objectives behind the indirect tools are usually more pragmatic and less ideological than the objective behind either the macro or the direct value capture instruments." The problem is that it is easy to confuse the direct instruments with the indirect ones because the classification focuses on the motivation of value capture and the motivation of legal restrictions is oftentimes not obvious.

For this reason, a more practical classification of direct and indirect models for value capture is used that focuses on the subject of the instrument. Pursuant to our classification indirect models base upon taxes on the whole real estate while the direct models contain mandatory

or voluntary proceedings to absorb a part of the value increase as well as taxes that are referred to a specific part of the value increase (e.g. capital gain tax). Countries which have a low level of direct models have generally higher tax rates than countries which use direct instruments to absorb a part of the value increase.

All this models need a legal framework. In the first place, the constitution must define private property and the social function of property to allow the capture of at least a part of the value increase by law (Alterman 2012). Furthermore, legal norms for mandatory or voluntary proceedings for this capture must exist and these regulations must be known and accepted in the local governments.

2.1 Direct models for the value capture of developed land

The "value increase" of developed land by public measures generally is caused by planning, land management and new infrastructure. On the other hand, in several countries the constructions are included in the computation of betterment levies. However, the legislation of a particular country may limit the capture of the value increase to its individual parts.

The following examples should give an overview of different types of models which are used in many countries worldwide.

Fees and taxes

Many countries (e.g. Germany, France and Sweden) use fees to recoup development costs (e.g. costs of infrastructure) or taxes to capture a specific part of the value increase (e.g. capital gain tax).

The "real estate consortium" or "conjoint urbanisation"

The public authorities and private land owners aspire a co-operation for the urban development of former rural areas. After the development the land owners get back a plot which has the same value as the plot before the development. Due to the increasing prices per square meter a part of the developed area will remain with the municipality. The realization may be based on voluntary agreements or may be part of a mandatory proceeding (Lungo & Rolnik 1998).

Negotiated development (developer and municipality)

The developer prepares the plan jointly with the municipality. Nevertheless, the municipality should take into account all private and public interests before the approval of the plan. The affected area can be (complete or partial) property of the developer or municipality. Generally, the developer is responsible for the construction of the infrastructure.

Flexible building rights

There are different models which imply exceptions to the general use regulations in favour of investors or property owners who paid a certain amount of. The allowed exceptions and financial considerations are generally regulated in legal norms. In doing so, the core of the urban planning will be conserved in spite of more flexible building rights.

Urban development or redevelopment measures

The new development of urban areas or the elimination of urban deficits are typical urban duties. In Germany, these problems are generally solved by mandatory proceedings. Urban redevelopment measures are those measures where an area is substantially improved or transformed with the purpose of eliminating urban deficits. The purpose of urban development measures is to develop local districts in a manner which is in keeping with their particular significance for urban development within the municipality. If the municipality does not buy the real estates, the affected land owners have to pay a compensation corresponding to the value increase of their real estate.

Interim acquisition

The build-up of land stocks is oftentimes used in municipalities to have available plots for public objectives within urban development. Afterwards, a part of the plots may be sold to maintain the stock balance by a so-called "revolving land stock" (Hendricks 2006). The acquisition of plots should be done long before the urban development to avoid the anticipation of price increases by the land owners. The administration of land stocks is frequently realized by external corporations. Furthermore, the urban development is frequently done by public private partnerships. In this case, the benefits of the constructions remain with the private partner and the benefits of the increasing land value remain with the municipality (Morales Schechinger 3/2005).

Contract models

The agreement of certain duties of the private partner in return to subsequent building rights is an alternative to interim acquisition. The most common duties are the provision of the needed area for the infrastructure or provision of plots for social, public or ecological objectives. The affected land owners are sometimes integrated in a "real estate consortium" (cp. Section 2.1.2). In this case, the land owners get back a plot after the development which has the same value as the plot before the development (Morales Schechinger 3/2005). On the other hand, financial compensations may be agreed for the generated value increase of the developed land due to public measures (Morales Schechinger 5/2005).

2.2 Value capture of developed land by taxes on the whole real estate (indirect models)

2.2.1 The basis of taxation

Basically, three different models can be distinguished. On the one hand, the land value may be used in addition to the value of the buildings. Alternatively, only the land value or the profitability of the real estate may be used.

Many countries (e.g. United States, Canada and Germany) use the first option. Generally, professional valuation experts create maps of land values which have to be actualized in a certain interval. The valuation of the buildings is done by a simplified version of the cost approach multiplying the useable area of the buildings by price per square metre which is

listed in a valuation table. The price depends on both, the use and the quality of a certain building and has to be estimated by a valuation expert.

However, many countries (e.g. Denmark, Jamaica and parts of Australia and New Zealand) use only the land value as basis for the calculation of real estate taxes. The main objective of this approach is a higher efficiency of the land use in urban areas. The biggest problem is the fact that the land value oftentimes is quite small in comparison to the value of the real estate in the whole (especially in case of commercial properties, e.g. hotels or offices). This may cause an unjust taxation.

There are two reasons causing concern considering the profit of the real estate as basis of taxation. On the one hand, the valuation of unused plots is a problem in this system and on the other hand there is oftentimes a lack of information concerning the income of commercial or industrial properties. In that case, the valuation has to be based on theoretical assumptions. For these reasons this approach is less used than the others (Morales Schechinger 2007).

2.2.2 Tax rates

In principle, the options to determine a single tax rate or different tax rates exist.

Progression in stages

Generally, countries use a system of different rates distinguishing between plot and constructions, use of the plot and/or buildings (e.g. living or commercial use) or built or unbuilt plots (Hendricks 2015).

Continuous progression

The progression in stages causes leaps in the taxation. For this reason two owners of real estate of more or less the same value may have different financial burdens, if they are in different tax brackets. The continuous progression is an approach to avoid this problem.

One option for this kind of progression are additions within a bracket, which rise continuously and adapt the maximum value in a bracket to the starting value in the following bracket.

An alternative is the definition of different rates for different “value sections”, that is e.g. a tax rate of 0.6% for “the first” 25000 €, 0.7% for “the second” 25000, etc.

Extraordinary tax for unbuilt plots

The definition of higher tax rates for unbuilt plots is quite common in many countries. One reason for this regulation is the pressure on the land owner to start building activities on the plot. If this does not work, the higher tax income of the municipality can be at least used to refinance the higher costs of technical infrastructure which are caused by the fact that the municipality has to develop new building areas while parts of the developed urban areas are unused.

3. France

3.1 Local authorities and planning system

There are two levels in the French urban planning system:

- The structure plan ("schéma de coherence territorial": SCOT) at the level of the conurbation;
- The local plan or land-use plan ("plan local d'urbanisme": PLU) at the level of the commune. The local plan must be compatible with the structure plan.

Detailed plan for a comprehensive area to be developed or redeveloped is embedded into the PLU even though it is elaborated separately for a specific project.

The structure plan (SCOT) is not legally binding on individuals but only on public communities. The local plan (PLU) is the main document for the regulation of the local urban development system since it is elaborated and modified by the commune and since it is legally binding on everybody. It creates local land rights that individuals can avail themselves of their relations with other individuals or with the commune. Inhabitants are consulted by means of a public enquiry.

In improved zones designated as buildable by the local plan, the commune theoretically cannot refuse a building permit if it conforms to regulations. In natural zones designated for future urbanization the commune is free to take any decision it deems appropriate. It decides if and when to modify the local plan.

The French local plan is ambitious since it undertakes the definition of future urban form of every buildable parcel of land of the commune and, what is more, to make this a legally binding definition (Acosta and Renard 1993). So the local plan constrains the commune who is bound by regulations and the zoning plan. But the system has adapted itself to this formality by organized instability. Local plans are very often the object of revision (every 3 years on average).

3.2 Direct value capture

3.2.1 Extension of property rights

The annual land tax

An annual land tax on buildable parcels ("Taxe d'urbanisation"), based on the market value of the land, was included in the general bill on land use and planning voted by Parliament in 1967 ("Loi d'Orientation Foncière"). The same bill instituted the principle of legally binding local plans ("Plans d'occupation des sols" which have been transformed into "Plans locaux d'urbanisme" in 2000) and the annual land tax was regarded as a fair compensation for the building rights granted to landowners. It was also intended to contribute to infrastructure expenses by the communes and to provide an incentive to landowners to sell their plots. But this annual land tax was never implemented, for political reasons, given that land-

owners are also voters, and for technical reasons: it would have taken several years for local plans to be designed (Comby and Renard 1985); and in the case of a house already built, which part of the garden should be considered as buildable land?

After the failure of the Taxe d'urbanisation imposed by the central government, there have been several attempts to reactivate such a land tax but from the communal level. A 2006 bill ("Loi d'engagement national pour le logement") gave the possibility for the communes to increase manifold the fiscal value of buildable parcels on which the local taxation (originally designed for agricultural land) is based. A small number of communes have voted to apply this measure so far with the clear result of fluidizing the land market, thus avoiding to waste natural land and to have to invest in new infrastructure.

A 2012 bill ("Loi de finances rectificatives pour 2012") reversed the burden of proof, allowing the government to decide for the zones where this measure should be operating, letting the communes to decide explicitly not to apply it. But so far the Government has backed away from such an initiative for political reasons, given the current saturation of French tax payers under Hollande's Government.

Tax on land recently designed as buildable by the local plan

Another measure voted by Parliament in 2006 ("Taxe sur la cession de terrains devenus constructibles") has proven more successful than the annual land tax since more than 6000 communes have decided to apply it. It consists of a one-off taxation of transaction on land which has been rendered buildable by the local plan less than 18 years ago. The rate is 6.66% of the capital gain[5].

The buying-back of building rights to the local authority

The principle of this method is that beyond a legal density ceiling the building rights must be bought back to the local authority. This measure was introduced in 1976 ("Plafond légal de densité", PLD) with a legal density ceiling at 1 (equivalent to a plot ratio of 1) at a time of continued increase in real estate prices and when public opinion thought that developers put up too dense and too high buildings. The yield benefited to the commune who could use it for infrastructure and social housing.

But, as a side effect, the PLD fostered sometimes an incoherent skyline when builders didn't want to pay for extra building rights and limited their construction to the legal density ceiling. And during the downward phases of the real estate cycle, it was observed that the PLD precluded builders to launch new developments because landowners didn't want to sell at a diminished price and because, in the case of already built plots, the cost of demolition and rehousing was no longer worth it. So the PLD was progressively abandoned, the more so as density is now trendy and is not anymore considered negatively. On the contrary,

5 Capital gain is the difference between the cost of acquisition and the selling price, taking into account monetary inflation and all expenses made on the land (i.e. internal infrastructure, decontamination, etc.).

there is an attempt to tax insufficient density ("Taxe de sous-densité"), but with a so complicated legal system that so far no local authority has tried to implement it.

3.2.2. Public investment

To describe the various means of recouping the cost of public investment, we'll use our usual typology of four urban development modes (Vilmin 2008):

- The *spontaneous development*, which corresponds mainly to the production of individual housing and small condominiums assumed by households or local builders in already serviced areas; infrastructure and urban amenities are in place thus, contrary to what happen in the three other modes, there is no substantial modification of the urban fabric. Such spontaneous development is guided by the market.
- The *regulated mutation* (urban development or redevelopment measures): here we find small or middle size development operations like allotments or densification of existing urban fabric; they are realized by specific operators (real estate developers) according to the detailed land-use plan (generally binding), the provision of infrastructure being made by the municipality. These projects are of private initiative and are guided by the market. The role of the municipality is limited to the enactment of the precise rules of the game (including financial contribution to infrastructure and proportion of social housing), but not to intervene in the transactions between land owners and operators.
- The *negotiated development* (contract model): in this case, the development concerns a more important urban project, where the rules of the game will be discussed and negotiated between the municipality and the operators; a medium or long term contract will then formalize the commitments; it is a hybrid organizational form (between market and hierarchy).
- The *public development* (interim acquisition) applies to a complex urban project that the municipality doesn't want to leave to the market (or cannot, if there is no market); it is implemented by the municipality itself or by a public development corporation after the land in the perimeter has been acquired, by expropriation if need be. It is a hierarchic governance structure.

Each development mode corresponds to a specific legal tool for recouping the cost of public investment.

Spontaneous development

The commune, or the intercommunal body, can institute a development tax ("Taxe d'aménagement") with a rate of 1% to 5% of a base per floor space square meter which is set nation-wide by the Government. The local authority is free to use the yield (about 20 € per floor space m²) for any investment in the city without having to justify that the investment is related to the district where the building is located. The "Taxe d'aménagement" is well adapted to construction in existing urban fabric that is already serviced. But it is insufficient for construction in new outlying districts.

Concerning fluids such as electric power, water supply and sewage, gas, telecommunication, district heating … the amortization of investment is generally included in the consumption bills paid by users to the network operator. But in the three other development modes (corresponding not to spontaneous but to intentional development), the part of the investment corresponding to their need can be charged to developers.

Regulated mutation

The rate of the development tax can be raised up to 20% ("Taxe d'aménagement majorée") on the condition the yield (about 80 € per m² floor space) corresponds to new facilities and services rendered necessary by the new construction. But builders and developers are not required to assume any of the cost of the pre-existing public facilities with residual capacities. The cost of these facilities is considered to have already been paid for by the taxpayers. It is therefore a marginal urban development cost that is charged to builders. This cost is very different from one district to another and, in a way, fees calculated according to marginal cost are contrary to the principle of citizen's equality before tax. That is why this system has had a set of legal precautions imposed on it that consists of requiring the commune to publicly display the facility programme which is rendered indispensable by new construction. The court verifies the « direct link » between facilities that are charged to the developers and the real needs of the new construction. It is unlawful to charge builders with facilities that are not made strictly necessary by their construction. The court also verifies the « proportionality » of fees: contributions to public facilities and services must be proportional to the use made of them by the new construction. The cost of a given facility can thus be charged to several development projects but only in proportion to the floor space that is to be built in each of them. However, as the rate cannot be set beyond 20%, the yield is frequently insufficient to cover the whole of the needed public investment in infrastructure and services, and in this case the local authority has to pay for a part of it.

Negotiated development

In such a negotiated development, the fees to be paid are determined in a contract between the local authority and the developer. There are two types of contracts which are defined by public law (the freedom of contract of private law doesn't apply there): the partnership urban project ("Projet urbain partenarial") and the comprehensive development zone ("Zone d'aménagement concerté", ZAC). The latter is assimilated to a delegation of public service because the private developer is supposed to build infrastructure and services for general public purposes. In both cases, the fees correspond to the real cost of infrastructure and services. So the yield is generally higher than with the 20% development tax. But the rules of "direct link" and "proportionality" apply all the same.

Public development

In a public development, it is realized directly by the local authority or devolved to a public development corporation, the cost of infrastructure and services will be recouped when selling the developed plots to builders or industrialists.

3.2.3 Value increase due to general economic development

The taxation of real estate capital gains benefits to the State regardless of the origin of the gain: increase of building rights, public investment in infrastructure and services, cyclical increase of prices … It doesn't apply to residence. The rate is digressive depending on the holding period. After a certain number of years it is nil.

Rate and holding period have varied through time. When the conditions are stricter the result is the rarefaction of land on offer. Then the professional lobbies put a pressure on the government to relax them. But when the government is in need of financial resource (which was the case in 2011) the rate and the maximum holding period (after which the owner is totally exonerated) are increased, fostering a further depletion of transaction, particularly for second homes and parcels of land which are not exempted. As a matter of fact, landowners ceased to make financial arbitrages in their patrimony considering the transaction cost incurred. So the government is again (2013) in the process of relaxing the conditions: the holding period has been shortened from 30 year to 22, and the rate (34.5%) lightened for second homes (24.5%) if the sale occurs before the end of August 2014.

Taxation of capital gains is technically easy but it is self-defeating since as a result the base for taxation and the building activity are dwindling. To stave off this side effect it would be necessary to implement an annual land tax. But we have indicated that this measure which has been on the political agenda for almost 50 years has proven elusive. Only sparse experiments have been tried out at the level of the commune. And since the trend is now to "rebuild the city on the city" rather than eating up agricultural land, fiscal measures that hamper urban regeneration may be considered counterproductive.

3.3 Indirect models

There are four local taxes benefiting to local authorities and constituting the main part of their resources:

- tax on non-built land is paid by the owners and is based on rental value of the (agricultural) land;
- real estate (land with building on it) tax is also paid by the owners and is based on the rental value;
- local rates (residence tax) are paid by occupying households, either tenants or owners, and is based on rental value;
- local corporate tax is paid by companies.

Those local taxes cover the operating expenses of the local authority but also the parts of public investment in infrastructure and services which are not recouped from developers and property owners (the "direct models").

Rental value appraisals are generally ancient and barely take into account the value increase due to public investment, extension of property rights and general economic development.

There is no land tax based on market value of the land. Since only rental value is taken into account, improved land is traditionally taxed relatively little (ADEF 1996). But this situation may be changing as we'll see below.

3.4 Interim conclusion for France

Finally, the following figure summarizes the value steps of property development in France.

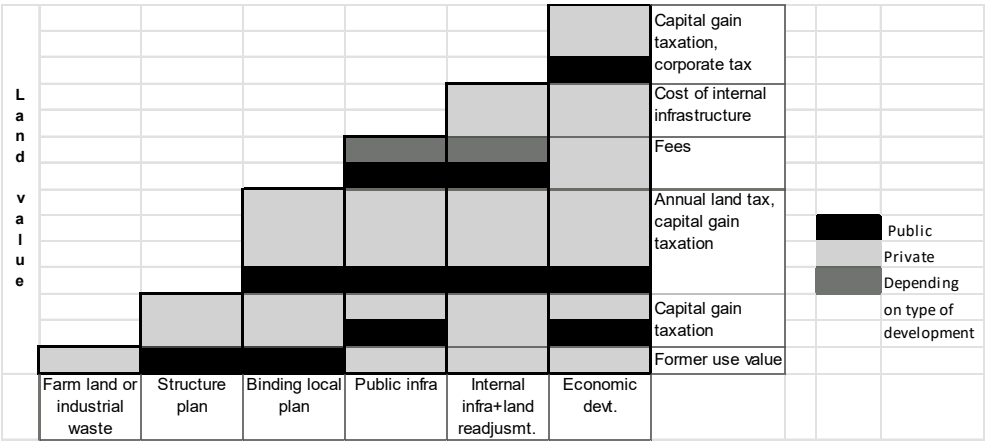

Figure 2: Value capture in France.

On the whole, the French land taxation system, if we except the recouping of public investment (direct model), tend to deter mobility and fluidity of land transactions. The results are scarcity of buildable plots on the market and high land prices in dense/central areas, encouraging urban sprawl in periurban areas where land prices are much lower.

4. Germany

4.1 Local authorities and planning system

According to the German Federal Building Code, the municipalities are the responsible bodies of the urban land-use planning. It has two stages. The first step is the preparatory land-use plan. It is binding for the administration but has no direct external impact. It achieves a strategic balance between different public and private interests related to the limited area of land within the municipal boundaries. The legally binding land-use plans have to be developed out of the preparatory land-use plan. The main contents are plot-specific regulations concerning land use and building density and the determination of those parts of a plot on which houses may be built.

4.2 Direct value capture

Concerning "unearned increments" the direct German models are focussed on land value and their increases. The private building activities are not taken into account. Generally, the refinancing of concrete activities of the public authorities (e.g. construction of local

infrastructure, land reallocation) is possible. On the other hand, planning gains remain to the landowner, if the area is developed by mandatory measures. Only if the area is developed by cooperative (voluntary) measures, the municipality is generally able to make a grab at the part, which is caused by the planning. In this case, it is very important that the contract is concluded before the planning. If there a legally binding land-use plan already exists, the resulting price increase forms part of the private property of the land owner. On the other hand, according to the German ownership law the anticipation of a price increase does not form part of the property. For this reason the local authorities are generally allowed to intervene in the private property before the passing of the municipal planning.

4.2.1 Development according General Urban Planning Legislation

The German federal building code provides various instruments for developing building land. The land reallocation and the provision of infrastructure are important instruments for municipalities in developing building land.

The municipality is obliged to provide the local public infrastructure, whereas nobody is entitled to infrastructure provision – also if a legal binding land-use plan already exists. The municipality provides the local public infrastructure as part of their capability and according the political discretion. Local public infrastructure according federal building code is e.g. roads and other traffic facilities but also parks and green spaces. The construction costs are allocable. The beneficial owners have to bear up to 90% of the costs as recoupment charge. A local law regulates the distribution basis. Only if an investor is willing to do the provision, the municipality does not have any costs (Schmidt-Eichstaedt 2005: 427 et seq.).

If the municipality wants to realize its binding land-use plans, the reallocation measurement can be used to rearrange the property (borders and property rights). The reallocation creates plots suitable in terms of location, shape and size for built development or for other uses. The needed public area is also provided (e.g. roads, green spaces). The structure is fixed in the binding land-use plan.

The property owner receives new plots in the same location or in a location with the same value. The reallocation measure represents a burden sharing e.g. concerning the loss of private area in the location of the new public area. With reallocation, the owners altogether as solidarity raise only a small part of their area for use of new public infrastructure. The property owner has various advantages of the reallocation. The development time is shortened and the quality of his/her land increases. He/She has an advantage by provision of infrastructure and compensation areas. In addition, he/she has a favour through the consistence of the binding land-use plan and the property structure. Therefore, the owner has to pay the value increase caused by the measure. The planning advantage in form of increasing land value by urban planning (preparatory and binding land-use plan) remains with the owner (Dieterich et al. 2006; Teigel 2002: 44–78).

4.2.2 Development according Special Urban Planning Legislation

The German special urban planning legislation contains instruments, which municipality can only use under special conditions (cp. Section 2.1.5). Before using this instrument, the municipality must try to get a contractual solution and has to proof, that other instruments like reallocation measure would fail. Special circumstances need special instruments with a high intervention in property. Therefore, the municipality can capture the whole value increase caused by the measures in the urban development and the urban redevelopment measure. At this point, only the urban development measure should be presented.[6] The municipality captures all value advantages by planning, reallocating and providing the infrastructure. This is realized through interims acquisition. The municipality buys the land at a value, which is not influenced by the measure at beginning. After planning, reallocation and provision of infrastructure, the building land is sold to new owners. The value difference has to be used for realization of the measure. A possible surplus must be distributed to the old owners (Runkel 2013).

4.2.3 Cooperative development by urban contracts

Interim acquisition

The build-up of land stocks is oftentimes used in municipalities to have available plots for public objectives within urban development (cp. Section 2.1.6). The main advantages of this model are the absolute control of the circle of future land owners and the capture of the whole price increase between purchase and sale. The main problems are the interim financing between purchase and sale and the development risk, i.e. the municipality has to find customers for the developed area. Generally, parcels may be bought for low prices, if they are bought wide before the planning process starts. But in that case, the period of interim financing and the development risk are quite high. On the other hand, if the parcels are bought shortly before the passing of the land-use plan, the prices are higher but there is a lower development risk and a shorter period of interim financing.

"Revolving land stocks" are another instrument to decrease the problem of interim financing by selling a part of the plots to buy new ones. However, a lot of money is needed to initiate the land stock.

Contract models

The agreement of certain duties of the private partner in return to subsequent building rights is an alternative to interim acquisition (cp. Section 2.1.7), but the German legislation includes some restrictions concerning the objectives of urban contracts. The German Federal Building Code defines the legal objectives. The "contracts of measures" include the contracts of planning (e.g. the draft of the preparatory or legally binding land-use plan) and the contracts to prepare the building activities (e.g. demolition of old buildings, removal of plants

6 The urban redevelopment measure is used in built areas. Within other instruments of this special legislation, municipality has no possibility of capturing the value increase and therefore are not considered any further.

or contaminated soil). The "contracts of edification" may regulate the use of the plot (e.g. type and grade of the authorized use, the obligation to finish the construction of the buildings in a given period of time), the ecological compensation, the housing supply for sections of the population who have extraordinary problems to find an adequate accommodation or the housing supply for the locals. The most important group of contracts are the "contracts to cover the follow-up costs". They can be used to cover the costs of the municipality (not another territorial authority) in the past or in the future which are condition or consequence of the development of the area (e.g. infrastructure in the broader sense).

All the contents of contract have to meet two important legal principles. The first one is "the exclusion of arbitrary tying arrangements". There has to be a strict objective connection between the obligation of the private contractual partner and the urban development. Furthermore, the municipality has no right to "sell" sovereign acts. The second one is "the imperative of adequacy". The problem is that the interpretation of "adequacy" depends on the way you look at it. The best criterion to check the fulfilment of this principle is the proportion of the value increase of the developed land to the cost distribution. In the literature it is controversial discussed how many percent of the value increase which is caused by the planning may be absorbed by the municipality, but it is the prevailing opinion that a capture up to two thirds is permitted.

In the whole it is permissible, if the municipality absorbs up to two thirds of the planning gains to fulfil an objective according to article 11 of the German Federal Building Code and if the contract is concluded before the planning. A permissible capture of more than two thirds has to be checked in every isolated case. Furthermore, all costs of the municipality in the past or in the future can be refinanced which are condition or consequence of the development.

4.3 Indirect models

In Germany, the indirect models can be divided in the real estate and the real estate transfer tax.

4.3.1 Real estate tax

The real estate tax is a non-personal tax, which is takes up the outer characteristics of the tax object. Nowadays, the assessment basis is the so-called *Einheitswert* of the property (land and buildings).[7] The real estate tax is yearly raised as a product of the Einheitswert, the *Steuermesszahl* (as a part of the Einheitswert fixed by state) and a *Hebesatz* (a municipal percentage that varies depending on location). The present criticism on real estate tax points out the *Einheitswert*. The *Einheitswert* is stated as inadmissible from the highest court for other taxations. Further ideas for real estate tax base on value or size of the property. The owner has the duty, to notify a change in the *Einheitswert,* e.g. if the use of the property is

[7] A fomalized valuation method (cost or income capitalization approach) determines the *Einheitswert*. Valuation date is the 01.01.1964 and 01.01.1935 respectively.

changed. This would cause a changed taxation (Buntrock 2014: 367–383); Lehmbrock and Coulmas 2001; Josten 2000).

4.3.2 Real estate transfer tax

The real estate transfer tax is a legal transaction tax. The tax has to be paid, if a real estate property changes the owner. Basis of this transaction is a contract, a disposal of a leasehold or a legal property transfer by heritage or donation. Reallocation instruments like urban reallocation measure are excluded from tax liability. The German states determine the tax rate, which vary from 3.5 to 6.0% of the purchasing price (Ardizzoni et al. 2008; Fischer 2014: 321–352). Value increases in case of repeated sales are not taxed.

4.4 Interim conclusion for Germany

Concerning "unearned increments" the direct German models are focussed on land value and their increases. Neither private building activities nor connection to utilities (e.g. gas, electricity, water or telecommunication) are taken into account. These kinds of constructions and their financing are regulated by contracts between the property owner and private or public partners. For example, the property owner has to apply to a local energy provider and to pay a defined all-inclusive price to get a connection to power supply.

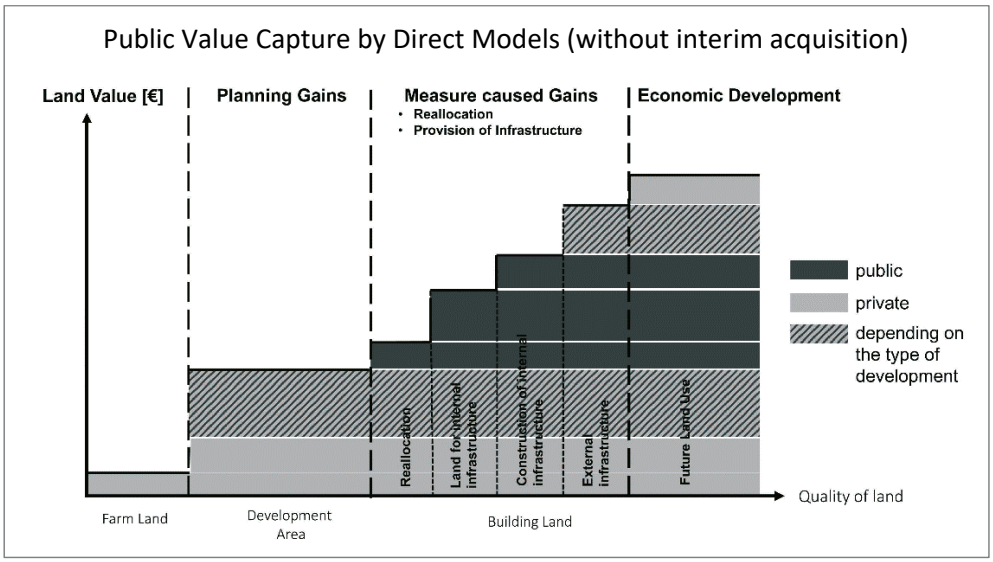

Figure 3: Value capture in Germany.

Generally, the refinancing of concrete activities of the public authorities (e.g. construction of local infrastructure, land reallocation) is possible. On the other hand, planning gains remain to the land owner, if the area is developed by mandatory proceedings. Only if the area is developed by cooperative (voluntary) proceedings, the municipality is generally able to make a grab at the part which is caused by the planning. In this case it is very important

that the contract is concluded before the planning. If there already a legally binding land-use plan exists, the resulting price increase forms part of the private property of the land owner. On the other hand, according to the German ownership law the anticipation of a price increase does not form part of the property. For this reason the local authorities are generally allowed to intervene in the private property before the passing of the municipal planning.

5. Sweden

5.1 Local authorities and planning system

Administratively Sweden is divided into three government bodies: the State, the County Administrative Boards (21), the County Councils (21) and the Municipalities (290).

According to the Planning and Building Act land-use planning is basically a municipal concern. However, the State can make an order for the municipality to adopt, revise or cancel plans, if it is necessitated by national interests or by interests involving several municipalities. The municipal planning and development control is carried out through the Comprehensive Plan (*översiktsplan*), Detailed Plans[8] (*detaljplan*) and, finally, Building Permits (*bygglov*)

The municipalities have, besides from planning duties, a broad range of responsibilities (social services, education, housing, energy provision etc.) to a large extent financed by income taxes. Approximately 60% of total tax revenues in Sweden consist of the municipal income tax.

5.2 Implementation of development projects

In Sweden there are two factors with a vital bearing on the implementation of development projects (Kalbro 2013): (1) Ownership conditions within the development area; is the land privately or municipally owned when the development project is initiated? (2) The role of the developer (property owner) in the process; Does the developer play an active part in work on the Detailed Plan together with the municipality. Or is the planning work entirely a municipal responsibility?

In terms of these factors, one can distinguish between four models, or cases, of development project implementation.

In *Case 1* the land is owned by developers/property owners who do not play an active part in drawing up the detailed plan (beyond being consulted about it). This situation can be exemplified by development in existing built environments, e.g. renewal and infill development of older residential areas with several property owners, not professionally engaged in development and construction activities, building their own single-family dwellings.

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8 The Detailed Plan is normally a "project plan" prepared after the inititation of a project (see e.g. Kalbro and Røsnes 2013; Kalbro and Lindgren 2015).

	The developer does not participate actively in plan preparation	The developer and the municipality prepare the plan jointly
The developer owns the land	*Case 1*	*Case 2*
The municipality owns the land	*Case 3*	*Case 4*

Figure 4: Four principal cases of development procedure.

Case 2, as in the preceding model, the developer owns the land when planning starts. One vital difference, though, is that municipality and developer prepare the Detailed Plan in co-operation. This case is the normal procedure when the land is owned by professional developers. Almost invariably a Development Agreement between the municipality and the developer is drawn up regulating, among other things, the developer's financial contribution to municipal infrastructure.

In *Case 3* the land is owned by the municipality. The municipality appoints a developer through a land allocation when the Detailed Plan is adopted, or is in a late stage of the planning process. In this case the municipality will be sole agent during the planning phase. However, the municipality's planning initiative is often taken in view of the existence of potential developers who are willing to build in the development area. The closer conditions for implementing the Detailed Plan, including the transfer of the municipal land to the developer, are confirmed in a Development Agreement between the municipality and the developer.

Case 4, when the land is owned by the municipality, a developer is appointed at an early stage of the planning process. After this the plan preparation is done in collaboration between the municipality and the developer. When the developer is appointed a Land Allocation Agreement is concluded. In connection to the adoption of the Detailed Plan a final Development Agreement is drawn up regulating land transfers, financial issues etc.

5.3 Direct value capture

A development project includes several types of facilities – streets, green spaces, water and sewerage mains, electricity supply, telecommunications etc. This section will give a brief overview of how these facilities are provided and financed.

Normally the municipality is responsible for areas that are designated for "public places" in a Detailed Plan – streets, green areas etc. To cover the cost of public places, the municipality is entitled to levy charges from the developer/property owners. These charges must not exceed the construction costs of the facilities. Maintenance costs, on the other hand, have to be funded out of municipal taxation revenues. Private roads, basically used by residents within a development area, are operated and financed by property owners (joint facility

associations) according to the Joint Facilities Act. In case there are several property owners using the road this responsibility is given to Joint Facility Associations, see below.

Water supply and sewage disposal are generally managed by the municipality (or municipally owned companies). The municipality is entitled to charge the property owners. The charges consist of a connecting charge and an annual user charge.

Power supply and district heating, by municipal or privately owned companies, are financed entirely by means of charges to users. These generally take the form of a connection charge, an annual fixed charge and a variable charge based on actual consumption. Telecommunications and fibre-optics are managed by private operators of internet, TV and telephone and financed entirely by means of charges in the form of a connecting charge, an annual subscriber charge.

5.3.1 External and social infrastructure – Development agreements

The above said refers to, what can be labelled as, "internal" infrastructure serving a limited development area (normally a Detailed Plan). When it comes to facilities like main roads and green areas for larger areas the financial responsibility has, for long time, been laid on the public sector.

However, 2015, the Planning and Building Act was amended with a legal regulation of Development Agreements (*exploaterigsavtal*) between the municipality and private developers (land owners).[9] The new regulation gives the municipality the possibility to charge the developer for technical infrastructure – roads, water and sewage etc. – that is "necessary" for the implementation of a development project/a Detailed Plan. This means that also external roads etc. that is a prerequisite for the development may be carried out or financed by the developer. "Social infrastructure" – schools, day-care etc. – must, however, *not* in any case be financed by the developer.

5.3.2 Municipal land ownership

In Sweden, a lot of land appropriate for housing is owned – often since many years back – by municipalities and supplied to developers through the use of 'land allocations'. A land allocation connects a developer and a municipality in an interdependency-based collaboration intended to jointly create an implementable development right, followed by a land transfer (Caesar 2016).

Through the land transfers to developers – to the actual market price – the municipality can assimilate the value increase due extension of property rights and public investments.

5.4 Indirect models

The Swedish tax system related to real estate consists of three parts.

9 Planning and Building Act, Chapter 6, Section 40.

- property tax
- capital gains tax (when properties are sold)
- company tax

The *property tax* system can be summarized as in the table below.[10] The "tax value" referred to in the table corresponds to 75 percent of the estimated market value.

Table 1: Annual property tax in Sweden

Property	Annual tax	Maximum amount
Single-family houses	7.000 SEK (750 EUR)	0,75 percent of the tax value
Apartment buildings	1.200 SEK (125 EUR) per apartment	0,30 percent of the tax value
Commercial properties	1,0 percent of the tax value	
Industrial properties	0,5 percent of the tax value	
Agricultural and forest	No property tax	

The *capital gains (sales) tax* is valid when privately owned properties are sold. The tax rate is 22 percent of the capital gain – the difference between the buying and selling price with a deduction of improvement costs.

Through the *company tax* professional developers – development companies – are paying 22 percent of the annual business profit.

5.5 Interim conclusion for Sweden

Applying the Swedish system for value capture to the "value step model" in section 1 (cp. Figure 1), the following general remarks can be made about the direct value capture when the land is privately owned. Firstly, value increase due to private investments is not subject to public value capture. Secondly, thus the direct models for value capture are confined to the extension of property rights and public investments, i.e. source 2–3 in Figure 1.

Land value increase due to *extension of property rights* – Detailed Plan/Building Permit – benefits, in principal, the developer/land owner, with the exception that the administrative cost for preparing the plan and the permit falls on the developer. Thus a (minor) part of the planning gain is recouped by the public sector.

Regarding *public investments* the cost for internal technical, infrastructure are born by the developer. Through amendments in the Planning and Building Act 2015 parts of the costs for external infrastructure may be covered by charges from the developer. The cost recovery is, however, limited to technical infrastructure, i.e. roads, water & sewage etc. "Social infrastructure" such as schools, daycare etc. will still be a public sector responsibility.

10 Swedish Tax Authority (Skatteverket).

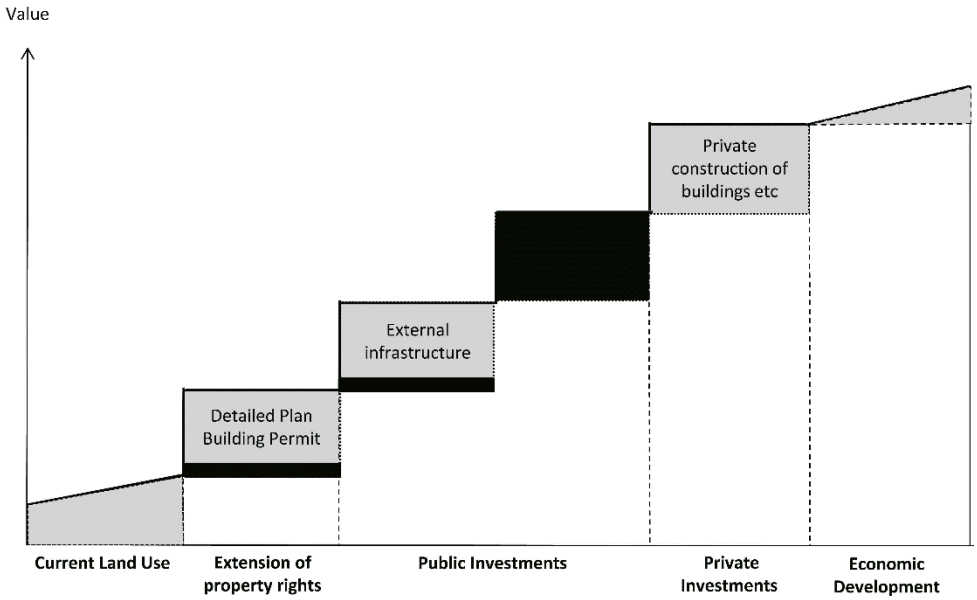

Figure 5: Value capture in Sweden.

The *indirect methods* – the tax system – are (more or less) applicable to all property value increase, independently of the "sources" 1–5 in Figure 1.

6. Comparison / Conclusion

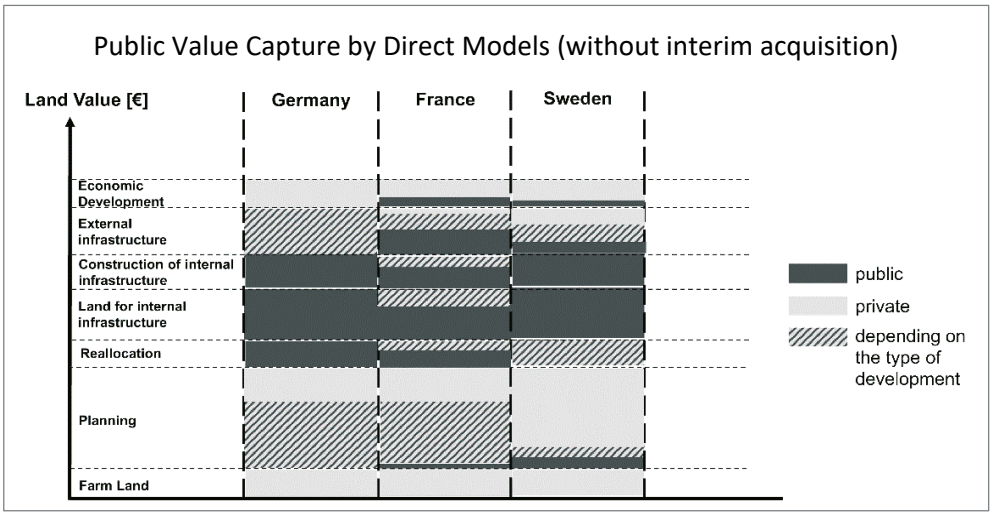

Figure 6: Comparison of value capture in Germany, France and Sweden.

Obviously, the most investment-friendly country is Sweden. The value capture is mainly focussed on refinancing of internal infrastructure and the legal restrictions are binding for mandatory as well as voluntary proceedings. Through the amendments in the Planning and

Building Act 2015 parts of the costs for external infrastructure may be covered by charges from the developer.

France and Germany have basically similar systems. The development by agreements offers the possibility for the municipality to capture a big part of the price increase for specific purposes. The main difference is the value capture in case of mandatory proceedings. In Germany, it is explicitly assigned to value increase due to reallocation and internal infrastructure. In France, the affected land owners have to pay up to 20% of theoretical costs of construction of permitted buildings. This amount may cover the costs of infrastructure, but oftentimes it does not.

The interesting results of this paper may be basis for an extended study to get an overview of value capture throughout Europe.

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Armands Auziņš* and Sanda Geipele*

Creative Destruction for Sustaining a Land Development in Residential Areas

Latvian experience in resource allocation for development of housing sector

Abstract

The development of the housing sector indicates the household formation and relates to the residential real estates. Therefore the assessment of the developments may provide the decision makers with necessary information on the state and potential of the housing sector, market situation and particular socio-economic development trends. The study is concerned with an examination of resource allocation in order to promote a sustainable development of housing sector in the context of evolving residential real state market during period 2002–2015 in Latvia. The findings of the study show limited opportunities to create a solvent demand, providing high-quality dwellings in case of the existing institutional environment in housing policy in Latvia. The outcome points to the necessity and potential finding conceptual solutions and increasing the management efficiency.

Key words: housing sector; creative destruction; land development; residential areas

1. Introduction

A historical evolution shows that the system of market economy has no inherent a stability – it has been changing and cyclic. The national economy of Latvia is comparatively small and opened that has been moving towards a developed market economy since the renewal of independence in 1990. The development trends and peculiarities of real estate market should be explored in conjunction with the development of market economy if observing the last 20 years. A professional's argument on characteristics of real estate market in Latvia expresses its disparity from similar markets – it never really could be considered as wholly Latvia's market (Kļavis et al. 2013: 12). Accordingly, the development of real estate market has persistently been influenced by changing and peculiar external factors. Many of transactors were being foreigners. Mortgage lending has been mainly provided by foreign banks, which significantly influenced the developing of households during the last 15 years, because 80.5% of the Latvia's banking sector formed foreign capital (FKTK 2014).

Residential areas represent one of the major segments of real estate market. The research on its development is related to real property transactions within the housing sector. This sector involves the housing stock of both individual residential houses and high-rise multi-family residential buildings.

* Riga Technical University, Institute of Civil Engineering and Real Estate Economics / Latvia.

Concept of "creative destruction" in relation to real estate

It is generally known from the economic theory that a competition is the most important characteristic and driver of the development of market economies. Well-known economist J. Schumpeter introduced the term "creative destruction", which he derived from Marxist thought and popularised as theory of *economic innovation* (Reinert and Reinert 2006). The expression of this concept indicates to the situation, in which new market participants replace outdated ones, thus creating place for newer, more efficient and wealthier entities and goods (Schumpeter 1994: 83). In concequence, guided and introduced innovations into market cause a replacement of previous ideas, approaches, methods and technologies, but "creative destruction" is then a reason for continuous progress and improvement of living standards and human welfare (Henderson 2008). Developing the ideas about systemic contradictions in capitalism, the influence of urban environment on making goods and territorial attraction of a capital has been explored (Harvey 2001). Therefore, an idea was substantiated that in order to overcome periodical crisis and soften the crisis occurrence, the investments in construction and infrastructure improvement are necessary, for instance, in the case of 'bubble blast' of real estate around the year 2007 in Latvia. Urbanisation may be considered as a way to absorb the capital surplus (Harvey 2011). However, this process should not create the negative effects of so-called 'unplanned urban sprawl', as a result of which, a 'dead capital' can occur, for instance, either unfinished new developments with serious physical depreciation or damaged amelioration systems. Most commonly this process is guided by regulations on land use and development, which are elaborated and implemented within the framework of spatial planning system. As the possibilities of capital use cannot abide a limit to profitability, ever more frantic forms of "time-space compression" arise, often impelling technological innovations (Harvey 1992). These technological innovations can be introduced in order to increase speed of turnover, to develop faster transport and communications' infrastructure as well as to create flexible accumulation of the capital. However, it should be admitted that the findings of innovative solutions often boosts instability, uncertainty and risks, because the innovations need some time for its recognition and acceptance, as well as its financially sound demand should be promoted. For example, it is widely experienced that the ecologically sound, energy-efficient or 'smart' houses have been placed on the real estate market, which provide the dwellers with accordingly healthy living conditions or possibility to reduce the maintenance costs. Globalization can be viewed as some ultimate form of time-space compression, allowing the movement of capital investment geographically. Thus, it is concluded that a concept of "creative destruction" can be applied to prefer the efficiency measures and sustain the land management.

Land development in residential areas

In Latvia, like in many parts of the world, the local governments are in charge of the public decision-making to develop and approve the spatial development plans (Saeima 2011). However, local stakeholders – property owners and developers implement these plans through management of the properties and development of necessary infrastructure and buildings in accordance with planning regulations, including functional zoning, permitted

land use and set land use restrictions in a specific territory. "Land development" is concerned with an implementation of spatial development plans, thus promoting new development proposals and developing appropriate to either urban or rural environments. However in practice the distinction between both environments often is not clear. Generally, land development measures refer to the changes in land use intensity. Nowadays various stakeholders – real property owners, developers, financial institutions, central and local governmental authorities, qualified experts and others whose interests can be affected are involved in a development process. It is typically expected that the real property value will increase as a result of land development at a specific area. However, contemporary challenges and addressed issues during the implementation of development measures, in particular in residential areas, are related to the acquisition and preparation of the development sites. Accordingly, specific due diligence procedures and real property transactions are performed as well as investments attracted for financing the projects and its implementation phases.

General provisions related to local spatial planning, land use and building whithin the territory in Latvia have certain impacts on types of land use for providing a housing function such as envisaging an appropriate infrastructure, thus determining (Cabinet of Ministers 2013): (1) individual house building – a functional zone for solitary lifestyle and the main type of use of which is individual house and summer cottage building; (2) low-storey residential building – a functional zone with the building of up to three storeys; (3) multi-storey residential building – a functional zone with building of four and more storeys. The main type of use of a low-storey residential building territory is individual house building, terraced house building and multi-apartment house building up to three storeys, but the main type of use of a multi-storey residential building territory is multi-storey and terraced house building.

Hypothesis and purpose of the research

The real estate market is never perfect; there are market failures. Various economic sectors, institutions and processes need following the efficiency domain to rationalise their performance and gain the best possible outcome. The housing stock is aging if it is not renewed to the extent required. The real estate market can offer real estate upgrading as well as production of new houses, taking into account not only the need for provision of housing functions, but also the potential to create a financially sound demand by offering high-quality dwellings in new and modern development projects. For this purpose conceptual solutions can be found to increase efficiency measures and to promote the housing sector management in accordance with the public interest (Geipele and Auziņš 2016).

After 1990 the land reform started with following processes of privatisation and restitution of real properties in both rural and urban areas in Latvia. At the same time, the denacionalisation of building properties was carried out. As a result of restitution and denacionalisation, so-called 'splitted' real property tenure occurred. In Riga City the land properties have been restituted to previous owners (before 1940) and their heirs in the former property boundaries in spite of the built infrastructure (e.g. roads and buildings) on these properties during

the Soviet period. Moreover, it was politically stated that the acceleration of the land reform should strengthen the national independence. In reality, the weak and fragmented institutions were established for land use and housing management. First version of spatial planning law was introduced just in 1994. The law has been gradually improved during next 10 years. The quality of spatial planning documents also has been gradually improved till meaningful changes there were possible to introduce in spatial planning system in 2011. Private land ownership still significantly dominates versus public ownership in Latvia. As on January 1, 2015 only 1.5% of registered land area belonged to municipalities, but 19.5% to the state (mostly forests). About 1.5% of municipal land was registered as land area for residential building (SLS 2014). Finally, it is concluded that insignificant areas are in the possession of local governments, the land tenure is still fragmented and overlapping, the residential building infrastructure, i.e. buildings, open space, engineering networks, is mostly in poor condition (e.g. high energy consumption, obsolete management and architectonic standards, chaotic parking areas for cars, people unwilling to cooperate). But, at the same time, the real property market is developing largely on the basis of formerly built and comparatively old residential apartments, reasonable land readjustment procedures to form more efficiently manageable real properties still lack, and new residential development projects urgently need sustainable housing policy support.

If considering the development trends of the housing sector and analysing such aspects as diversity and aging of housing structure in relation to development of residential real estate market, the following *hypothesis* of the research arises to be tested: a "creative destruction" is possible within the segment of residential real estate market and it may contribute to an efficient management and sustainable development of the housing sector in Latvia. On the one hand, the land use patterns of residential areas indicate the potential for development of housing sector, but, on the other hand, the development of housing sector indicates the possibilities for development of households. Accordingly, the *purpose* of the research is to investigate the current state in housing sector and land-related resources for its support, to analyse the development trends of residential real estate market, to assess the potential and possibilities in resource allocation for successful implementation of development projects in residential areas and make some contribution to significant improvements in the housing policy of Latvia.

2. Materials and methods

For the purpose to explore the dynamics and development trends of residential areas and market transactions of related real estates over the years 2002–2015 as well as to assess the peculiarities of housing sector in certain research territories, appropriate materials and methods have been used. Those factors that affect the aging of housing sector and the stagnant nature of real estate market over the last five years have been explained when assessing the structure of housing sector and the intensity of real estate transactions in the residential market segment. Based on the research results and their discussion, meaningful conclusions were drawn and proposals for promoting development projects within housing sector were made.

Classification of real estate objects provides background information for analysing trends and development characteristics that will give opportunities for analytical assessments that will reveal challenges and opportunities within both the housing sector and the real estate market. The structure of residential buildings gives an idea of the composition and state of the housing stock. The variability of construction output, issued building permits and commissioned residential buildings in new construction projects provide an overview of new housing supply in the real estate market. The dynamics of real estate transactions and the development trends of real estate market in its certain segments identify the market activity and potential.

In accordance with established official classifications the dynamic statistical data series about appropriate territories in Latvia have been analysed, the objects of real property transactions have been identified as well as the housing sector assessed. Although there exist various problems when analysing land use-related classifications regarding terminology, criteria and their characteristics, the classification of functional zoning basically complies with the classification of objectives of real property use (Cabinet of Ministers 2006), which has been developed and is being used mainly for cadastral evaluation needs and administration of real property tax.

The research indicates a number of restrictions and constraints that have affected the context of the research conducted and the interpretation of the results obtained. The research analyses statistical time series, including the whole territory of the Republic of Latvia, including the territory of Riga City and the territory of Pieriga Region. Pieriga Region composes a statistical territory covering Riga City as well as 17 amalgamated municipalities of the former Riga District, which until the changes in the administrative-territorial division in 2009 (Saeima 2008) were part of the territory of Riga District, and additionally 12 municipalities, which presently composes the agglomeration of the capital of Latvia – Riga. These separated territories have been selected because of higher concentration of population and more active real estate market compared to other parts of the country.

To conduct the research, the methods of statistical and comparative analyses are mainly used to analytically evaluate the dynamic time series by classification of real estate objects as well as the housing sector structure and the real estate market in the residential segment. The methods of logical construction and historical analysis are used to explore the relevant concepts to research context as well as to analyse the housing sector, to identify the development trends, to choose and assess the development projects.

3. Discussion and results

3.1 Land use dynamics

In order to analyse the land use classification in Latvia, the division by the groups of objectives of real property use (ORPU) is used, which in the housing sector comprises: land areas for individual residential building (code: 06) and land areas for multi-family residential building (code: 07). The ORPU are assigned by local municipalities considering the spatial

development plans and registered in the National Real Estate Cadastre Information System (NRECIS), which is maintained by the State Land Service (SLS). Municipalities determine ORPU for all existing and planned land units and their parts (Cabinet of Ministers 2006).

Assessing the division of land areas for residential building by the two groups of ORPU for the period of 2002–2015 (as of January 1) in the territory of the Republic of Latvia, the Riga City and the former territory of Riga District (SLS 2015[a]), the statistics of these groups and their dynamic time series indicate that, comparing the both types of land areas, a higher number of land units and land areas occupied are intended for individual residential building, except Riga City where multi-family residential areas dominate. If comparing with other groups of ORPU registered in the NRECIS, the land areas for individual residential building changed in the territory of Republic of Latvia from 0.6% to 0.7%, in the Riga City from 11.2% to 9.9%, but in the Riga District from 1.9% to 2.9%. The land areas for multi-family residential building changed only in the Riga District from 12.2% to 9.0%, but in the other two areas remained the same 0.2%. It is identified that in some municipalities within Riga District territory, which are bordering to the Riga City, significantly changed the number of land units and registered areas in both types. Exploring the changes in both number of land units and land areas, significant increase has been observed during the period of 2005–2010 in all research territories, except Riga City, which indicates to the relatively rapid formation on new land units and land areas for residential usage. Since 2010 relatively insignificant changes in the number of land units and areas have been observed in the research territories, showing the permanence of the housing sector in the provided land areas in general and, thus, by these two characteristics pointing to the invariance of the housing sector development in Latvia (Geipele and Auziņš 2016).

3.2 Housing stock

According to building registration data as on January 1, 2015 in the NRECIS 1,393,789 constructions were registered, of which 1,367,519 or 98% were buildings (non-residential buildings 1,007,622 or 72%, and residential buildings 359,897 or 26%) and 2% or 26,270 engineering constructions. 86% of all registered buildings belonged to private persons, 3% – to municipalities, but 1% – to the state. There are no available data about the owners' status regarding to residential buildings in the NRECIS (SLS 2014).

Before performing the analysis of real estate market of the housing sector, the age distribution of the housing stock in Latvia was find out (see Figure 1).

As shown in Figure 1, in the period of 1946–1970 the largest number of the residential buildings was constructed, i.e., 25%. It is obvious that most of the current Latvian housing stock has been built in the period until 1990, in terms of volume making up the most significant part of residential buildings – 86%. Only 10% of residential buildings have been constructed in the period of 2000–2011, which means that the housing stock in Latvia is changing and developing relatively slowly. Furthermore, analysing the information from different sources, including about a proportion of multi-family residential buildings and its maintenance and partly renovation, one can conclude that the Latvian housing stock is still

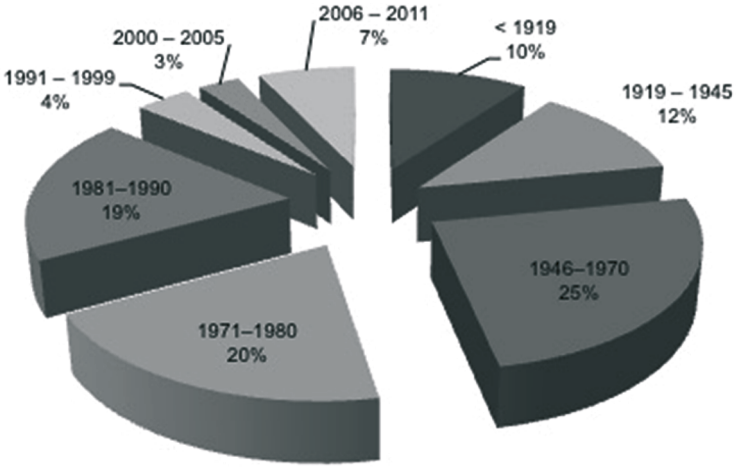

Figure 1: Age distribution of the housing stock in Latvia, % (Source: Geipele and Auziņš 2016).

developing slowly, and its correct registering and evaluation require general indexing of residential buildings or identification and inspection, as well as the existing 'serial type' residential buildings have served for the considerable time period and are no longer considered to be energy efficient according to the evaluated characteristics. Thus, the research allows identifying the necessary contemporary challenges to building renovation or demolition. They should substantiate the implementation and development of housing policy at the national level, as well as assessing the housing potential and recognizing the threats and opportunities related to the housing stock.

3.3 Construction output: volume changes and market supply

In a long-term perspective the real estate market is considered to be a function of the economic development. But "construction" – is a function of various economic related forces, which unlike those sectors that characterize supply. Residential building is associated with the consumption that characterizes a demand. To demonstrate the development nature and trends of the housing market, it is important to identify the construction output and the number of newly built apartments that make up the real estate market supply (Geipele and Auziņš 2016). Law on Residential Properties (2011), which prescribes the status of a residential property, the rights, duties and accountability of an apartment owner, as well as the competence and decision-making procedures of the community of apartment owners, defines a residential property, hereafter – an apartment, as an independent immovable property which has been legally partioned in a residential building. Within the framework of the research, following the Central Statistical Bureau (CSB) methodology, the analysis has been performed for the period of 2002–2014 in the Republic of Latvia as a whole as well as in Riga City and Pieriga Region. Accordingly, Figure 2 demonstrates the construction output index at current prices and the number of newly built apartments in these territories.

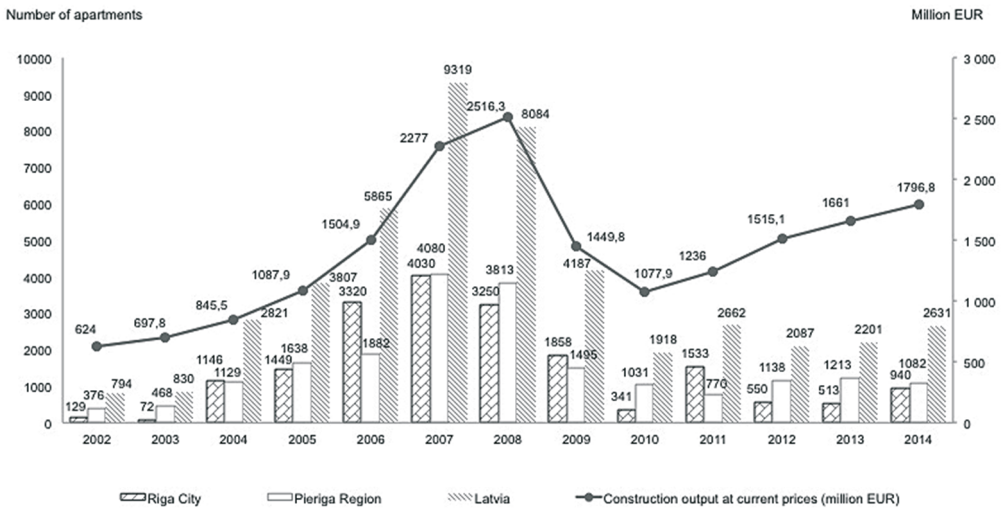

Figure 2: Construction output changes at current prices and the dynamics of newly built apartments (figure made by authors using source: CSB 2015).

Since 2002 the construction output increased approx. 3 times. After the sharp drop in the period of 2007–2010, when the real estate market experienced downturn, the value of construction output has started to moderately increase since 2010. A similar trend appears in the analysis of the number of apartments built in appropriate territories in the specified period of time. As Figure 2 demonstrates, despite the fact that the largest number of apartments built in the Republic of Latvia and Riga City was observed in 2011, the number is still 3.5 times lower in the Republic of Latvia and 2.63 times lower in Riga City compared to that of 2007.

To recognize the development of housing market and its characteristic processes, besides above mentioned, some research has been done to determine the number of building permits issued and newly erected residential buildings commissioned (Geipele and Auziņš 2016). The analysed data indicate that the construction rate of residential buildings has significantly decreased at the end of the research period in 2014 compared to indicators eight years ago when they showed an increase in the number of building permits issued and the buildings commissioned in 2006 and 2007, and at the end of 2007 – a rapid reduction. The studied housing development trends in the period of 2002–2014 suggest that despite the systematization of the housing stock at the national level, the number of new projects under construction at the end of the research period has decreased, which can be explained by socio-economic and legal-political situation in the country. This finding suggests that the national policy should find ways to improve and develop the institutional environment in housing and housing market, especially by means of the construction of new projects due to the aging of residential buildings.

3.4 Real property transactions and market development

It is assumed that on the basis of the development of real estate market it is possible to evaluate the nature and trends of economic development. The research involved and analysed the transaction dynamics and average market value changes in the residential real estate market. The analysis of transactions with vacant residential land units, which indicates the development potential and individual residential properties, which indicates already developed land units was performed gathering data about the number of transactions for the period of 2002–2014 in the Republic of Latvia as a whole as well as in Riga City and Riga District. In general, the results of the analysis illustrate the cycle and trends of Latvian real estate market in all indicated headings for the period. After the relatively rapid reduction in number of transactions in between 2007 and 2009 follows modest uplift, which may be explained by cautious supply of real estates into market and careful entering into transactions after the crisis period.

Relatively speaking, Latvia's rapid economic growth during the research period has contributed not only to rapid development of real estate market, but also to relative stagnation if observing the development trends in apartments' real estate market during the last few years. Figure 3 shows the changes in average market value and transaction dynamics of apartments in formerly built (mostly serial type) residential buildings in the Riga City and Riga District for the period of 2002–2014.

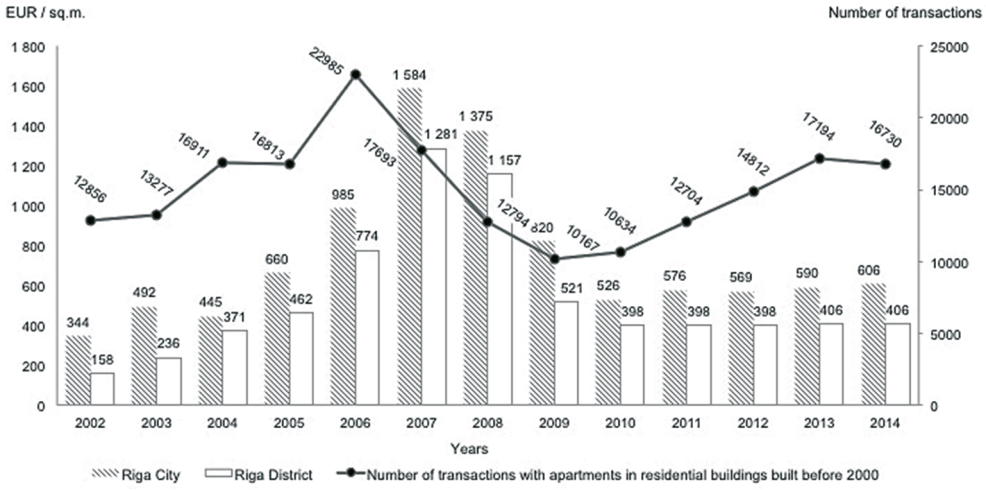

Figure 3: Average market value and transaction dynamics of apartments in formerly built residential buildings in Riga City and Riga District (figure made by authors using sources: Latio 2015; SLS 2015[b]).

Figure 4 shows the changes in average market value and transaction dynamics of apartments in newly built (starting from 2000) residential buildings in the Riga City (the neighbourhoods, city centre, old town) and Riga District for the period of 2003–2014.

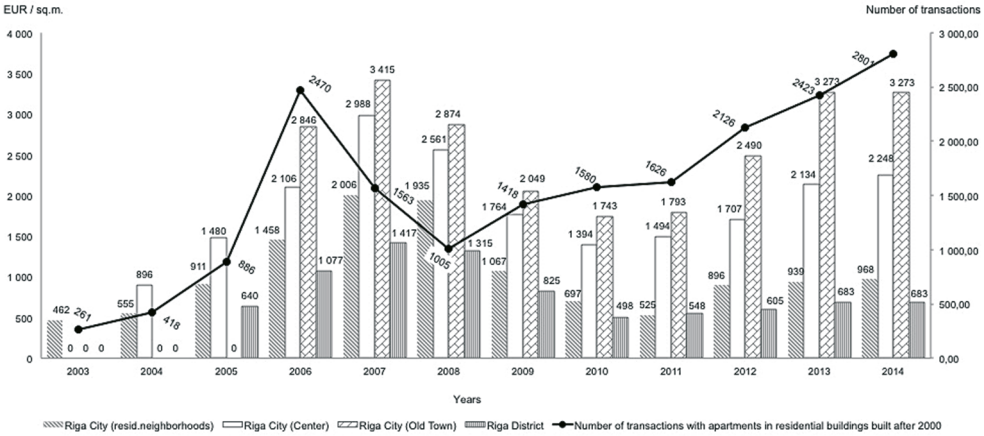

Figure 4: Average market value and transaction dynamics of apartments in newly built residential buildings in Riga City and Riga District (figure made by authors using sources: Latio 2015; SLS 2015b).

As the market of apartments is usually the most active one, it best reflects the dynamics and intensity of the real estate market transactions. The common characteristic (see Figures 3 and 4) in the data for the research period indicates to the development cycle of Latvia's residential real estate market and its changing nature. Therefore, the average market values and the number of transactions have risen up till 2006–2007 and then fallen. The moderate upward of market trend started from 2010 in formerly built residential buildings. The growth of number of transactions in newly built residential buildings has resumed already in 2009 and rapidly risen after 2011.

Although since 2011 the real estate market has become balanced in terms of average market value and transactions have resumed with apartments in all types of residential buildings, the construction rate of newly built residential buildings is not as dynamic, despite the development and aging of Latvia's housing sector. Thus, the future development scenario of residential real estate market depends on the national policy addressing the housing issues, which should envisage drawing up strategic planning documents of the market development directions and evaluating its effectiveness taking into account socio-economic, political and institutional factors, so that a decision-making process in real estate and construction sectors become systemized and effective.

4. Conclusions

The dynamics of construction output and market supply as well as transactions with residential real property for the research period basically reflect the cycle of economic development – relatively rapid growth during 2002–2007, then rapid recession up till 2011, and then slowly increase. Although since 2011 the real estate market has stabilised and transactions intensified, the supply dynamics of the new building projects is far too slow if considering the existing structure of housing sector. The development of real estate market

largely depends on development of construction industry. On the basis of the research results, it can be stated that the research hypothesis has been confirmed partly, because taking into account the development trends of residential real estate market, the existing structure of housing sector and the development rate of new projects in residential areas in case of the existing institutional environment in housing policy issues, there are limited opportunities to create a solvent demand, providing high-quality dwellings, especially in multi-family buildings. However, the results of the performed analysis at the same time point to the necessity and potential to find socially acceptable conceptual solutions and to increase the management efficiency within housing sector in Latvia. The potential policy issues of the Latvia's housing development should envisage the assessment of factors affecting the development of real estate market in relation to the functioning of the market, which would allow efficiently using resources and increasing the investments in real estate and construction sectors, thus promoting an expected and stable socio-economic development of the territory in the long-run period. The performed analysis and its most significant results substantiate the necessity to continue the study towards development opportunities of real estate market in several directions, including the creation of high-quality housing supply by providing the most suitable land areas and creating the appropriate solvent demand, as well as the assessment of challenges, effects and risks by attracting foreign capital and foreign investments in real estate development. Thus, a feasibility of "creative destruction" in real estate market should be justified by quality assessment of housing availability and initiative of local governments enabling to implement the building projects under permitting.

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Derya Oktay*

A Critical Approach to Sustainable Urbanism

Lessons from traditional and contemporary paradigms

Abstract

In the era of globalisation in which serious environmental problems are threatening cities and their inhabitants, as cultural integrity is constantly under attack and many cities lack socially inclusive and responsive environments, there is an urgent need for a radical shift towards a holistic strategy for sustainable urbanism combining ecological sustainability and socio-cultural sustainability. This calls for sensitivity to the traditional urbanism and impact of global ideas, practices, and technologies on local social and cultural practices both at the city scale and architecture scale. In line with these, this chapter aims to establish an environmentally sound and human friendly framework for sustainable urbanism in future cities. In this context, the study firstly provides a conceptual understanding of sustainable urbanism and a critical review of its philosophical and practical framework; secondly, it provides a critical assessment of contemporary approaches to sustainable urbanism; thirdly, the chapter analyses the traditional Turkish (Ottoman) city which provides valuable clues for sustainable development, and discusses possible research directions that could help promote the concept of sustainability in the urban environment of future cities.

1. Introduction

Changes that have taken place in the world over the past twenty years, including ecological disturbances and radical changes in traditional settlements have produced cities that are not just chaotic and monotonous in appearance, but have serious environmental problems threatening their inhabitants. In this context, environmentally sensitive design approaches at the building scale has been understood better comparing to those at the urban scale, and there have been significant developments in the field, although the contemporary architectural practice in the developing countries is still lacking many aspects of sustainable building design.

The efficient layout of our built environment presents an exceptional opportunity to enhance our quality of life while reducing our ecological footprint to protect the environment. On that ground, sustainable urbanism emerges as a sound framework that draws attention to the immense opportunity to redesign the built environment in a manner that supports a higher quality of life and human health.

When sustainable urbanism is characterised in many contexts, what is usually addressed as the main concern is natural environment, and hence ecological sustainability, a condition

* Ondokuz Mayıs University, Department of Architecture, Samsun / Turkey.

that could be explained with the climate change, the inevitable environmental crisis. However, we should be aware of the fact that today's development practices do not only consume enormous amounts of land and natural resources, damage ecosystems, produce a wide variety of pollutants and toxic chemicals, create ever-growing distances and fuel global warming, but also create inequities between groups of people, undermine local community and social values, economies and quality of life. These incremental changes imply a more critical state in cities of traditional societies where transformations in the urban level are still visible.

What is questioned in this chapter is that, given our knowledge that environmental sustanability is a crucial need, are the contemporary approaches adequate for all settings? At a time of uncontrolled globalization in which sense of place, history and cultural distinctiveness is constantly under attack and many cities lack socially inclusive and responsive environments, do these approaches also integrate social-cultural dimensions? These call for a new understanding of traditional settlements as they represent good uses of local environmental and social values in their times.

2. Understanding the concept of sustainable urbanism

Although the concept of "sustainability" in its modern sense emerged in the early 1970s in response to a dramatic growth in understanding that modern development practices were leading to worldwide environmental and social crises, during the seventies and eighties, the word "sustainability" was connected with the quotation from the Brundlant Report "development which meets present needs without compromising the ability of future generations to achieve their own needs and aspirations" (WCED 1987). However, with that definition hereafter, the notion of endurance and continuity was thought to be the domain of natural science that studied environmental measures to ensure that controlled growth meant that we use the earth in a way that endowed the same rights for future generations. Falling beyond the realm of natural science, the city, the community and their concerns were treated as separate entities, rather than being incorporated into the sustainability context (Haughton & Hunter 1994; Berg, Magilavy & Zuckerman 1990). What is more, most of the literature viewed the city and urban living as detrimental to the natural environment and hence a challenge to sustainable development.

On the other hand, since the city is an organic and dynamic entity and may take many different forms and meanings at different time intervals, we are bound to take the "time" factor into account. Sustainability, then, can be regarded as a perspective or paradigm in which we consider the three dimensions of society, economy and environment together, extending the fourth dimension of time.

3. A critical assessment of contemporary paradigms

Sustainable urbanism grows out of three late 20th Century reform movements that have transcended McHarg's antisocial environmentalism to highlight "sustainable development", that is a development which is non-damaging to the environment and which improves the long-term health of human and ecological systems (Wheeler 2004, 24). The "New

Urbanism" and "Smart Growth" movements, together with the paradigm of "Green Architecture" provide the philosophical and practical framework of sustainable urbanism at the city level. Each of these movements, however, has revealed certain insularity.

The movement known as the New Urbanism, which appeared in the early 1990s, has become a strong force for re-evaluating the physical layout of communities. However, the movement is open to criticism on a number of fronts – in particular for being focused on better-designed suburban development, often for upper income groups, rather than the creation of truly "urban" places, and for not incorporating green building design and landscaping.

Just a few years later, in the mid-1990s, "Smart Growth" evolved as an effort to recast the policy debate over sprawl in a way that more directly linked the environment, the economy and daily life concerns in pursuit of a positive and sustainable urban growth as essential to the quality of the city and urban life (Tregoning 2006; Wheeler 2006;). The movement focused especially on mechanisms to promote more compact, walkable and economically efficient urban development.

Compact cities are argued to offer opportunities to reduce fuel consumption for traveling, as homes, work and leisure facilities are closer together. They are also favored by many in the field of urbanism because urban land can be re-used, while rural land beyond the urban edge is protected. Economic benefits, due to high concentrations of people supporting local economics and easier access to services and facilities, are also suggested. Compact cities with higher densities may also mean that people are more likely to meet each other on the street than in low density areas (Talen 1999; Duany et al. 2001), and people may have a stronger sense of attachment to place (Nelessen 1994).

However, the case of the compact city cannot be said to be proven, and there are many counter-arguments on its "negativity" as it can still be considered contradictory to the preference for suburban living where the advantages of concentration might change into disadvantages through congestion which would outweigh energy consumption benefits of the compact city.

On the other hand, anti-sprawl strategies, which have obvious consequences for green and open space, have frequently lead to deadlocks in planning, especially concerning green space. On that ground, it can be stated that if green space is deprived, a compact city may become the antithesis of a green city.

Further, the compact city makes little sense for developing countries because the context is completely different from North American and European countries whose cities have experienced declining populations and deindustrialization. Cities of developing countries have much higher densities than their counterparts in developed countries, and they are not becoming significantly less compact in spite of decelerating population growth and the beginnings of decentralisation.

Overall, what is disregarded in all these approaches is that cities also have social-cultural aspects, and in this context, social sustainability needs to be paid serious attention. Mc Kenzie (2004, 120) efficiently defines social sustainability as "a life-enhancing condition with communities, and a process within communities that can achieve that condition". In this understanding, social sustainability is a system of cultural relations in which the positive aspects of disparate cultures are valued and promoted and there is widespread participation of citizens not only politically but also socially in all areas of urban life environment.

To this point, we have to ask ourselves what specific measures need to be taken to create sustainable urban environments, and how environmental and social concerns can be brought together into one convincing scenario, in which everyone benefits. In this context, it is important to understand that the idea of sustainability is not new, and the traditional cities are excellent examples to learn from regarding various dimensions of sustainable urbanism. Sensitivity to tradition allows us to excavate the sophisticated repository of knowledge embedded in planning and design principles and processes linked to the ecological and socio-economic contexts of times past. On that ground, this chapter will focus on the Ottoman (Turkish) city, which teaches many lessons that can contribute to meeting contemporary and future planning and design needs provided that their viability are checked for each case and in a time-based perspective.

4. Learning from the traditional Turkish (Ottoman) city

The traditional Turkish, or the Ottoman city, built collaboratively by various cultures on a geographical setting extending from Middle Asia to Anatolia, from Mediterranean to Balkans, demonstrates sensitivity to local topography, Islamic and Christian philosophies about the natural world, and local habits and traditions built from a multitude of human values over centuries (Cerasi 1999).

From an urban and social point of view, the main characteristic of the Ottoman city was its compartmentalization by mahalles (neighbourhoods), the outcome of ethnic particularities and religious differences. The mahalle was a geographical entity as well as a homogeneous community providing social and economic collaboration among neighbours (Figures 1, 2). Each mahalle had its own characteristics and provided an indicative, unique social environment for their inhabitants. However, spatial segregation that was based on ethnicity and profession leaded separate lives within each minority, and therefore indicated a negative aspect from the perspective of contemporary sustainable urbanism. The mahalle was self-sufficient as well through the presence of a variety of functions including a religious-social centre, small local market, fountains, imaret (open kitchen) and at times, workshops (Oktay 2004). As a result of the closed economy, every household produced their own foodstuffs, i.e. vegetables, fruits and a variety of seasonal produce that can be preserved and stored.

The efforts of numerous private builders (masters) in residential areas were guided only by a few simple rules of civility, assuring individuality within the neighbourhood as well as community identity apart from the works of government. It is a remarkable lesson that every

Figure 1: A typical layout of mahalle (Aru 1998).

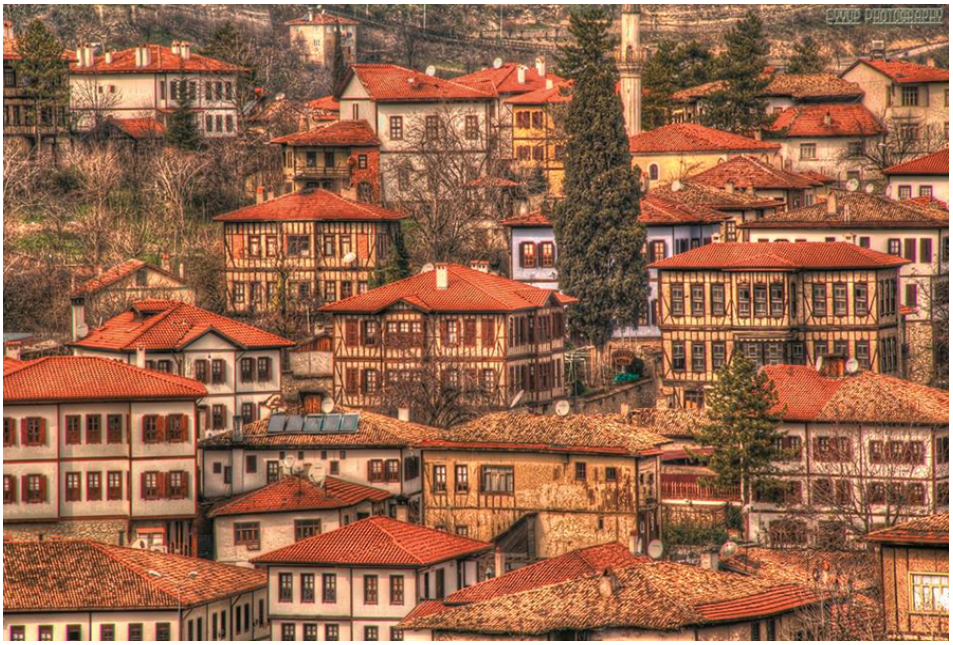

Figure 2: A view to the traditional townscape in Safranbolu, Turkey. (E. Muhcu Archive).

house in the Ottoman city was different, even as there is an overall unity and consistency in building technique, scale and character (Eldem 1987). As such, despite the lack of an organising development plan at the governmental level, that is a must in today's development practices, the respect to local environmental and social values made the Ottoman City a sustainable settlement regarding many points.

The space of the traditional (Ottoman) city was, at a functional level, clearly divided into public and private realms. The public realm, often in the town centre, contained all the collective activities of the town, such as trade and commerce, religion, education, administration, and urban facilities, resulted in a fine-grain mixed-use character. The main public node and the representation of people's power were bestowed to the citadel, the Friday mosque and its courtyard, and the bazaar. One of these elements, the main – often covered – street or streets of the city, the bazaar or *arasta*, functioned also as a communication channel, connecting these to each other and top the less important activities such as public baths, water storages, and educational centres, hence creating a vivid public realm in a spatial continuum. This space was the meeting place of the local people with each other, with the political, religious and economic hierarchies, and with the outside world. However, owing to the cultural codes and realities of the time which were very different from those of the modern Republic of Turkey, most of the public facilities were perceived as the territory of men as the traditional role of women necessitated them to spend the majority of their time in the house and in its environs, which constituted the private realm.

The street system in residential areas was mostly pedestrian and had a hierarchical order: from the main streets spread out narrower streets that themselves had dead-end branches that lead to individual houses. In this system, only the main through-fares separated the urban fabric. This system was achieved through a process of organic growth in which the street pattern was gradually adjusted and changed according to the peculiarities of the land and needs of the local people, where there was no need for wider streets and a low level of accessibility was required. The hierarchical pattern of streets with dead-end branches serving a group of houses created privacy for the dwellers, and helped create a strong sense of belonging to their neighbourhood. From an urbanistic point of view, this organic character of the street, in the state of continuous becoming, produces an effect of great expressiveness, and therefore, enhances the character in the Ottoman city. The street also bore a potential for social activities. Children of similar ages played together and identified themselves with the street they lived in. Fountains of running water were found at many street corners where women had the chance to meet their neighbours and have a chat whilst getting water every morning and evening.

On the other hand, *avlu*, the courtyard of each house, an isolated environment that is well defined and well protected, served a variety of uses including social gathering, such as wedding and circumcision parties, women's preparing winter food together, or just spending time together, and helped create a more cohesive community in the *mahalle.*

Owing to the fact that Ottoman urbanism was never based on the kind of strong formalism characteristic of western cultures, a generally informal character was dominant in cities. In this context, there were no formal public open spaces, i.e. well-defined squares, or monumental axes to be found in the cityscape. However, despite having no planned squares and the lack of an active use of *meydan* by people, there was a social and psychological tendency towards meeting and gathering in open spaces of natural character (Eldem 1987; Cerasi 1999).

The Ottoman city possessed various attributes that generated an ecologically sustainable environment. Regional climatic characteristics were reflected on the patterns of settlements, and accordingly every region produced its own characteristic urban fabric and architecture. For instance, in Safranbolu, one of the most characteristic towns in the north-western Black Sea region of Anatolia (Turkey), hard winters forced the people to settle in sheltered valleys (Günay 2005, 21). The pre-existing topographic character of the site was apparent at the urban scale even in intense built-up areas. The green gardens, i.e. vegetable gardens and patches (*bostan*), orchards, and so forth, implied a green belt dividing the quarters and bounded the town (Aru 1998, 12), and contributed to the self-sefficiency in general. The small squares at the intersection of streets with trees created opportunity for access to nature in the public realm as well. The streets that were defined by high walls of the residential courtyards provided a protected and comfortable space, and being divided into two by a 10–14 cm water canal running through the middle, helped distribute water to gardens, and prevented the rainwater from flowing into the courtyards.

The presence of a variety of house plans all with a courtyard, *avlu,* or garden in every region of Anatolia reveals the fact that there was a natural relationship between such a layout and the Anatolian life-style (Kuban 1983). With its fruit trees, flowers and small kitchen garden, the *avlu*, separated from the street by a wall, was the closest relation the house has to nature; and thus it also provided the inhabitant with direct access to nature, and enhanced both the building ecology and self-sufficiency of the house.

The Ottoman city was also exemplary in the sense that its inhabitants preferred simplicity in every aspect of life and generally adopted a sustainable lifestyle that promoted a self-sufficient urban and housing environment.

All these peculiarities, on the contrary to many newly developed urban environments in Turkey and around the world, make the Ottoman city an ideal model for ecologically and socially sustainable cities despite its shortcomings in terms of viability of certain aspects (i.e. women's limited use of the public realm) for today's cities and urban life. Since sustainability needs to be assessed considering the cultural codes and realities of the time, as discussed in the background section of this chapter, these shortcomings may be tolerated within the larger, holistic context provided that requirements for every aspect of life are satisfied in today's urban planning and urban design.

5. Redefining essentials for sustainable urbanism

Based on our critical review of contemporary approaches to sustainable urbanism and our analysis of the Ottoman city as an ideal model for sustainable urbanism, it seems essential that new urban planning and design endeavours should comprise a human dimension and demonstrate respect to regional characteristics. In this context, the following aspects are considered essential: Context-sensitive compactness and de-fragmentation; Completeness: good mixed-use; Connectedness: integrated transportation and land use; Ecological sensitivity; a focus on place and public spaces; Social-cultural sustainability; and Sustainable life style.

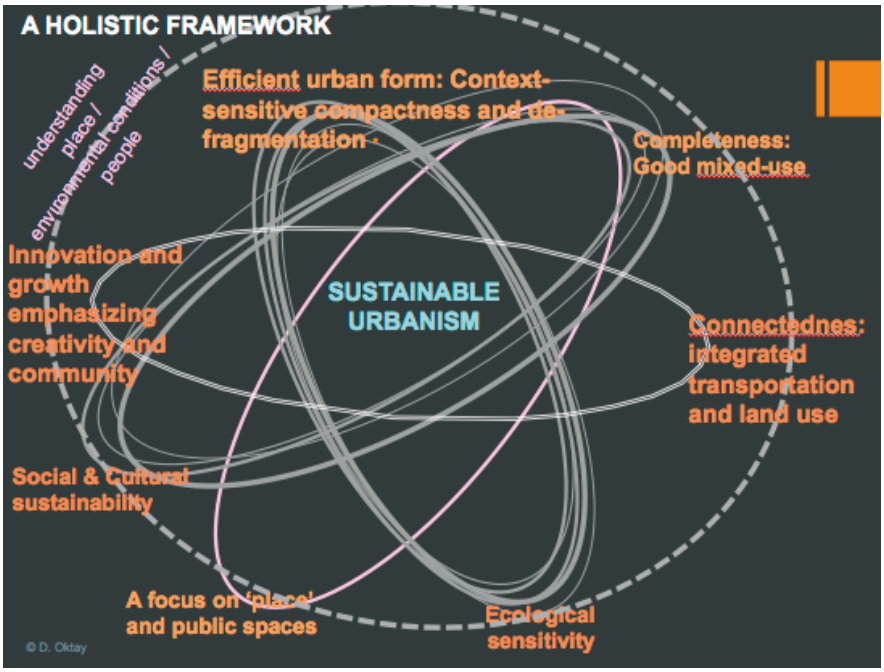

Figure 3: A holistic framework for sustainable urbanism.

Context-sensitive compactness and de-fragmentation. Urban design of compact cities can obviously contribute to a more sustainable way of life, particularly in industrialised societies. However, as revealed through the ideas exemplified by the traditional Ottoman city that comply with regional characteristics, it cannot be expected that cities should all fit the same formula. What is needed is not a radical set of measures, but by a complete diagnosis of the territory, identifying local characteristics (i.e. climate, landscape, identity, culture and traditions), specificities, demands and dynamics, and an estimating and evaluation of the urban development processes, through comparing the demand and the offer for urban growth, and consideration of the issues of "where" and "how" the urban settlement grow.

Inspired by the Ottoman city and *mahalle,* the contemporary city could be thought as an entity made up cohesive and identifiable districts, and smaller towns of functional diversity could be created in the vicinity of the city rather than reaching unacceptable levels of density and population. In this context, density should be related to design in such a way that its advantages and disadvantages are investigated by considering local social dynamics (need for privacy, degree of privacy, neighbourly relations, and so forth) and environmental values (green infrastructure, made of wetlands, forests, groundwater recharge zones, and so forth), and new scenarios for "de-fragmentation". De-fragmentation, an anti-thesis for the fragmented and sprawled city, is possible through densification on brownfield sites and transport interchanges.

Completeness: good mixed-use. Fine-grain mixed-use, an important component of the public realm in the Ottoman city, is sought in urban expansion in order for those environments to

be lively, safe, sensorily rich, choice laden, economically and spatially efficient and ecologically diverse; sustainable as far as the built environment can believably be. Containing all the collective activities (i.e. trade and commerce, religion, education, administration, and urban facilities), the central parts of the city revealed a fine-grain mixed-use character and helped the local people meet with each other (despite the limited frequency by women owing to the cultural codes of the time) and with the outside world. The main street and the bazaar or *arasta* in the Ottoman city, functioned as a communication channel, connecting the main activities to each other and top the less important activities (i.e. public baths, water storages, and educational centres), and created a vivid public realm in a spatial continuum. These characteristics can be re-interpreted as a model when planning and/or re-designing our cities whose central parts are deteriorating owing to the lack of diversity of main functions and the effects of privately owned, introverted spaces of modern urban commerce and design.

Connectedness: integrated transportation and land use. The findings of empirical surveys (i.e. Lund 2002; Kim and Kaplan 2004; Khandokar et al. 2009; Oktay 2010) suggest that the social and physical contexts of the walkable neighbourhood enhance casual interactions and social participations and are likely to contribute to the sense of community. In the Ottoman city, the walkability of the streets (at a time of the unavailability of motor cars but other means of transport such as horses and donkeys) was enhanced by human scale, physical convenience (protection from sun, rain, etc.) due to the narrow and winding streets following the natural contours of the land, and pleasant continuity of the outer walls of the houses and courtyards that. From these, one important lesson for the contemporary city is designing the city streets first for people taking into account the functional and aesthetic needs of people rather than complying with cars only.

Ecological sensitivity. As observed in the Ottoman settlements which reveal an ideal integration with the natural environment and climate, sustainable urbanism seeks to connect people to nature and natural systems, even in dense urban environments. In this context, an attempt at integrating such features as edible landscapes of fruit trees and large vegetable patches (allotments) into the city would be beneficial for dwellers in terms of lower heating and cooling bills, lower food costs, and reduced risk of flooding and landslide damage. Trees with canopies can be used for their shadowing effect, and for the definition of spaces both in streets and courtyards.

A focus on place and public spaces. Although public spaces form a crucial feature of sustainable and liveable cities, contemporary urban environments frequently lack enough space kept aside for them, and most of those spaces which are introduced as "public spaces" miss spatial, ecological and social qualities, and cannot be considered "places for people". In this vein, inspired by the Ottoman city, new urban areas could be planned and designed around a hierarchy of spaces for different purposes, the idea of main shopping strip could be revived in order to prevent the shopping malls to be the norm, and the street pattern could be organized in a way that each street has an identity through the continuity, design and functional layout of buildings.

Social sustainability. Social sustainability is a system of social-cultural relations in which the positive aspects of disparate cultures are valued and promoted and there is widespread participation of citizens not only politically but also socially in all areas of urban life environment. As the most appealing aspect of sustainable urbanism is to be the sustainable neighbourhood with its societal benefits, we must widen our definition of the sustainable urban neighbourhood to include social as well as environmental concerns as reflected in *mahalle*, the cohesive neighbourhood unit in the Ottoman city. However, we should not ignore the great changes that happened in the daily life of people, i.e. significant increase in percentage of working women, women's equal participation in almost all aspects of life, and so forth.

Sustainable lifestyle. Everything we do as professionals and as human beings in the name of sustainability means very little if we don't actually change environmental behaviour of consumers, companies, communities and governments. In today's cities, what is needed for sustainable lifestyle is "education for sustainable development" and hence "ecological citizenship", that would enable urban residents to develop the knowledge, values and skills to participate in decisions about the ways they do things individually and collectively, both locally and globally.

6. Conclusion

This article focused on the significance of a holistic approach to sustainable urbanism. It was established that it is essential to ask ourselves what specific measures need to be taken to create sustainable urban environments, and how environmental and social concerns can be brought together into one convincing scenario, in which everyone benefits.

What is obvious is that the norms and ingrained behaviours are slowly changing, moving away from car-centric sprawling planning towards more environmentally-focused, high-density developments. The newly developed paradigms that focus on how to achieve sustainable environments, namely Smart-Growth and New Urbanism, need to be understood provided that the local conditions and characteristics are taken into consideration.

In this context, it is important to understand that the idea of sustainability is not new, and the traditional cities are excellent examples to learn from regarding various dimensions of sustainable urbanism. The developing countries should give up copying the bad habits experienced in the western parts of the world, but return to their own regional precedents and culture, and develop them with innovative approaches.

In line with these, the proposed holistic approach integrates the following qualities: Context-sensitive compactness and de-fragmentation; Completeness: good mixed-use; Connectedness: integrated transportation and land use; Ecological sensitivity; A focus on place and public spaces; Social-cultural sustainability; and Sustainable life style.

The recent efforts towards more sustainable urban environments have revealed that, in order for sustainable urbanism to move forward and gain traction, it is essential that it be seen by citizens as playing an integral role in addressing the key issues of our times.

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Vida Maliene*, Isabel Atkinson** and Steven Fowles**

The Challenges of Creating Co-Existing and Competitive Retail Centres in the North West of England

Abstract

A combination of changing consumer behaviour, fluctuating economic conditions, advances in technology and changing government policy have left many British centres suffering from varying degrees of decline. As modern technologies and transportation have altered the way we shop, research suggests that a centre's culture and identity can provide a successful foundation with which to create experiential retail that can attract footfall back into town centres (see for example El Hedhli & Chebat 2009; Verhoef et al. 2009; Padilla & Eastlick 2009; Robertson 1997; Runyan & Huddleston 2006). This chapter provides an overview of some of the challenges facing declining centres in the North West of England and, focusing on the regeneration of Liverpool's core retail area, explores the ways in which identity and culture have been incorporated into its urban design to enhance the retail experience on offer in the city centre.

1. Introduction

In Britain the term 'high street' refers to the main commercial street(s) of a town or city, and is often perceived to be the core retail and shopping area of urban centres (Carmona 2015). The term is also synonymous with smaller, suburban commercial streets, which can therefore cause confusion and debate regarding the specific definition of the term. However, for the purposes of this chapter, the term refers to any retail location, large or small, from small suburban shopping parades to large city centre retail areas.

Since the industrial revolution high streets have played a significant role in British society. Prior to advances in modern transportation, local communities were heavily reliant on their local shops and services which they would access, predominantly, by foot or bicycle. Wild and Shaw (1975) report how geographical parallels between store locations and custom were at their highest in mid-1800. However, over the last 50 years, cultural changes – including an increase in the number of women choosing to work; an increase in private car ownership; and the increasingly busy lives led by individuals – have altered consumer shopping habits and have driven an increasing demand for ease and convenience. Consequently alternative

* Department of the Built Environment, Faculty of Engineering and Technology, Liverpool John Moores University / UK. Corresponding author, tel.: +44 151 231 285, e-mail: v.maliene@ljmu.ac.uk.

** Department of the Built Environment, Faculty of Engineering and Technology, Liverpool John Moores University / UK.

retail approaches, such as out-of-town and online retail, have developed to meet the consumer's evolving needs. These retail approaches have also provided benefits to the retailers themselves: reducing store overhead costs, and in the case of out-of-town units, providing built-for-purpose units which are easily accessible for delivery vans and lorries. The ability for out-of-town and online retail to meet the changing needs of the consumer and retailer has often left traditional centres lagging behind, and many British high streets have fallen into decline as they struggle to compete for consumer preference.

2. Case study high streets suffering from decline

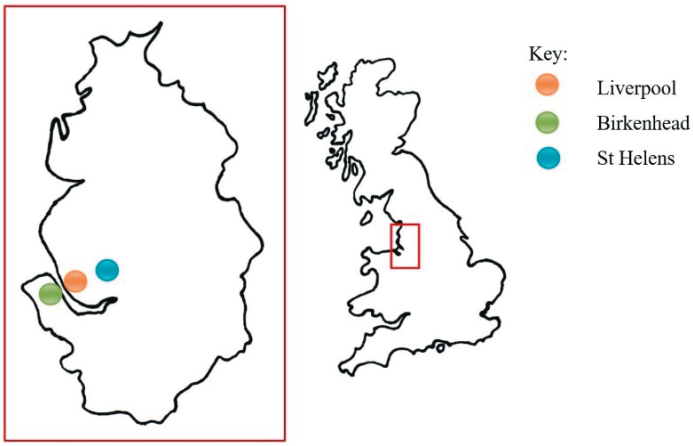

Figure 1: Locations of Birkenhead, St Helens and Liverpool (Source: author's own).

2.1 Birkenhead, Wirral

Birkenhead is a town located on the Wirral Peninsula, in the North West of England (see figure 1). The town sits on the bank of the River Mersey, directly opposite the famous Liverpool waterfront. During the 19th century the town flourished thanks to the employment opportunities presented by the Birkenhead docks and the shipping industry. However, economic changes during the latter half of the 20th century saw Birkenhead fall into decline, and this decline was reflected in the town's core retail area. In recent years the success of the nearby Liverpool ONE development (see chapter 4) has placed further strain on the town centre, and the planning approval of the 'Wirral Waters' scheme – a £4.5bn scheme comprising residential, leisure, commercial and retail development scheduled for completion in approximately 30 years – creates further uncertainty for the future of Birkenhead's existing high street. In 2010 Wirral Council commissioned GVA Grimley Ltd to conduct an integrated regeneration study for Birkenhead and Wirral Waters. The document notes that "Birkenhead town centre is in significant decline and needs to find a new purpose and direction" (GVA 2010). Since 2010 efforts have been made to rejuvenate the town centre, including new signage, outdoor repairs and a new heating system. Additionally, the centre has reportedly observed a decrease in store vacancy rates from 40% in 2011 to 9% in 2014 (Liverpool Echo 2014). However, with plans recently approved for a new leisure centre,

including bars and restaurants, on the periphery of the site, and the proposed development of the aforementioned Wirral Waters scheme, the sustained survival of Birkenhead town centre remains uncertain.

2.2 St Helens, Merseyside

Located in the North West of England (see figure 1), within commuting distance of both Liverpool and Manchester, is the town of St Helens. In its heyday the town thrived thanks to the coal, glass and copper refining industries. However, as Britain moved towards a more service based economy, such industries fell into decline. Like Birkenhead, the decline of St Helens was reflected in the core retail centre.

Between 2004 and 2008 St Helens fell from 92nd place to 118th place in the National Regional Hierarchy and issues were identified regarding vacancy rates, management of the centre and the number of visitors to the high street, amongst others (St Helens Council 2009). In 1992 the town's vacancy rate stood at 3%. By 1999 it had increased to 7% and, ten years on, the rate had risen again to 10.27% (2008/09) (St Helens Council 2009). Since 2009 St Helens has witnessed the closure of some of its most prominent stores including WH Smith, Burtons and Dorothy Perkins (St Helens Star 2014). Additionally, in 2014 the council published a report citing the need for public realm investment, parking improvements, shop front improvements and initiatives to promote and support businesses on all of the high streets within the local authority's boundary, not just the town centre (St Helens Council 2014).

2.3 Resident data: Birkenhead and St Helens

Between December 2013 and April 2014 data was obtained in the suburbs surrounding Birkenhead (61 participants) and St Helens (75 participants), in order to gauge the opinions of residents with respect to their local high street. The data observed that 70% of Birkenhead participants and 71% of St Helens participants preferred to shop at other retail destinations, rather than their respective local high street.

With reference to the Birkenhead participants, the data suggests that they seek greater choice when opting to shop in other retail destinations, with 99% of those who preferred to shop elsewhere stating this reason. The three main preferred destinations were observed to be the city centres of Liverpool and Chester, and the out-of-town outlet village, Cheshire Oaks. 44% of all participants stated that they would choose to visit Liverpool city centre in order to access greater choice. Participants also noted the increased prosperity, better quality environment and better quality goods on sale in Liverpool. These results would appear to support previous observations that middle order centres in particular are adversely affected by increasingly prosperous larger town and city centres (see for example Department of the Environment 1992; British Council of Shopping Centres 1996; Ravenscroft 2000). Additionally, less than half (44%) of the participant sample stated that they conducted non-food shopping in Birkenhead high street, and 64% said they conducted their food shopping in supermarkets located outside of the town centre. The results indicate that Birkenhead's high

street is struggling to compete with the retail offering of nearby city centres and suburban supermarkets.

St Helens presents a slightly different scenario in that the town is home to two decentralised retail parks, located on the edge of the town centre. 61% of the St Helens participants said that they preferred to shop at the retail centres rather than St Helens town centre. 50% of those participants stated that they sought more variety and better quality shops from the decentralised developments. Furthermore, 75% of the total sample said that they would prefer St Helens' high street if the range of shops was similar to that of the retail parks.

Of all participants 88% indicated a desire for a greater variety of retailers in St Helens' high street, 56% believed more parking would improve the retail centre, and 56% believed more locally owned/ independent shops would benefit the high street. These figures suggest that local residents seek attributes more commonly found in larger city centres, out-of-town locations and in online retail, to be present in their local high street.

Participants were also asked about their views on the identity and image of their local town centres. Birkenhead's participants appear to have been divided in their opinions of the centre as 26% believed that the high street negatively contributed to the image of Birkenhead, however 30% felt that it positively contributed to the town's identity. The further 44% did not express an opinion either way. Additionally, 45% of St Helens' participants did not feel that the high street represented the local community.

3. Image and the retail experience

In a retail agglomeration, the success of individual stores is often dependent on the image of the overall shopping destination (Bell 1999) and image is observed to play a key role in consumer patronage (El Hedhli & Chebat 2009; Verhoef et al. 2009). Whilst only a small amount of research has explored town centre image from a consumer's perspective (Hart et al. 2013), the literature available suggests that a customer's experience of a retail centre plays a fundamental role in their image of that destination (MacInnis & Price 1987). Over the last 20 years increased importance has been placed on the 'experiential' elements of management initiatives (Warnaby 2009); this is often reflected in the mix of occupiers, and the focus on achieving competitive and diverse centres (Henley Centre/ BCSC 2002).

It is recognised that the shopping experience can be shaped by unique characteristics such as buildings of historical interest and themed zones (Padilla & Eastlick 2009; Robertson 1997; Runyan & Huddleston 2006). Additionally, Erkip et al. (2013) report that town and city centres play an important role in the identity of a local area and its residents. As diversity is considered to be a fundamental characteristic of thriving high streets (Carmona 2015), creating retail centres with identities can be an effective way of creating distinctive centres which will stimulate positive consumer experiences, therefore encouraging increased consumer patronage.

The New Economics Foundation (2005) believe that the domination of chain stores, leading to 'clone towns', has left British high streets less resilient to changing market forces.

Moreover, they note how the process of regeneration can, in some cases, further strip centres of their identities, as local materials are replaced with modern, sterile facades which mimic other high streets across the country.

4. Liverpool ONE

Located in the North West of England is the city of Liverpool. For decades the city's core retail area was in need of investment and revitalisation, and in 2004 funding was secured for the redevelopment of Paradise Street to create the Liverpool ONE retail development.

Liverpool ONE is recognised as the largest regeneration project of its kind in Europe, and is considered to be the most important development within Liverpool in over 60 years (Daramola-Martin 2009). The development – which involved the collaboration of 22 architectural firms (Building 2008) and the acquisition of land through compulsory purchase orders – covers a 42 acre site within the city centre and comprises 148,500 square metres of retail space, leisure and business facilities and a new bus station (BDP 2014). The first phase of the redevelopment involved the construction of 30 new buildings in amongst the streetscape of refurbished existing stock (Laing O'Rouke 2014). Grosvenor's retail project director Rod Holmes oversaw the construction of Liverpool ONE. Given the competition posed by nearby centres and out-of-town retail developments, Holmes believed that incorporating ample 'variety, choice and surprise' was key to success (Building 2014). The design of the scheme has integrated the culture of Liverpool into the development – from its maritime past, to its connections with music and sport – to create a high street with a relevant and unique identity.

4.1 Physical linkages

The Liverpool ONE development has been successful in creating a more unified city as physical linkages between the retail area and the city's other major land marks have been redefined and enhanced. Additionally, as illustrated in Figure 2, the development has been intertwined into the city's previous primary high street.

Figure 2 illustrates how an entrance into 'Liverpool ONE', situated on the previous main high street, blends into the existing street scape, mimicking the facades of the surrounding shops. This subtle entrance provides access between new and old without detracting from the traditional streetscape or appearing to be an entirely separate entity.

Materials used to construct parts of Liverpool ONE were chosen due to their connection to the local area (One Community no date), and Chavasse Park – a designated area of public green space within the city centre since the 1980's – was revitalised. Following the completion of the developments underground car parking facility, the park was reinstated above to provide 22,000 square metres of landscaped greenspace (Willerby-Landscapes 2008). The new park – which comprises plants which formerly grew wild in the area (One Community no date) – has been integrated among the bars and restaurants which occupy the top floor of the development. The park also provides an attractive physical linkage between Liverpool

ONE and the Albert Dock – an important historical land mark and a popular visitor destination for both local residents and tourists.

Figure 2: Entrance to Liverpool ONE via the former main high street (Source: author's own).

4.2 Land marks, monuments and signage

Scattered across the development are various landmarks and monuments which provide connections to Liverpool's past. Examples include the 'Sugar House Steps' which provide access to Chavasse Park and also act as an outdoor seating area. The steps acquired their name due to their location, which is the approximate site of Liverpool's first sugar house (Liverpool ONE no date). Other examples include the Liverpool Sailors' Home Gateway, which stands near to the site of the former sailors' home, and a monument which enables the public to view Liverpool's underground dock, which was built by Thomas Steers between 1709 and 1715.

The design of the Liverpool ONE development also introduced new streets which had previously not existed. This was considered an opportunity to further incorporate history and culture into the scheme. Some examples include 'Wall Street' which was named in commemoration of the walls of the historic Liverpool castle; 'Custom House Place' was named in memory of the former custom houses; and 'Thomas Steers Way' was named after the aforementioned developer of Liverpool's old dock (Liverpool ONE no date).

4.3 Retail units and organised events

The integration of culture and identity into the Liverpool ONE development extends beyond the physical streetscape, having filtered into some of the retail units in a number of ways. For example, the HMV music store features a 30ft image of The Beatles in its main window, overlooking the main high street. Additionally, the Liverpool FC and Everton FC shops are located within the development, reflecting the city's love of football. Liverpool ONE also regularly plays host to a variety of events which have included ice festivals in Chavasse Park, piano festivals and specified weekends where retailers offer additional discounts and offers to consumers.

5. A thriving retail centre

Liverpool ONE was officially opened to the public in 2008. Since opening the development has recorded impressive sales and footfall figures. In June 2014 a review was published into the ongoing progress of Liverpool's main retail area. The review observed a 52% increase in trading within the style and leisure sector between 2008 and 2012, and a consistent 99% or higher occupancy rate of units within the Liverpool ONE development (Liverpool Vision 2014). Additionally, footfall figures between 2009 and 2012 were observed to increase by approximately 2.3 million (One Community no date), and those for 2014 observed an increase of 1 million compared with those reported for 2013 (Move Commercial 2014). Furthermore, in the year March 2014 to March 2015 sales within Liverpool ONE rose by 15% and footfall increased by a further 4% (Grosvenor 2015). These figures demonstrate how resilient the development has proved to be during a time of economic uncertainty on a global scale.

Since opening Liverpool ONE has continued to welcome new stores and new brands to the city, and of those new stores which have opened in the last two years, 90% have been new to region (Grosvenor 2015). Additionally, in 2002 Liverpool was ranked 13th place in a ranking of Britain's best retail destinations (Daramola-Martin 2009), however, by 2013 the city had climbed to 5th place (JCDecaux 2014).

The ideologies of place identity have helped Liverpool to reinvigorate its retail experience by embedding the city's maritime history, and music and sporting culture into Liverpool ONE through its physical environment and organised events. This experience, along with the growing range of stores, has enabled the city's popularity to prosper. This popularity has been reflected in the rising levels of footfall and increased sales figures over the course of the developments existence. Liverpool ONE has also won numerous awards (Visit Liverpool no date; e-architect 2014) and the development's masterplan was also the first to be shortlisted for the RIBA Stirling Prize in 2009. Additionally, Chavasse Park was awarded 'Green Flag' status and has been praised for its commitment to community involvement, heritage conservation and biodiversity (Liverpool ONE no date).

6. Conclusion

As Liverpool city centre's popularity as a shopping destination has grown, it poses increased competition for town centres in the city-region such as Birkenhead and St Helens. The resident data outlined above suggests that the two retail areas do not offer the desired range of retail sought by the local consumer base, and they are failing to emit a wholly positive identity which is identifiable by the local community. As consumer trends increasingly favour alternative retail approaches such as online and out-of-town retail, pressure grows on high streets to adapt and provide a unique service to customers; one that cannot be replicated, or bettered, by these competing entities. However, given the investment and collaboration required to create a holistic identity, smaller, less nationally significant centres such as Birkenhead and St Helens are often left struggling to compete with close neighbours. Moreover, the result of the recent referendum – resulting in a vote for the United Kingdom (UK) to leave the European Union (EU) – creates further uncertainty for these towns. Birkenhead has benefitted from EU funding since the 1990's and the town's award winning bus station was part funded by the EU (Financial Times 2016). However, as yet, there is no guarantee that any future shortfall of funding – as a consequence of leaving the EU – will be made up by the UK Government. Additionally, the economic uncertainty sparked by the vote to leave has led to a drop in consumer confidence (to its lowest level in 3 years) (YouGov 2016). YouGov has also warned that the sharp drop in household financial expectations for the next 12 months may have a significant effect on retail spending.

In light of the issues outlined above, smaller retail centres such as Birkenhead and St Helens may be forced to re-think their functions. One possible solution is provided by the Governments recent relaxation of development rights to allow for conversion of empty shops into a range of uses including residential use, without the need for planning permission. Whilst there may be concerns about the loss of traditional high street functions, such development would reduce the environmental problems caused by vacant shops, and an increased resident population could stimulate demand for alternate health, leisure and social uses. For example Birkenhead has already welcomed a "midwife shop" which opened in 2009 providing a walk-in service for pregnancy and post-natal issues. Other innovative solutions include the conversion of vacant units into school classrooms. This is particularly pertinent given the recent figures released by the Local Government Association (LGA) estimating the need for an extra 336,000 school places in England by 2024 to meet growing demand (The Guardian 2016). This type of approach may secure the traditional role of high streets as the centre of the community and enable them to successfully co-exist alongside their metropolitan neighbours.

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Olga Petrakovska* and Mykola Tregub**

Current State of Industrial Land-Use in Ukraine

Abstract

The article considers the definition of the main components of the formation and functioning of industrial areas in Ukraine. Whilst basic approaches for the formation of industrial regions, districts, agglomerations and units, which were formed historically, are defined and systematised, the directions of further development of industrial areas are proposed taking into consideration the actual situation and future development trends.

1. Introduction

Because of a wide range of factors, including the climatic, geographical location, and geology, Ukraine is one of the countries that has the highest quantitative and qualitative indicators of agricultural land. In Ukraine, the agricultural land forms up 70% of all territory (Fig. 1).

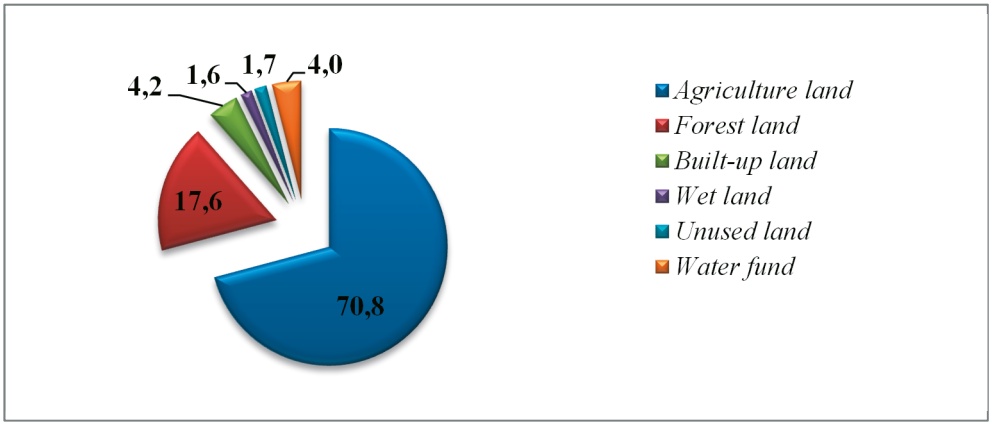

Figure 1: Structure of the land fund of Ukraine (Source:http://land.gov.ua/).

Due to the fact that Ukraine was part of the Soviet Union for over 7 decades, it had a planned economy and industry developed alongside its agricultural. The distribution of industrial areas depended largely on existing mineral deposits and convenient transport system and jobs were created based on the distribution of such powerful industrial centres. The total area of all land for industrial use in Ukraine is not more than 10% of built-up land (Fig. 2). Now the structure of the industry includes almost all sectors. Despite the decline

* Kyiv National University of Construction and Architecture, Department of Land Management and Cadastre, Kiev / Ukraine.

** State Higher Education Institution "National Mining University", Department of Geodesy, Dnipro / Ukraine.

of industrial production in recent years, the industry in Ukraine still employs about 20% of the population (Kostenok 2015).

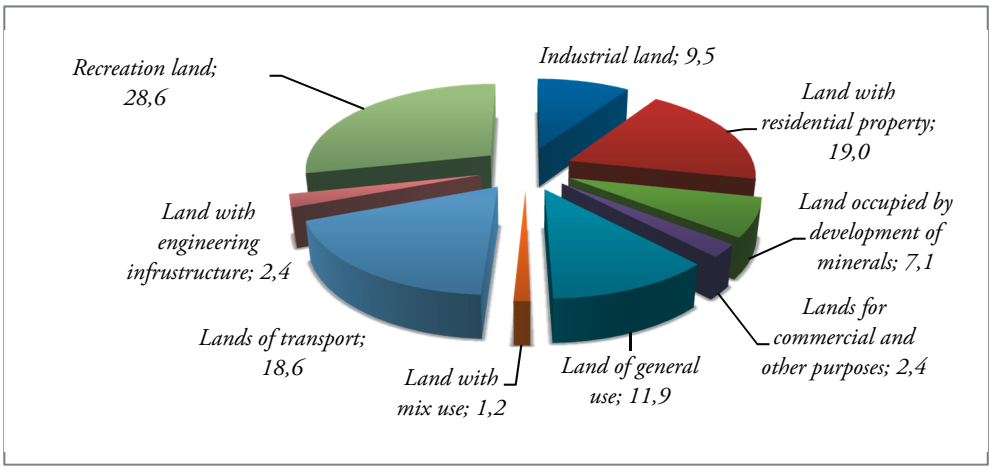

Figure 2: Structure of the built-up areas in Ukraine.

It should be noted that the level of the employment of the population mirrors the economic development of the country. The main indicator that reflects the economic development of any country is the gross domestic product (GDP). In Ukraine, the allocation of GDP, depending on the distribution of land fund, is rather heterogeneous (Fig. 3).

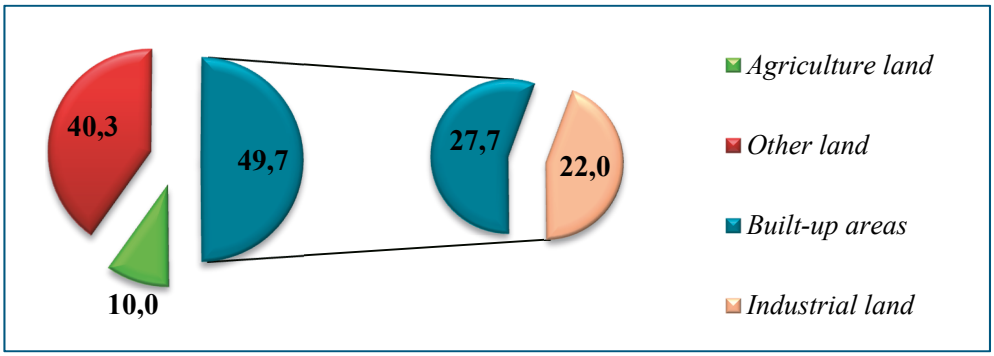

Figure 3: Formation of Ukraine's GDP, depending on land use (%)
(Source: http://www.ukrstat.gov.ua/).

As a consequence of the land use of industrial areas and the employment of the population, this part of the economy formed double GDP than the agricultural land use (Fig. 3). Although the agricultural land has an area some hundred times greater than the industrial land (Fig. 1), the issue of the efficient use of industrial land is still critical. Thus, determining the current state and weaknesses of land management industry in Ukraine is of great importance.

2. Current situation of industrial areas formation

As a result of geological and geomorphological history, Ukraine has large deposits of mineral resources that have contributed to its industrial development. Under the influence of industry and the development of the necessary infrastructure new cities were created and settlements that were later transformed into industrial centres (Tregub and Trehub 2015). Further intensive development of industrial areas has led to the need to improve the mechanism of the organization of the territory. Taking into account the features of a planned economy, the expediency of the industrial area zoning of the entire country emerged as an economic necessity. The improvement of industrial areas gave rise to the emergence of industrial areas, agglomerations and hubs (Ischuk and Gladkyi 2011).

Mergers of industrial enterprises and areas might be based on their integration both within one and several different industries. Industrial areas zoning is directly related to the economic zoning of the country and based on intra- or inter-sectoral division of labour and integration of production. At present, there are 8 industrial districts in Ukraine. General layout of industrial districts in Ukraine is presented in Fig. 4.

Figure 4: Industrial areas zoning in Ukraine.

On the basis of the analysis of industrial enterprises in the industrial districts of Ukraine, it was found that each region is fundamentally different according to its industrial direction. The Pridniprovsk and Donetsk regions account for over 50% of the total industrial production in Ukraine. It can be explained by the presence of large industrial enterprises and heavy steel industry, with minerals mined by both open and underground methods. Based on the natural resources, the East and Central parts of Ukraine are presented by mining industry,

metallurgy and processing industry; the South by machine-building industry, and the West and North of Ukraine by no real metal industry. Thus, the dispersion of industrial facilities in Ukraine is heterogeneous.

While Volyn and Donetsk districts have only two regions, the other districts have three or more (Fig. 4), which proves the heterogeneity of inclusion of cities and regions in the industrial district.

As a result of analysis two following approaches of the formation of industrial regions in the industrial district were defined based on:

- regional specialisation and production structure; and
- specialisation and production cycles.

In Ukraine the production groups *on the basis of regional specialisation and production structure* are the following:

1. *Industrial regions* are *regions with a high level of resources development and significant branching workforce*. These areas are characterized by well-developed mining and processing industry and, consequently, the predominance of manufacture of the means of production over the production of commodities.
2. *Industrial and agricultural regions* with *lack of mineral resources*. They are characterized by advanced manufacturing industries.
3. Industrial and agricultural regions with a large amount of agricultural resources and no mineral resources. These regions specialise in mechanical engineering, food and light industry.

For the *production cycle* and the *corresponding industrial specialisation,* the following regions are determined:

1. *Coal mining - metallurgy - chemical industry* – the regions of coal and steel industry with a complete cycle;
2. *Metallurgy full cycle - engineering* – the regions of the mining industry and metallurgy with a complete cycle;
3. *Metallurgy - engineering - chemical industry* – the regions of mining and chemical processing of coal, metallurgy incomplete development cycle and engineering industries;
4. *Hydropower energy and related industrie*s.

It should be noted that the system approach to the formation of industrial regions is commonly used and it is hard to find the regions that use only one type of industrial development. A regional specialty is the basis of industrial areas zoning – the union of several regions in the industrial district. Combining industrial regions in industrial district is usually based on two approaches – *integrated* and *branch*.

The *integrated* approach is determined by the union of several industries and is not dependent on the availability of minerals within the same region. Branches that form the industrial district may be technologically and spatially disparate, heterogeneous, quality and quantity different, etc., but combined to form a single complex and a closed cycle of production of a certain product. Because of the possibility of using existing infrastructure, the integrated approach provides the most cost effectiveness in the case of spatial proximity of administrative units that are part of the same district.

The *Branch* approach is fundamentally different from the *integrated* one. This could be explained by the fact that different industries can develop separately (in a generalized way) only in areas that are adapted to this resource. The boundaries of the branch industrial areas do not coincide with *integrated* ones, whereas we cannot say that the integrated district is a set of branch ones. Generalization of the approaches to zoning of Ukraine for integrated and branch approaches is presented in Table 1.

Table 1: Allocation of industrial regions of Ukraine by different approaches

Industrial District	Integrated approach	Branch approach	Number of regions	Key settlements
Donetsk		+	2	Donetsk, Luhansk
Kyiv	+		4	Kyiv, Zhitomyr
Pridniprovsk		+	3	Dnpropetrovsk, Zaporizhzhya
Kharkiv		+	3	Kharkiv, Sumy
Chornomorskyi	+		4	Odessa, Simferopol
Lviv-Carpathian	+		4	Lviv, Ivano-Frankivsk
Volyn	+		2	Rivne, Lutsk
Podillya	+		3	Vinnitsya, Ternopil

Most industrial areas of Ukraine are formed using an integrated approach (Table. 1). This is explained by the historical specifics of each industrial district and the need to create a labour market based upon the absence of natural resources within a region. Other industrial districts (Donetsk, Kharkiv and Pridniprovsk) are grouped by branch approach (Table 1). Correspondent Eastern regions of Ukraine have both a large amount of mineral resources and developed processing industry along with mining sites. These industrial districts are the largest in Ukraine by area and population.

In Ukraine, in addition to the terms “industrial district” and “industrial region”, there are used also the terms “industrial agglomeration” and “industrial unit” which are closely related to levels of urban planning in Ukraine (On Urban Planning 2011). To date, planning

documentation is developed at the national, regional and local levels, and these levels are associated with the term "industrial agglomeration" and "industrial unit". Content-wise, they reveal integrated and branch approaches only at regional and local levels of the planning.

Industrial agglomeration involves concentration of enterprises of various industries in the territories in one or adjacent regions. In the middle of agglomeration, there are formed multi-sectoral industrial centres industrial sites on a relatively small area. Industrial agglomeration is considered to be a subsystem of the overall national economic system of production allocation and of a single settlement system. Industrial agglomeration is formed by territorial concentration of production, arising as a result of industrialization. Industry becomes the basis of the largest cities and large cities form the core of the agglomeration area. Because of the concentration of production, agglomeration effect occurs mainly explained by close industrial relations which promote territorial cohesion of manufacturing industries and sectors. As a result, the settlements are grouped around the main centre – core metropolitan area. The industrial agglomeration is characterized by: high territorial concentration of production (industry), infrastructure, research and educational institutions, population; close production-functional relationship of manufacture and settlements that make up the metropolitan area.

Industrial units are formed at the local planning level. They are located in several industrial centres and areas that are in the vicinity, and are united by common territorial specialisation, logistics and production-technical ties. United according to this principle, the areas share the industrial and social infrastructure, natural and other resources, create common types of production interbranch and regional importance, while maintaining their independence. In industrial units, there are formed the conditions for regional integration, cooperation, specialisation of production, fuller use of the unique high-performance equipment, production facilities and capacity for processing local raw materials, secondary resources, interbranch organization of production, development and maintenance of public utilities (Teudtling-Scheunhofer and Davies 2013).

The industrial production in Ukraine fell by over 30% in the past two years (Kostenok 2015). This situation has caused to transform the depressive industrial areas in Ukraine. Nowadays the most appropriate way to transform the industrial territories is the creation of industrial parks. By 2013, there was no indication to their appearance, but at present there are real projects of development of industrial parks which are based on existing social and economic conditions in Ukraine (On industrial parks 2012). The first parks in Ukraine are developing in the Western regions, where integrated approach to the formation of industrial areas has been substantially developed. Thus, based on the analysis of current approaches to industrial parks formation we can state that its core is an integrated approach that was used in the past. In the Eastern part of Ukraine, development of industrial parks is not sufficient. Such definition is explained by obsolete branch approach to the operation of industrial areas, which is very hard to transform under changing conditions. It evidence that the development of industrial parks requires the introduction of new approaches to land administration

in Ukraine (Land Code of Ukraine 2001), as forming several types of industry on the area of 15–700 hectares is a rather complicated and responsible process.

3. Conclusions

To sum up the research of features of forming the industrial areas, we can say that due to the reduction in production capacity, the redevelopment of industrial agglomerations and units will get increasing importance. Due to the gradual depletion of natural resources, it is important to shift from branch approach to an integrated one of industrial areas formation. As a result of the integrated approach to the formation of industry, since 2013 Ukraine has made the first steps towards a new format of industry – industrial parks. Formation of areas for industrial parks will start a systematic approach to the problem of management of industrial land based on innovative international approach and evaluation of its adaptation in Ukraine.

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Alexandra Weitkamp*, Isabelle Klein* and Frank Friesecke**

Strategies of Developing Building Land in Growing Cities

Possibilities and Limits of Urban Contracts

Abstract

The municipality often decides for a well-defined strategy in preparing building. The municipalities have different motives and aims for this standardized building land strategy: this could be preparation of social housing, overwhelming costs or green aspects. A lot of German cities are affected by a high dynamic with increasing rents and prices of real estates in the prospering cities accompanied by a decrease of social or affordable housing quota.

That is the reason, why cities with pressure on the housing market initiated so-called 'Baulandmodelle' – a standardized building land strategy in areas where a binding land use plan is needed for the development. Within the decision of the building land strategy, the individual form of the process is regulated as well. Therefore, three models in Stuttgart, Munich and Cologne are compared with regard to the criteria costs, social housing and urban quality by a verbal argumentative method. In conclusion, a standardized building land strategy provides more transparency, predictability and security of planning. It enables an equal treatment of all beneficiary of planning and ensures certainty in action for authority.

1. Introduction

In growing cities, the housing market is stressed in Germany. Especially, there is a problem to offer affordable housing for all groups of inhabitants. Stressed housing markets could be found mostly in the south of Germany. High rents are recognized for e.g. Munich, Stuttgart but also for Cologne and Hamburg.

A lot of these growing cities established strategies of developing building land. In a general treatment for all developers, the burdens of developing building land are committed. Part of this burden is to offer a porting of the resulting living space as social or affordable housing. The dimension of possible burdens is measured by the value increase of the land: normally, 2/3 of the increase could be used for public interests, 1/3 remains by the developer as incentive. The added values of such models are transparency in the process, financial discharge of the municipal budget and last but not least the possibility to offer affordable housing.

Future tasks and challenges influence the German land policy. It is intended to act efficient with land: new use of green space for settlement and traffic use, increase of mixed uses and

* Technical University Dresden, Geodetic Institute, Chair of Land Management, / Germany.

** die STEG Stadtentwicklung GmbH, Stuttgart / Germany.

intensified uses should be reduced. The urban development will be focused on inner areas. This means to mobilize derelict land, a use of the potential of re-densification and to close the gaps between buildings. The housing provision should be socially fair in precarious market situation. Germany has in mind to prevent of more social fragmentation in the cities and development of socially mixed quarters. The adaption of cities and municipalities at climate change and achievement of energy political aims should be done.

That is the reason, why cities with pressure on the housing market initiated so-called 'Baulandmodelle'. This a standardized building land strategy in areas where a binding land use plan is needed for the development. Within the decision of the building land strategy, the individual form of the process is regulated as well. Therefore, Standardized Building Land Strategy is presented and three models in Stuttgart, Munich and Cologne are compared with regard to the criteria costs, social housing and urban quality by a verbal argumentative method.

2. Preconditions and Intentions of Local Policy Decision for a Standardized Building Land Strategy

A standardized building land strategy bases on a so-called *'Grundsatzbeschluss'* of the municipality. This *'Grundsatzbeschluss'* is a legal decision by local resolution. The municipality decides for a well-defined strategy in preparing building. It is binding for all municipal businesses afterwards. The procedure is legally defined by local law.

2.1 Motives and Aims for a Standardized Building Land Strategy

The municipalities have different motives and aims for this standardized building land strategy (Institut für Landes- und Stadtentwicklungsforschung des Landes Nordrhein-Westfalen 2003). Aspects are maybe mobilization and re-use of building-land potential also like an acceleration of building land production process. Another aspect could be the wish for a cost transfer and the involved financing of the building land production in light of discharging the municipal budget. Often, there is a jam of development because of a lack of ability according to the municipal contribution. Mainly the cost-insensitive local public infrastructure is problematic to finance with municipal budget.

Very often, municipalities have a socially balanced urban development in view of a standardized building land strategy: development of building land should prevent spatial polarization in social structure and prepare affordable housing for social disadvantaged classes. Also, urban qualified land use is focused, which is reached by uniform energetic requirements, minimum quality standards of building projects and prescribed architectural and urban design competitions, respectively. Further municipal policy objectives like damping the increase of land prices, contemporary use of building permits could be expressed within the standardized building land strategy (Drixler et al. 2014: 37–39).

2.2 Prices of Housing

Spatial disparities because of heterogeneous increases and decreases of population characterize the German municipalities (Friesecke 2008) although the German population is going

to shrink in long term perspective (cf. Fig. 1). Structurally weak cities with unfavourable preconditions will have more problems to comprise the locational competition. Polarizing trends are already visible today. Since 2006, especially big cities record a population gain in order of the losses of the decreases in the 1980 in Western Germany: living locations in inner cities are able to compete.

Only prospering cities will be attractive for new trained professionals and will hold their population, especially the younger group of persons. Despite the demographic change, these cities with their regions will be sustainable because of their economic strength (Bundesinstitut für Bau-, Stadt- und Raumforschung 2011).

The attractiveness of prosperous cities is argued by the decision for a location from the groups of migrants, the possibilities of qualification at universities, and the wide range of cultural offer and private service provisions. New living forms like e.g. town or detached houses in the cities support these trends. Also the changed employment behaviour of women could be an explanation for the reprised attractiveness of big cities as living location (Gornig and Geppert 2010).

Accompanied by these trends is the high dynamic with increasing rents and prices of real estates in the prospering cities. Scarcity on housing market leads to tight markets. Reasons are the increasing discrepancy between new residential construction and housing demand. As result, the differences between the rental levels in inner city locations rise. Affordable housing is missing already for households with medium income. Social displacement and segregation processes are rising. The proportion of flats, which are suitable for families in respect of size and structure, is only 27% of all rental flats (Bertelsmann Stiftung 2013a: 4). As subsidized flats, 4 Mio. additional apartments are needed. In the recent 10 years, an average of 100'000 flats are lost (Pestel Institut 2014). Accompanied by this trend are concerns on social fragmentation of the cities and rising social problems as well as grievances of special quarters.

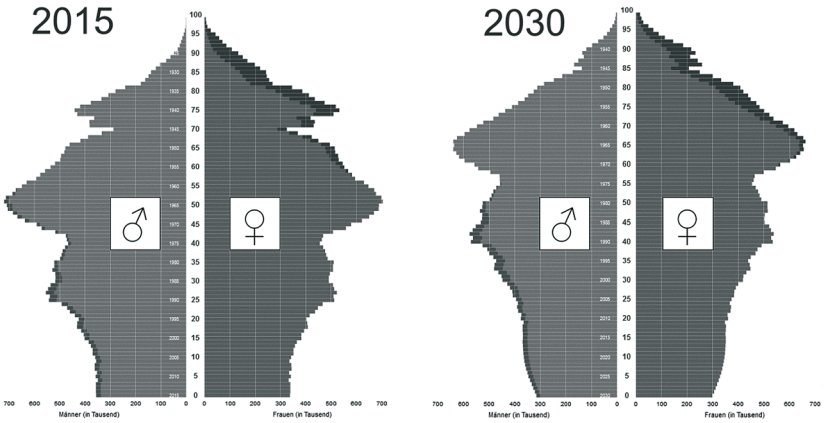

Figure 1: Demographic pyramid for 2015 and 2030 (Statistisches Bundesamt 2015).

Rental prices are important for the German population because the German ownership rate is, compared to other European countries, at a very low level. In 2014, 52.6% of the German population lived in their own apartment or house, while Spain had an ownership rate of 77.7% and the UK of 64.6%. Only in Switzerland, the majority of 54% of the population lives in rented apartments or houses (Statista 2015a). Over the past 20 years, the ownership rate increased from 38.8% in 1993 to 52.6% in 2014 (Statista 2015b). However, the percentage of inhabitants of prosperous German cities living for rent is a lot higher than the German average. Thus, in 2012 Munich and Stuttgart had an ownership rate of 21% and Hamburg of 23% (Statista 2015c). The low quota of ownership is historically caused: after World War II, the aim was the production of homes. This stimulates the rental market. The homes had a high quality and a basis for an attractive rental market was born. A further issue is the restraint of funding the ownership in Germany compared with the international market. Nowadays, in the cities, prices of homes are high, so it is not attractive to buy but to rent. In rural area, where the demand is only low, prices are very moderate and there, people normally buy their homes (IWK 2016).

The German cities with the highest rents are currently (as of 2014) Munich, Stuttgart, Cologne, Frankfurt a. M. and Hamburg (cf. fig. 2). The highest rental rates are achieved in Munich. Here, the average rental rate for new lettings was in February 2014 12.20 EUR per sq.m and for existing rents at an average of 10.25 EUR per sq.m (Statista 2014). By comparison, in 2014 the German average was 6.28 EUR per sq.m (F + B 2014). In Munich, in the third quarter of 2015 the prices for a ten years old apartment with sophisticated equipment and an area of 60 per sq.m to 80 per sq.m living space increased again to 15.44 EUR per sq.m (Statista 2015d).

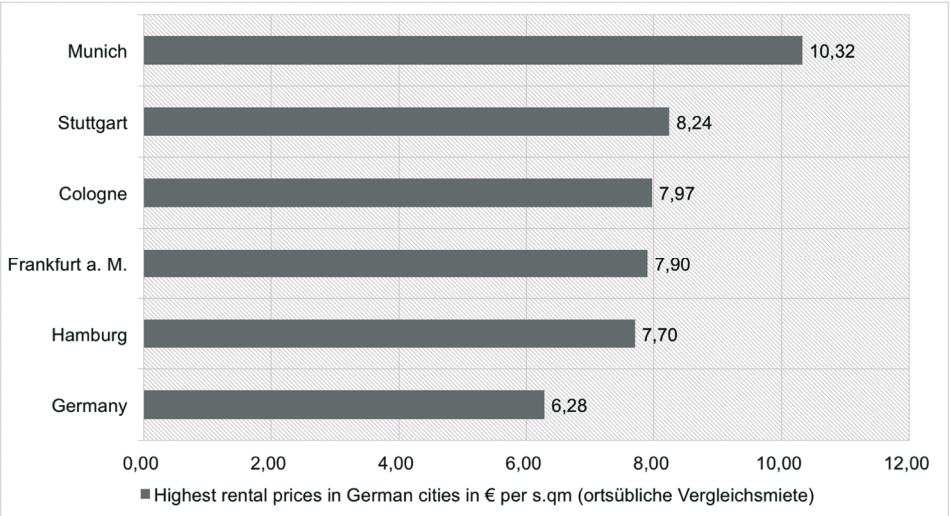

Figure 2: Highest customary comparative rents in German cities in 2014 compared to Germany average (Based on F+B GmbH 2014).

The highest increased offer rents could be determined for Trier, Jena, Regensburg and Stuttgart with more than 4% in the first quarter of 2014. Similar increases can be stated for Berlin and Frankfurt. Within the timespan of 2009 to 2014, Wolfsburg, Berlin and Ingolstadt had the highest increases (cf. fig. 3). Between 2009 and 2014, rental prices increased in Stuttgart by 12.8%, in Munich by 11.8% and in Hamburg by 11.5% (Statista 2015e). But how much money people have to spend for living? In 2014, households in Munich had to spend 23.9% of their disposable income on housing costs. In other cities like Hamburg (21.8%), Frankfurt (21.4%) and Cologne (21%) the expenses on housing costs were lower. However, households in Munich (50.407 EUR per year in 2013) have a higher average income than, for example, households in Hamburg (43.245 EUR per year in 2013) (Zensus 2011). Moreover, it should be noted that approximately half of the population of the cities of Munich and Hamburg has an average income of less than 1.000 EUR per month (as in 2013). The amount of low-income households is rising. In Munich, the proportion of low-income earners has increased by 2% between 2009 and 2013 (Bertelsmann Stiftung 2013b). During this period, the proportion of households with a middle income has fallen, while the number of households with high incomes has remained largely constant.

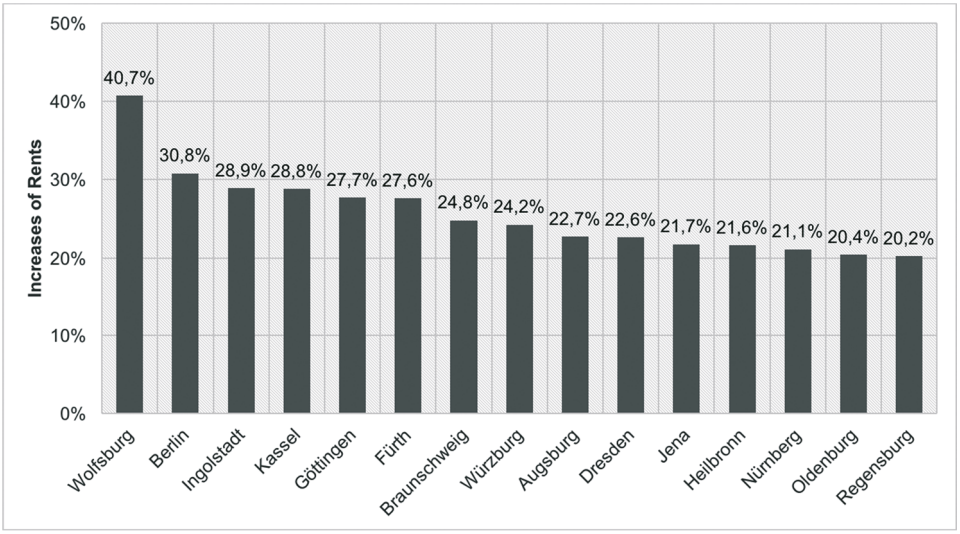

Figure 3: Cities with highest increase of rents 2009–2014 (Immobilienscout24 n.d.).

The reasons of this development are for point of view of demand: increase of population, trend of re-urbanization, reduction of household-size and rising individual living-space demands. From the point of view of offer could be stated: rising land prices, decreasing new constructions in segment of social housing with parallel trend of phasing out of subsidized flats, rising building and modernization costs, losses by 'natural' wastage of buildings and re-uses of living space in offices, flats in condominiums and luxury modernization. A need of yearly 130'000 new social flats can be stated, to hold the level of 1.6 Mio. flats.

Housing markets are developing periodically, fluctuating and regional totally different (Pfeiffer et al. 2000, Waltersbacher 2014). They are highly correlated with the up streamed

land market: the prices for building land indicate the high connection with the development of rent and housing prices. With mean construction costs of 2'500 EUR per sum living space, land portions of same height are realistic for very good living areas in big cities.

A crucial precondition for a demand-driven provision of flat is a quantitative and qualitative building land offer at an affordable price level at the right location and to the right time. The provision of building land needs time because of the long planning and development process. Thus, a strategic action is needed (Schäfer and Forschungsgruppe Stadt und Dorf 2000).

2.3 Decrease of Social Housing

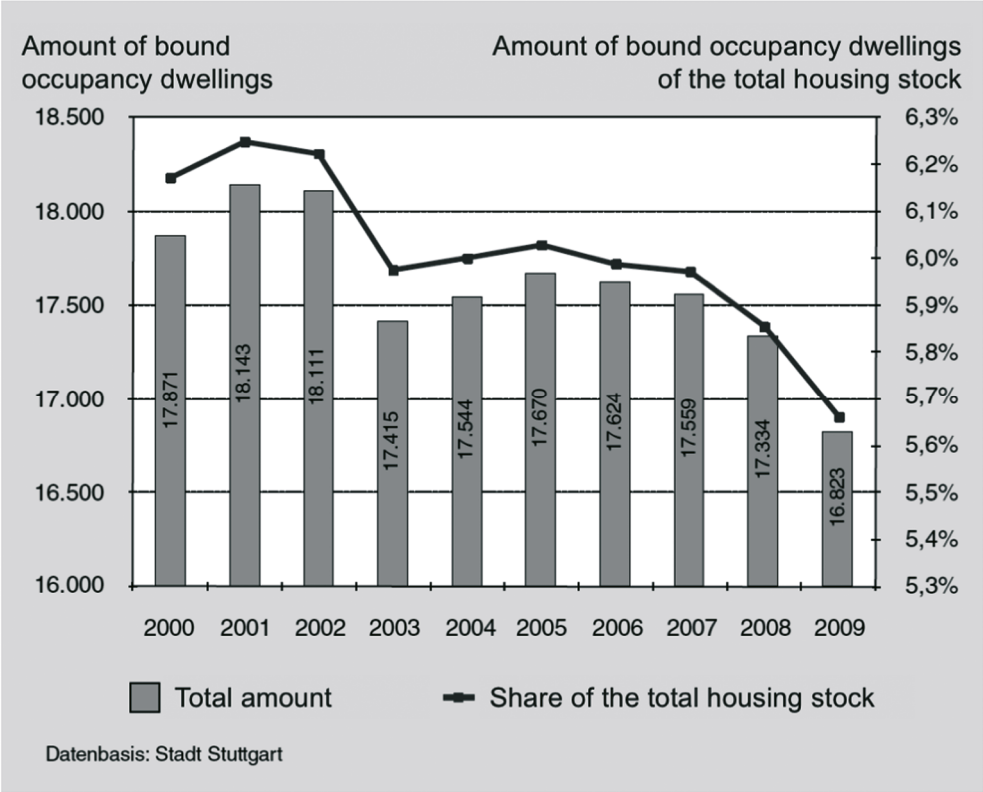

Figure 4: Development of the amount of bound occupancy dwellings in Stuttgart between 2000 and 2009 (based on: BBSR 2014).

The proportion of bound occupancy dwellings decreases nationwide while the amount of people who are entitled to social housing rises. Fig. 4 shows the development of the social housing stock in Stuttgart between 2000 and 2009. Tenant control agreements expired, and as in recent years only few occupancy rights have been granted, the negative trend cannot be countered. In the last years, public promotion of housing was not attractive for investors; the subsidies have partly not been claimed. A lot of local authorities neglected the social

housing promotion for a long term. The social costs that arise due to housing shortage, for example social welfare costs, could, according to Völker (2003: 30) in long term be signifycantly higher than an "effectively used housing promotion". For this reason, the Federal Government, the states and the local authorities should "not adopt entirely from the housing promotion" (ibid).

2.4 Preconditions and Intentions of Local Policy Decision for a Standardized Building Land Strategy

Trends and developments in increasing municipalities are observable by a lack of affordable housing and especially missing social housing. That is the reason, why cities with pressure on the housing market initiated so-called *'Baulandmodelle'* – a standardized building land strategy in areas where a binding land use plan is needed for the development. In a first step, the municipality decides consciously for a defined standardized building land strategy with municipal council order. Within this definition, the procedure is standardized for all building land developments. This strategy is the basis for the following urban contracts between municipality and individual investors. The strategy replaces case-by-case decisions. Nevertheless, the strategy has to be flexible enough for respecting particular requirement (in case, preconditions are bad and investor cannot realize all demands of the strategy). Thus, the building land strategy represents the framework of the land policy of municipality (Drixler et al. 2014, Weitkamp 2015).

Within the decision of the building land strategy, the individual form of the process is regulated as well (cf. fig. 5). Stakeholders of the process are the municipality with their sovereignty of planning and the investor as beneficiary of planning.

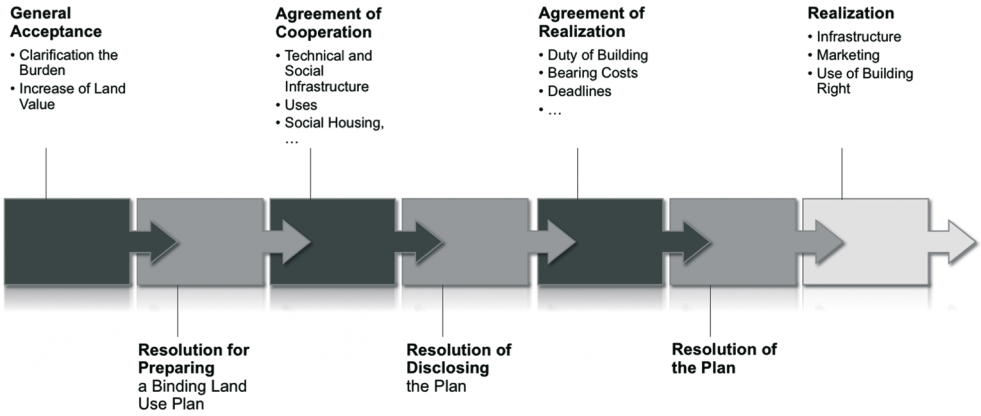

Figure 5: Process of a standardized building land strategy.

At first, the stakeholders agree to accept the procedure in a general consent. Within this general acceptance, the burdens are clarified and the increase of land value is determined. Appropriateness has to be proved and may be, first negotiations with the owners or developers will be done.

For proving the appropriateness, same requirements are valid which are valid for urban contracts according to German federal building code: Adequacy[1], prohibition of linkage[2], bid of causality[3] and equal treatment principle has to be respected.

This general acceptance is notarial certified. It ensures the willingness of cooperation and leads to the resolution for preparing a binding land use plan. Before the resolution of disclosing the plan is done, an agreement of cooperation is signed. Content of this agreement are regulars of technical and social infrastructure, social housing and other appointments. Before resolving the plan, the agreement of realization is signed: within this agreement, topics like duty of building, bearing of costs and/or deadlines are regulated.

With the legal validity of the plan, the realization can start. The municipality monitors the realization. The creation of building law is used, to force the aims of the municipality (Kötter 2014).

The municipality is free to decide about their land policy and the aims of the standardized building land policy.

According to the needs of the municipality, the aims of the standardized building land strategy varies (cf. Fig. 6):

- Use of building land potential,
- Supporting of urban housing,
- Securing of contingents of social housing,
- Securing urban qualities and/or
- Cost transfer to developer to release the municipal budget.

Figure 6: Aims of a standardized building land strategy.

1 Adequacy is in general measured by land value increase in comparison to the burdens.

2 On the one hand, nothing can be linked by an urban contract, which is not already in an "inner connection" in any case. On the other hand, allowed sovereign decisions cannot be made dependent on economic consideration.

3 Necessity of the immediate cause of the relationship between costs and project.

The municipality uses its sovereignty to demand the realization of the aims from the developer: but this is limited to 2/3 of the increase of land value. Otherwise, the model is modified (aims normally are divided in core aims and other) (Drixler et al. 2014).

3. Comparison of Strategies

In the following section, three models are compared to each other. The criteria are costs, social housing and urban quality. Stuttgart, Munich and Cologne are chosen as models (cf. table 1).

Each model is focused on transfer all arising costs. Within the models, (Housing) Policy Aims are defined like:

- Inner development and optimization of stock,
- Realization of affordable housing,
- Accomplishment turnaround of energy policy and
- Urban quality and building culture.

Each municipality focuses on its needs. Thus, Stuttgart and Munich subdivide the social housing portion in rented social housing rented housing for mean income (only Stuttgart) and cheap/subsidized condominiums while Hamburg only set the proportion of realizing social housing.

Comparing the legitimation and formal realization, it can be stated, that Municipality do generally a so called *'Grundsatzbeschluss'* (general policy decision for the building strategy). The procedure is only applicable in areas which needs new planning law (pressure is used for agreement with investors). Various conditions for the application are possible:

- Unrestricted use in municipality,
- Restricted on a certain size of living space or housing units within the project and/or
- Implementation is open to urban instruments like land allocation.
- According to Drixler et al. 2014, the economic effects vary as well. Therefore, three scenarios are defined: one scenario has low level of (land) prices, one scenario has a high level and the third one is defined as a re-densification scenario with a stock density of high floor space index is equal to 0.5 (*'Geschossflächenzahl'*/GFZ)[4]

[4] Proportion of the floor space to the whole lot; indicator for urban density: 0.5 means, that the floor space has half the space of the whole lot.

Table 1: Comparison of three models

Regulations	Stuttgart	Munich	Cologne
Costs	Technical infrastructure, local green space incl. land acquisition		
	Social Infrastructure like kindergarten or elementary school in form of financial and land distribution		
	Compensation of environmental impact		
	Costs of Planning		
Social Housing	20% divided in: – 1/3 as rented social housing – 1/3 as rented housing for mean income – 1/3 as cheap condominiums	30% divided in: – 20% as rented social housing – 10% as subsidized condominiums	0–30%
Quality	Urban design competition		
	Standards for quality, energy and climate	–	–

Fig. 7 shows fictitious costs because of social housing. The trend of cost arises linearly with GFZ – insofar with the urban density. The curves only have different levels caused by the prices after development. The cost trend of Stuttgart is higher than the other, because the model follows the rents and is independent of the land value. The cost trend of Munich and Cologne in the low level of prices is declining, while it is rising in the other scenarios. Reason is the institution of absolute threshold in relation to the realized floor space. In the scenario with a low level of prices, the value threshold of Cologne (400 EUR per s.qm) is exceeded only at very low GFZ from the market price per square meter living space. At higher GFZ, the market price per square meter of living space is below this limit.

There are no fictional costs shown, because it can be assumed that at such low land prices the developer can realize social housing without losses according to the Cologne model. As in Munich, the value limit in the form of development costs for rented accommodation (281.20 EUR per s.qm) is set lower than in Cologne (400 EUR per s.qm), the land values across the entire spectrum of the GFZ are such that in apartment buildings higher revenues were achieved as applied for the land development costs would be. The fictional costs do not fall back at zero in Munich model.

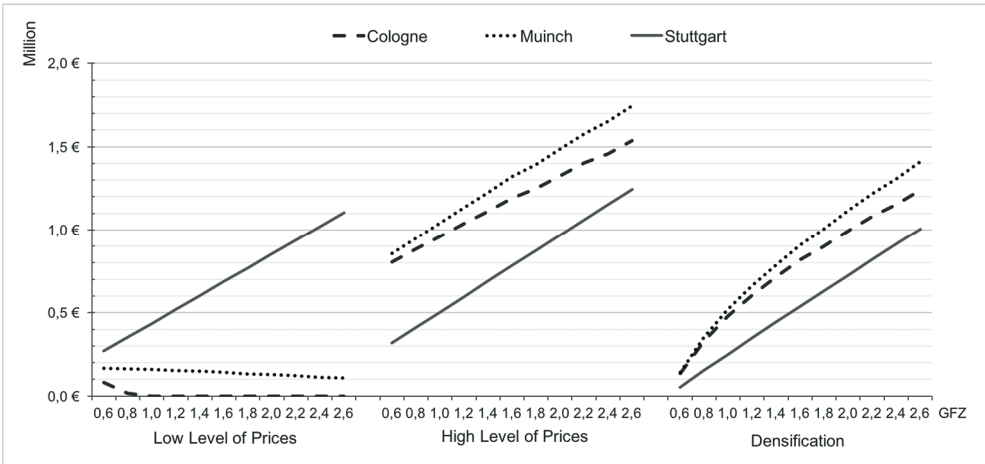

Figure 7: Economic Effects / Fictitious costs because of social housing (Drixler et al. 2014).

At high land values, the total burden increases with GFZ. Even if the impairment loss decreases with increasing GFZ, the threshold is no longer sufficiently large to compensate the increase in the burden due to the increasing living space.

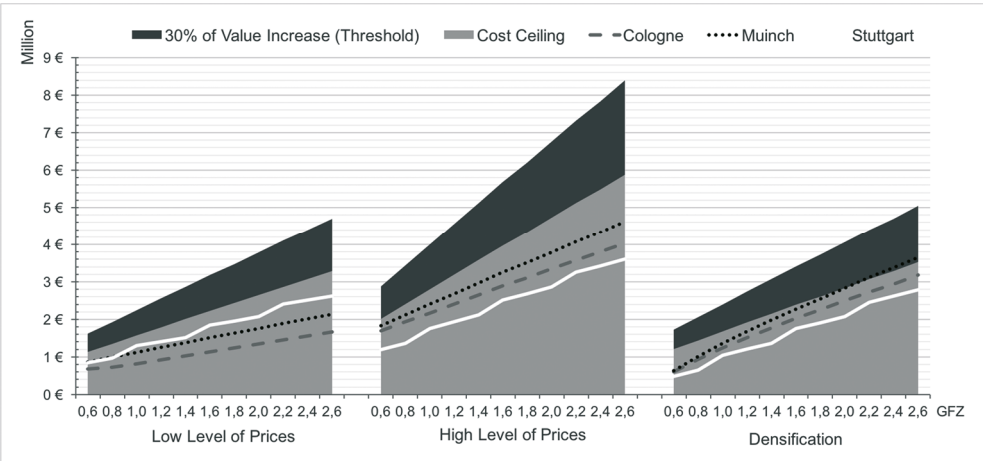

Figure 8: Economic Effects / Transferable total costs and verification of adequacy (Drixler et al. 2014).

In the scenario of re-densification, the same resulting land value is the same like in the one with high level prices. There, the total burden is lower, because of the fact, that a portion of living space is not considered (existing stock) (Drixler et al. 2014).

Fig. 8 shows the transferable total costs and verification of adequacy. These are the cumulative cost items for production, planning and technical infrastructure, area needed for public use, social infrastructure and subsidized housing and the 1/3-threshold because of planning-related value increase. The threshold is nearly respected: only in case of high floor space

index (GFZ) in a re-densification scenario, the Munich model exceeds the threshold. Comparing all scenarios, the properties and rules of the models are aligned to the local needs and value relations in the housing market (Drixler et al. 2014).

4. Conclusions

A standardized building land strategy provides more transparency, predictability and security of planning. It enables an equal treatment of all beneficiary of planning and ensures certainty in action for authority. Also, all contracts' regulations within authority are synchronized. The standardized building land strategy is an effective tool for realizing land policy at municipal level. Within the possibilities to focus the instruments according the local needs, it satisfies the special needs of the municipality. It can be structured in a very flexible way to be applicable for all developments.

Certainly, the application is restricted to development, which needs a new binding land use plan, the municipality will have no choice but to make use of other instruments for regulating the building market and combine their stakeholder with instruments of expanding the offer or legal instruments and fiscal stimulation (especially housing subsidy programs).

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Christoph Stankiewicz* and Brigitte Treskow*

Land Development Models as a Tool to Support the Subjects of Climate Change in Urban Planning

Abstract

The impacts of climate change as a global phenomenon affect in various intensities as well on the lower spatial levels. In particular, cities and municipalities have a high sensitivity to the effects of climate change and require an increased attention. Thus in recent years, aspects of climate protection and climate adaptation have experienced an increasing importance even in spatial planning. By extending the scope in land-use planning the planning authorities, have now numerous opportunities in the field of climate available. However, in many cases at the operational level of action the options utilized only very reluctantly. For stringent integration of climate concerns into the municipal land policy, the integration of issues of climate protection and climate adaptation in land development models is suitable.

1. Cities in the focus of climate change

Despite existing uncertainties in projections of the climate and the use of various models and scenarios with certain variances can be stated that the world's climate is changing (WBGU 1999; IPCC 2007; WMO 2010). According to the Intergovernmental Panel on Climate Change (IPCC), which consists of more than 2000 scientists from all over the world, the global warming is speeding up because of the increasing emission of greenhouse gases (IPCC 2013: 5–7). By now the atmospheric concentration of the most emitted greenhouse gas, carbon dioxide reached the highest value since at least 800.000 years (IPCC 2013: 11; World Bank 2010: 5). Due to rising economic activities of the world population since the beginning of the industrial revolution and the related burning of fossil resources, but also because of changes in land-use, the atmospheric concentration of greenhouse gases has increased drastically and is the main cause of climate change. There is general agreement that mankind is responsible for climate change because of these human activities (Oreskes 2004: 1686).

Climate change as a global phenomenon also has an effect on the local level, even if there are differences in characteristic and intensity. In particular, cities have a high sensitivity to the effects of climate change and require special attention because of the social importance and the high damage potential (Othengrafen 2014: 48). On the one hand, cities are considered as the main cause of anthropogenic climate change due to the increasing amount of people living in cities, which is up to more than half of the world population in the 21st century according to the United Nations (UN-Habitat 2006: 6). On the other hand, they

* Technische Universität Darmstadt, Department of Civil and Environmental Engineering, Institute of Geodesy / Germany.

are also particularly affected by the risks of climate change because of the high density of population and buildings and the agglomeration of sensible infrastructures (UBA 2012: 11). In this connection and because of manifold central social functions the importance of a city can assume a higher significance beyond the local context, so that impairments caused by climate change can lead to regional, national or even global effects because of the strong interdependence between cities (Ruth and Rong 2006: 21; Fleischhauer 2008: 274). Furthermore, cities have a very special microclimate, which is clearly different from the surrounding area. Buildings and ground sealing cause changes in the local heat management and wind field. Combined with the accumulation of pollutants this can result in urban heat islands with remarkable heat stress (MVIBW 2012: 22). All these factors additionally intensify the handling of climate change in cities and lead to an urban climate change (BBSR 2011: 9).

Starting points for measures against climate change unfold particularly at the local level of action, whereby municipalities as the smallest spatial-administrative entity play a key role in the achievement of envisaged climate targets (Hagebölling 2014: 120; Bläser 2012: 8). Here, the aims can be implemented in measures (Voß 2011: 234). In this regard, numerous municipalities have recognized the climate threat in the early 1990s and developed skills that have been promoted due to the introduction of climate and energy concepts (Greiving 2010: 30). There are various reasons for this commitment, but the essential motivations are reflected in cost savings in the energy sector, advancement of the local building industry, profiling and identity formation in the increasing competition of cities as well as the voluntary commitment to CO_2 reduction due to participation in appropriate memberships coming along with an accentuation of the role model of a city (UBA 2012: 21). Known city networks signalising a clear readiness to act in the field of climate change are Climate Alliance as well as the Covenant of Mayors. The maxim *Think globally, act locally* therefore clearly reflects in cities.

2. Planning Law instruments dealing with climate change

The land policy relevance of climate change in cities is based on a spatial and settlement structure that is energy efficient and resilient. A climate related arrangement of construction, transport and open spaces as well as the provision of land for producing energy from renewable sources supports this goal. In characteristic style of the "Wissenschaftlichen Beirates der Bundesregierung für Globale Umweltänderungen (WBGU)" (Scientific Advisory Council on Global Change), a sustainable design of urbanization and an overall climate-friendly land-use should be pursued with regard to climate change (WBGU 2011: 14). The implementation of this goal with its connecting factors in many areas including building structure, mobility, technical infrastructure and design of green spaces presents itself as a prime responsibility of urban planning and development. In particular, when it comes to consult concerns of subject planning as well as to weigh divergent space requirements against and with each other while focusing on long-term goals, the role of planning and land management becomes obvious.

The urban dimension of climate change (mitigation) and adaptation to climate change (adaptation) reflect in following requirements in planning (according to UBA 2012: 37):

- Reduced land-use for the protection of carbon sinks, the preservation of seepage functions and the reduction of traffic
- Creation of compact settlement patterns in order to reduce transmission losses; for this purpose also exploiting potential areas in urban areas under the proviso of a qualified inner urban development (Bosse et al. 2011: 7)
- Air Accessible open space use for the prevention of floods, to improve the ventilation situation and reduce heat loads.
- Structure-related optimizations by a climate-friendly orientation and shape of the building, as well as improved thermal insulation
- Small-scale planting in the form of local plantations, roof and facade greening
- Adaptation to topographic conditions
- Use of renewable energies, cogeneration and fuel restrictions
- Support of the "Umweltverbund" (environmental alliance) through intelligent path combinations, networks of bicycle path and optimized schedule timing

It is evident that measures on climate change in cities span a wide field. The municipal planning and especially land-use planning has the task to concretize the objectives and to apply them obligatory in projects and finally in measures. It is inevitably necessary that informal planning and policy decisions support and legitimize the legal tools. Binding commitments for anyone can arise from abstract goals in the cities and the formulations in concepts.

In the urban land-use planning, municipalities can set generally binding content into master plans, which is an effective instrument for the implementation of climate-related measures at project level. Specifications of the binding land-use plans are mandatory for anyone irrespective of the ownership of land. With the guiding principle of a planning justification and proper consideration of all interests a variety of approaches exist to fix climate protection and adaptation measures (Battis et al. 2009: 75). It remains unaffected, that despite the strengthened concern of the climate in urban development, no automatic priority for climate protection and adaptation results and these issues need to be evaluated depending on the particular case (Kahl 2010: 395–396).

To facilitate this case-related review process and to make it purposeful informal preparatory concepts play an important role. In accordance with § 1 Abs. 6 BauGB (building code) these concepts have to be considered in planning and taken into account as concerns when developing urban land-use plans. Climate and energy concepts, which are set up for the entire urban area or only a part of it, set out a conceptual framework and have a grouping function for issues of climate, although a final consideration of land-ownership must occur

(Hagebölling 2014: 143). Such concepts cannot be taken as a legal basis for the admissibility of projects, but have an immanent important role for planning due to their flexibility and their situation-specific character. Without informal instruments relating to climate protection and adaptation, statements about requirements in a city or neighbourhood can hardly be made (Mitschang 2012: 44), whereby the implementation of climate concerns into specific projects remains difficult. Stuttgart established with the help of a framework plan (Landeshauptstadt Stuttgart 2008) an informal instrument located somewhere between the zoning plan and land-use planning, which aims to ensure a climate-friendly growth of the city in the areas concerned (Drautz and Reuter 2008: 162; Baumüller 2008: 213). The Higher Administrative Court Mannheim (decision of 15 March 2012-4 BN 9.12) did not criticise this urban concept and serves – in major parts of urban climatic reasons – as consideration basis for securing green areas. With the framework plan, the municipality illustrates the importance of the climate for the commonweal. It helps to withdraw existing building rights and to protect areas which are important for the climate in a city. Such concepts with in-depth analysis of the initial situation, statements about perspective development and coordination with formulated goals, represent a solid basis for the integration of climate concerns into land-use planning (Mitschang 2012: 44).

In urban land-use planning there are numerous implicit and explicit options for mitigation and adaptation of importance (in detail: Battis et al. 2009: 75 et seq.; see table 1). The exhaustive catalogue with the stipulations under § 9 Abs. 1 BauGB sets the possibilities.

Table 1: Stipulations of climate relevant stipulations in the binding land-use planning (Source: own research based on Lülf, 2008, 73 and 80; supplemented and changed)

<table>
<tr><th>Stipulation</th><th>Regulatory content</th><th>Effect</th><th>Impact dimensions</th></tr>
<tr><td>§ 9 Abs. 1 Nr. 1 BauGB</td><td>kind and extent of structural use</td><td rowspan="4">– Reduction of energy consumption of buildings by compact settlement patterns
– Optimized solar orientation of buildings
– Avoid mutual shading of buildings
– Creation of aeration lanes
– Reduction of the heat island effect by lower degree of sealing</td><td>Climate protection</td></tr>
<tr><td>§ 9 Abs. 1 Nr. 2 BauGB</td><td>coverage type, constructible surface, position of physical structure, direction of the ridge</td><td>Climate protection / climate adaptation</td></tr>
<tr><td>§ 9 Abs. 1 Nr. 2a BauGB</td><td>distances</td><td>Climate protection / climate adaptation</td></tr>
<tr><td>§ 9 Abs. 1 Nr. 3 BauGB</td><td>size, width and length of sites</td><td>Climate protection / climate adaptation</td></tr>
<tr><td>§ 9 Abs. 1 Nr. 10 BauGB</td><td>areas to be kept free from development</td><td>– Creation of aeration lanes
– Reduction of the heat island effect by lower degree of sealing</td><td>climate adaptation</td></tr>
<tr><td>§ 9 Abs. 1 Nr. 11 BauGB</td><td>circulation areas</td><td>– Promotion of public transport and non- motorized transport</td><td>Climate protection</td></tr>
<tr><td>§ 9 Abs. 1 Nr. 12 BauGB</td><td>supply areas</td><td rowspan="2">– Integration of decentralized energy supply utilities and rational energy supply</td><td>Climate protection</td></tr>
<tr><td>§ 9 Abs. 1 Nr. 13 BauGB</td><td>supply circuit</td><td>Climate protection</td></tr>
</table>

§ 9 Abs. 1 Nr. 15 BauGB	green space	– Creation of aeration lanes – Reduction of the heat island effect by lower degree of sealing – Creation of cold air producing areas – Sequestration of CO2 in nature and landscape – Creation of shadow through vegetation – Increasing the microclimatic evaporation performance	climate adaptation
§ 9 Abs. 1 Nr. 16 BauGB	water expanse		climate adaptation
§ 9 Abs. 1 Nr. 18a BauGB	agriculture		climate adaptation / Climate protection
§ 9 Abs. 1 Nr. 18b BauGB	forest		climate adaptation / Climate protection
§ 9 Abs. 1 Nr. 20 BauGB	protection, care and the development of nature and landscape		climate adaptation / Climate protection
§ 9 Abs. 1 Nr. 21 BauGB	walking, driving or piping right	– Promotion of public transport and non- motorized transport – Promotion of rational energy supply	Climate protection
§ 9 Abs. 1 Nr. 23a BauGB	Protection of harmful environmental effects	– Promoting climate-neutral energy sources by burning bans	Climate protection
§ 9 Abs. 1 Nr. 23b BauGB	use of renewable energies	– Promoting climate-neutral energy sources – Promotion of cogeneration	Climate protection
§ 9 Abs. 1 Nr. 24 BauGB	protected areas to be kept free of development, precautions for protection from harmful environmental effects	– Creation of cold air producing areas – Reduction of the heat island effect by lower degree of sealing – Avoid mutual shading of buildings	climate adaptation / Climate protection
§ 9 Abs. 1 Nr. 25 BauGB	Planting order and obligation relating to planting	– Sequestration of CO_2 in nature and landscape – Creation of shadow through vegetation – Increasing the microclimatic evaporation performance	Climate adaptation

3. Urban development contract

In addition to the stipulations of the general urban planning legislation, there also exists an effective and complementary tool for the land-use planning for the integration of mitigation and adaptation in urban planning with contractual solutions in accordance with § 11 BauGB. 1. Urban development contracts allow communities to prepare and implement measures by a contractor at his own expense. Prior to the explicit anchoring of the first climate-relevant contract solutions in urban development contracts by the Europarechts-anpassungsgesetz (European Law Adaptation Act for the Construction sector) in 2004, arrangements could be taken to cope with challenges of climate change due to the non-exhaustive nature of the catalogue. Now the subject of climate change has been significantly accentuated by clarifying amendments (Birk 2013: 347; 354).

The application areas of renewable energy, cogeneration and requirements on the energy performance of buildings has been included in §§ 11 Abs. 1 Nr. 4 and Nr. 5 BauGB and contribute as an impulse to use contracts in the climate field. For example, arrangements can be made that even exceeded the legal requirements on the energy performance of buildings for insulation. However, the use of climate-friendly building materials, the construction and use of facilities from renewable sources or the compulsory connection and use of heat networks can be agreed as well. This regulatory content can be fixed in urban development contracts, which due to justification obstacles cannot be integrated in a development plan and thus go beyond the possibilities of the catalogue of § 9 BauGB (DiFu 2011: 47). Thus, urban development contracts complement the sovereign instruments of urban planning law and expand the policy-making power of municipalities (Burmeister 2014: 19).

4. Interaction of contractual solutions and binding land-use planning

Diverse dependencies and mutual complementary or substitution options arise regarding to the use of regulatory content in the field of climate protection and climate adaptation due to the co-operation between urban development contracts and urban development plans. Because in the binding urban development plan, it is partly impossible to create a maximum legal certainty, but is also not appropriate to accommodate all the measures envisaged.

Initially, binding agreements in relation to the rigid fixing catalogue allow a flexible and situation-dependent handling of climate-friendly topics with which individual cases can also go beyond the exact broader possibilities of § 9 Abs. 1 BauGB (Hagebölling 2014: 2014). Expressly urban contracts are therefore not limited only to content that will be included in a development plan anyway. Thus, plants for generation of electricity and heat from renewable energy sources can be set out in the development plan, for instance, and also will be clarified more extensively in a contract regarding the use of energy. Due to the consensual nature of the contract and the inevitably associated agreement between a project proponent and the community, acceptance of the planned measures will be increased as well (DiFu 2011: 47) and the regulatory density will be reduced in the development plan. In particular, technical parameters that vary greatly with increasing progress are technology-neutral agreements in contracts, among other things, the more suitable due to the durability and the increased modification effort of a development plan.

Preparatory contract contents detached from master plans and not necessary determinations are possible additional to supplements. Using such agreements replacing determinations, the treaties should not merely make up content, which were neglected in the plan preparation process of the development plan (Everding and Zerweck 2005: 140). Nevertheless, agreements replacing determinations find their way in contracts – even if the development plan has no preparation or focus on climate protection or adaptation – on condition that a reference to informal climate-related concepts can be produced (Hagebölling 2014: 249). For this reason, the creation of preparatory city or neighbourhood-related concepts in the field of climate has an important role in urban development. A fundamental advantage of stipulations in development plans with respect to contracts is the general validity of the stipula-

tions. A possible legal succession has to resolve properly from the transition of real property to a third party passing all agreements on the new owner which is often not the case (Spieß 2010: 11). Appropriate land registry backups are useful so that agreements under the law of obligations in case of a sale are known to the purchaser and accepted by the latter. This ensures that these remain valid despite change of ownership.

4.1 Practical application and characterization of instruments

It could be shown in general that communities have a variety of approaches with the instruments of development planning and urban development contracts to address the largely voluntary task of climate protection and climate adaptation on spatial level. It just depends to apply these potentials.

By anchoring content from informal climate concepts or fundamental expressions in development plans, a permanent commitment can be created, the general or abstract objectives can mandatory feed into concrete projects. This way, a part of private purchase contracts binding specifications for surface protection or land-use, but also planning details for structures can be controlled for everyone. With the integration of these objectives, a principle permanently valid basis for developments in cities will be created. Changes towards climate-friendly urban structures manifest themselves only over long periods, in particular because of already-developed cities and focusing on the item (Ritter 2007: 532). Nevertheless, land-use plans can achieve a solid foundation for a climate-friendly future. The emerging new projects and undrawn areas, as well as restructuring of the stock where land-use planning can also have impact, should include appropriate regulatory content in the context of climate change already.

No separate sectoral planning exists for the range of topics of climate, sometimes a result of major effect linkages in diverse disciplines and in the minority of communities no special climate department exists. Therefore, it requires the integration of existing processes and tools. Climatic issues have to be subjected to the spatial implementation level in the deliberation process as all the other concerns, in which they may be subject, if necessary (Hofmann et al. 2015: 12; also Kern et al. 2005: 34–36; 47; in regard to sustainable concepts Kötter 2003: 241–242). If planning is on quarter or even object scale, then effects on the local climatic conditions can be displayed only very vague or superficial – in a regional or even national context, the effects of individual projects are almost irrelevant. The climate issue only insufficiently appreciated in these cases and merely considered by minor modifications of the initial planning. Yet each project unfolds an impact on the protection of climate and must, primarily concerning the overall city, not be neglected in its cumulative effect by other projects. The addition of several in itself insignificant impairments can manifest themselves in the sum. In the verbal-argumentative handle the intangible phenomenon of climate change makes it difficult due to the lack of local concern and a lack of standards or limits in the use of the intangible field of action. It also remains so difficult, because the climate cannot be quantified as a measure (MVIBW 2012: 21).

The basic enforcement of greenhouse specifications is given by the land-use planning, whereas the actual implementation depends on the resistance of articulate representatives of particular interests and the political power of the municipality and planning authorities (Rannow and Finke 2008: 56). The beneficiaries are those individual negotiated solutions through the replacement of sovereign with cooperative instruments (Ohms 2000: 983), which is also reflected in land-use planning in the restrained use of stipulations (Kahl and Schmidtchen 2013: 134; 140). A large part of climate change related activities is therefore achieved through cooperation (Hagebölling 2014: 122). Thus, individual cases are taken due to negotiating skills and assertiveness of the parties, which will vary from project to project and may lead due to a downstream position of the climate in the planning process to a neglect of the concern. The initiation of climate change projects including energy and climate change concepts which have already been funded, inter alia, by the Federal Ministry for Environment, Nature Conservation, construction and reactor safety in more than 3,000 municipalities (BMUB 2015: 10–11), are insufficient on their own or are too superficial. Here only linkages with the land-use planning lead to a transfer of measures into concrete projects and thus create a geospatial binding of voluntary contents of the concepts.

For these reasons, it requires strict stipulations for dealing with climate change mitigation and adaptation in spatial planning and, consequently, the consistent use of opportunities in land-use planning. Also, Rannow and Finke argue the central weaknesses of a system based on voluntary commitments based procedure of informal instruments and advocate the development of a unified formal framework with binding quality standards (Rannow and Finke 2008: 64). The potential to make a greater contribution in the field of climate in the municipalities with the help of integration planning is also significantly expandable even with the existing legal possibilities (Kahl and Schmidtchen 2013: 12–13). The sole offer of created legal approaches does not suffice in many situations and needs to be supported by clear standards and guidelines. The execution can be carried out by the aid of established instruments and mechanisms in the municipalities.

4.2 Land development models as a building block for securing climatic quality objectives

An approach to integrate the importance of climate stringent in urban development is to convert it as a permanent part of municipal land policy in a land model. The adequate supply of the population with land is one of the mandatory tasks of each municipality and can be roughly divided into a sovereign strategy, a cooperation strategy and an interim acquisition strategy, whereas the consensual strategy in the plan realization assumes an increasingly greater importance (Kötter and Friesecke 2013: 387; 393). With a co-operation strategy with the aid of urban contracts, municipalities have far-reaching opportunities for action to anchor qualitative requirements, including climate-related measures. While there can be a quality control in conjunction with the plot marketing as well as in an aligned approach to interim purchase through private agreements, however, many municipalities do without due to the cost intensity on long-term land acquisition policies.

With the increasing use of urban development contracts and the change from a supply- to a implementation-oriented urban planning (Kötter and Friesecke 2013: 402), municipalities can provide a model for a fixed set of rules for land development. Instead of individual decisions, uniform standards can be created for all project authorities. A directive thus replaces individual arrangements. A land model creates a clearly defined framework for the application and linkage of existing instruments. In the design of a land model, the primary goals, such as mobilization of land, financing of land supply, supply of low-income households with housing and the creation of urban quality (Kötter and Friesecke 2013: 403) can complement with secondary goals such as climate protection and climate adaptation (see. Fig. 1).

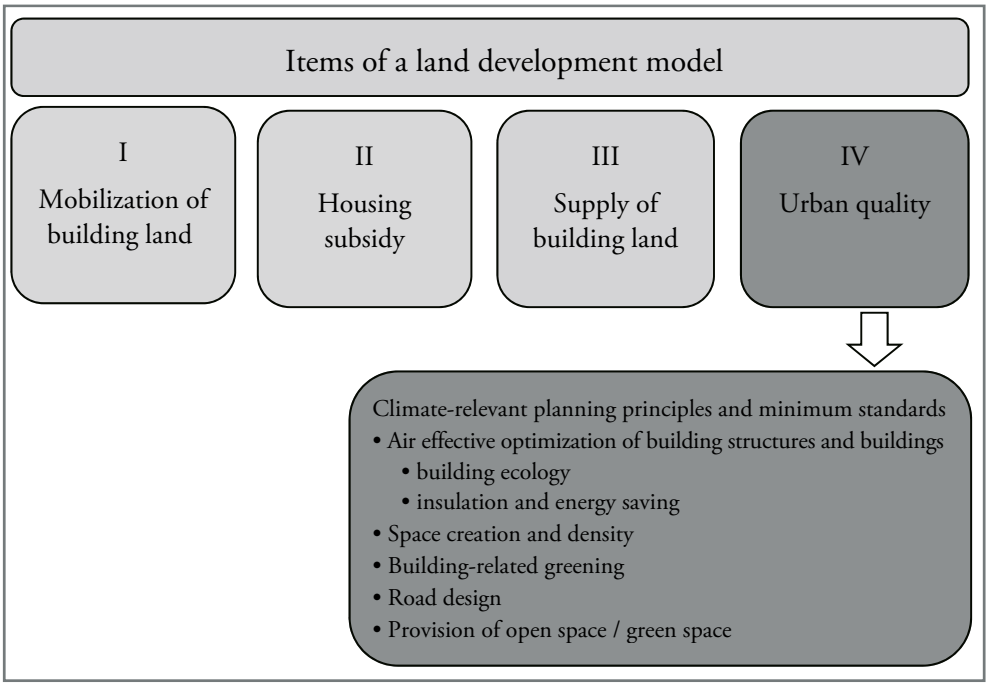

Figure 1: Items of a land development model (Source: Kötter and Friesecke, 2013, 403; supplemented and changed).

With regard to the efforts to achieve sustainable urban development, different requirements are bundled in the model. In a land development model, land value increases triggered by planning were normally used to finance various measures, whereby a corresponding proportion of the value increases is always attributed as an investment incentive also for the beneficiary of the planning. The remaining share of the increase, which remains with the beneficiary, must also follow the principle of appropriateness. In both the Stuttgart city development model as well as the model of socially fair land-use in Munich, one-third of the capital gain is retained by the investor, respectively owner (Fricke 2012: 148; Landeshauptstadt München 2009: 9; 31). The whereabouts of a monetary advantage of the beneficiary of the

planning after the financing of the resulting model of a land action is immanent important and forms the basic use of such a model. For this reason, land development models are tended in cities and regions with a structural and investment strong economic development and a concomitantly high land value level (Voß et al. 2012: 494). In the very restrained use of land models, still many new possibilities arise when imposing. In addition, established models like the one in Munich can be complemented by the block of the city quality with appropriate climatic needs.

The advantage of the integration of climate concerns into a land development model is that quality targets can be made and consideration directives can be dispensed. All content included in such a model are known in advance, backed by a decision and can thus establish city-wide standards. In addition, climatic specifications are transferred in qualitative and quantitative targets from their often abstract representation. In this regard and especially because of existing standards, a neglect or even rejection must not be expected due to the supposedly difficult "conceivability".

Rather, a high quality is determined by the setting of minimum requirements for plans extended to all projects and ensures equal treatment of all stakeholders. This means on the one hand, that in the transparent process all involved market participants of the real estate and construction industry can rely on clear guidelines and thus from the outset a calculation reliability exist in terms of requirements. On the other hand, the enforcement of particular interests influences a project less. The same conditions apply for all concerns, which is why a variety of climate-relevant details in the development plan and urban development contract no longer has to be put up for discussion. An obstacle seen by Kern et al. is the implementation of measures in the voluntary field of climate protection that are justified by the disastrous financial situation of the municipalities (Kern et al. 2005: 3, 8, 47). A land model could find a remedy at this point, because the costs are not borne solely by the municipality, but by the private beneficiary of the planning. Part of the planning-related land value increases would then flow into climate policies and could constitute a basis for funding.

The most effective tool is the one showing clear rules and is in usage. A land model helps here, in conjunction with a binding decision for the owner and the municipality, as a means to standardize and enforce minimum standards. This potential scope of existing instruments is extended and allow the municipality to control and to shape. The creation of land and planning law is therefore indispensable linked to compliance with the conditions of the land model.

Integrated content on the climate field, which can be implemented in a land model, are targets for urban development and urban design, principles to free space and concerning the planning of green space as well as energy requirements. The measures must not necessarily make explicit reference to climate, but may also address superficial or equal interests. Such multi-causal explanations with additional threads of argument, as in the area of recreation, biodiversity protection or long-term financial benefits increase assertiveness (BMVBS 2013: 30). Finally, the primary justification for a measure that uses the climate protection and

climate adaptation is subordinated – more essential is that anything is implemented at all. It can already be noted in the land-use model with which method or which combination of different procedures, including urban planning competitions, urban development contracts and binding land-use plans include the provisos to be backed up (Landeshauptstadt Stuttgart 2010: 23–27). Concerning urbanism can be set, for example, a balanced degree of building coverage and thus density rules for sensitive urban areas in terms of a qualified inner-city development. For the purpose it is necessary to define citywide density zones in advance and to define areas where may be no (additional) ground sealing. This kind of provisions in the municipal context can be established, inter alia, on objectives and principles of spatial planning or representations of preparatory land-use plans in conjunction with informal plans. In the area of open space planning, obligations can be called for a desired green equipment. These are a considered placement of ancillary facilities through the integration in the main buildings, minimum sizes of contiguous green space per dwelling unit, design of roofs with extensive green areas, the use of facade greening, substrate contract on underground parts of buildings and parking garages, as well as the use of the open spaces for water management purposes. Also as part of road design planting of large trees can provide shade. Concerning the energy performance of buildings, building position and cubature, shortfall of the applicable German Energy Saving Ordinance, evidence in the use of building materials from renewable raw materials as well as the coverage of the heat demand via a fixed share of renewable energies can be considered.

Even if the standardization based on a land model sporadic cause restrictions in the flexible design of projects, it still is an effective means to safeguard interests of climate protection and climate adaptation in cities. Although rigid quantitative targets do not necessarily need to be located in such a model, a bandwidth of terms can be formulated as well. Thus, at least ensure that climate-related concerns are stringently implemented and co-financed on the operational level of action.

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Andreas Hendricks*

Reduction of Usage of Agricultural Land for Non-Agricultural Purposes

Abstract

The increasing use of renewable energies and the growing settlement and traffic area will make demands on around 2.7 million ha rural area up to 2050. Accordingly, the reduction of usage of agricultural land for non-agricultural purposes is urgently required.

Generally, approaches in urban and rural areas can be distinguished. Measures in urban areas attempt to avoid soil sealing in agricultural areas by using the building land potentials in inner areas. On the other hand, methods in rural areas try to minimize the negative consequences of non-agricultural measures for agricultural areas.

Inner development potentials are brownfields, gaps between buildings and densification potentials. The corresponding monitoring is the basis for an effective land management. Approaches for the (semi-)automated detection are in development. The most important points for an enhancement of mobilisation are the improvement of the financial support system and the optimization of push-factors (e.g. taxes). Additionally, the demographic change has a big influence on the adequate supply of living space. While conglomerations have to fight a lack of available residential properties, shrinking areas have to face the vacancy problem. In both cases an optimal solution has to be found.

Fundamental tools in rural areas are the pooling of areas for ecological compensation, second generation of land consolidation, multiple usage and production-integrated ecological compensation. Crucial advantages of pooling concepts are the effectiveness of higher ecological network solutions and the lower costs of establishing maintenance and control. Compensation measures may be realized before interventions in ecological systems occur. They can be saved in an "eco-account". "Quality instead of quantity" is an important principle for the planning of compensation measures. The most important point of the second generation of land consolidation is the reduction of the road network and the unsealing of the corresponding areas. The multiple usage is especially focussed on the joint realization of measures of nature protection, recreation and water management. The production-integrated ecological compensation is mainly concentrated on the extensification of agriculture.

1. Introduction

The demand for land in rural areas is growing. The development of new settlements and traffic areas and the corresponding ecological compensation, as well as the designation of new nature protection areas, result in a loss of agricultural land.

* Universität der Bundeswehr München, Institut für Geodäsie / Germany.

Furthermore, some political decisions of the last years will have a major impact on the future land use.

Firstly, climate protection demands a significant reduction of greenhouse gas. Additionally, the Federal Government decided to stop the operation of nuclear power plants in 2022 and prefers to reduce its dependence to power generation by other countries. All these aims should be achieved by a reduction of energy consumption by 50% and an increase of the percentage of renewable energies up to 60% to follow the energy concept of the Federal Government from 2010.

Flood protection is another important topic on the political agenda. Extensive floodwater retention areas are needed to avoid catastrophic flooding like in Northwest Germany in 2002.

In addition, the Directive 2000/60/EC of the European Parliament (Water Framework Directive) has to be taken into account in establishing a framework for Community action in the field of water policy. The purpose of this Directive is to establish a framework for the protection of inland surface waters, transitional waters and groundwater. The most important regulations for agricultural areas are those concerning the use of fertilizer and the designation of strips of vegetation by the side of steams and ditches.

Due to this high demand for land in rural areas, it is necessary to find innovative solutions to reduce the use of agricultural land for non-agricultural purposes.

2. Land use

2.1 Development of land use

The actual land use in Germany has already been detailed in this book by Henricks and Thiemann (see p. 171). The biggest loss of agricultural land up to 2050 will be caused by the increasing use of renewable energies, and the development of new settlement and traffic areas.

2.1.1 Renewable energies

In 2011, 11.2% of the total energy consumption was generated by renewable energies. Most sectors require only a small amount of land. Undoubtedly the largest land requirements is from bioenergy. In Germany, around 2.08 million ha of agricultural land have been used for the generation of renewable energies.

The actual strategy in Germany to manage the transition of power generation to renewable energies is mainly influenced by a scenario called “Szenarium 2011 A” (Nitsch et al. 2012). This scenario was published in 2012 and provides an overview of the probable power generation in 2050.

Bioenergy will still be the by far have the greatest demand for land. On the one hand, the higher demand for bioenergy, the rising use of wood and the cessation of imports of biogenic fluid fuels or corresponding natural resources will increase the land requirements in this

subsector. However, technical improvements should decrease the quantity of natural resources required per TWh. In total, around 4.2 million ha will be needed (Temmler 2013).

As a result, around 2.2 million ha of agricultural land will be used to realize the transition of power generation to renewable energies.

2.1.2 Development of new settlement and traffic areas

In 2000, approximately 130 ha of land in Germany was utilised for roads each day in residential and commercial areas. This situation has prompted the federal government to set a goal, as part of the German sustainable development strategy, of reducing land use to an average of 30 ha per day by 2020. Until 2013, there has been a substantial reduction to 71 ha per day, which is mainly caused by a lower increase of settlement areas (cp. Fig. 1). However, many efforts have to be made to reach the aimed goal. Following a scientific study of the Bundesinstitut für Bau-, Stadt- und Raumforschung (BBSR) a reduction to less than 50 ha per day will be very difficult. Based on an average value of 40 ha per day until 2050 (14,600 ha per year) the loss of available land would be equal to around 0.5 million ha.

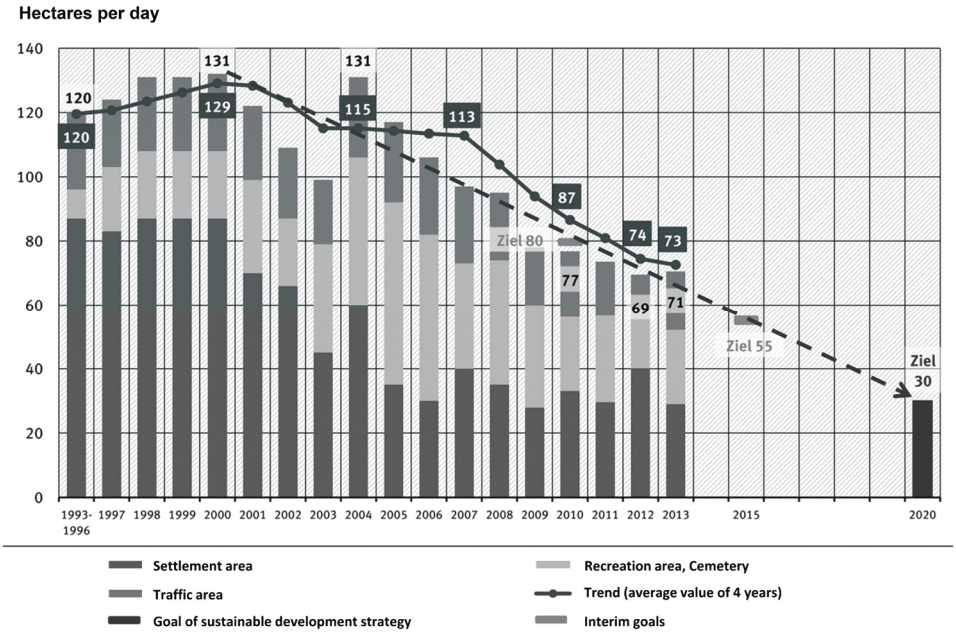

Figure 1: Increase of settlement and traffic areas (Source: Statistisches Bundesamt 2014, Bundesamt für Bauwesen und Raumordnung 2009).

However, significant differences have emerged between federal states and regions within these states (cp. Fig. 2).

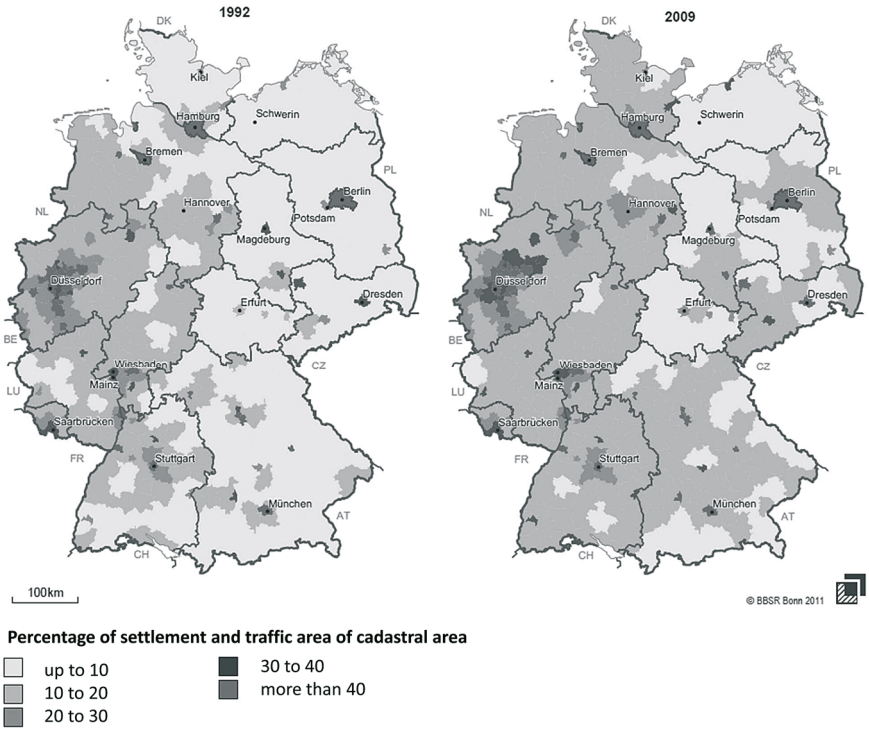

Figure 2: Percentage of settlement and traffic area of cadastral area (Source: BBSR 2011).

The highest share of settlement and traffic areas are registered in the city states Berlin (70%), Hamburg (60%) and Bremen (57%). The percentage is between 8% (Mecklenburg-West Pomerania) and 22% (North Rhine-Westphalia) (BBSR 2011) in the remaining federal states.

The highest numbers of new settlement areas may be found in regions with lower than average land values. The negative economic effects of a low building density in these regions are smaller than in regions of high land values. Additionally, it can be often observed in a tendency towards urban sprawls and as a consequence, a higher need of infrastructure. For this reason, the increase of land consumption in rural areas is generally higher than in conglomerations (cp. Fig. 3, West Germany). An exception can be made in shrinking areas. If there is a big loss of population, the effect can be greater as a consequence of low land values (cp. Fig. 3, East Germany).

Other problems are the dissection and fragmentation of rural areas by urban conglomerations and transport networks. The negative consequence, apart from land loss, manifests itself in the fragmentations of flora and fauna habitats, detours and incomplete access to farmers, and uneconomically shaped agricultural and forestry plots.

The increasing settlement and traffic area is also a consequence of intercommunal competition and public subsidy payments. Since the communal income depends mainly on the

number of inhabitants, all municipalities try to attract young families by developing new residential areas. Furthermore, the development of new commercial areas and the construction of residential properties are frequently supported financially by public authorities. Possible instruments are the improvement of infrastructure, provision of low-cost building land, low business tax rates or subsidies for the construction of residential properties.

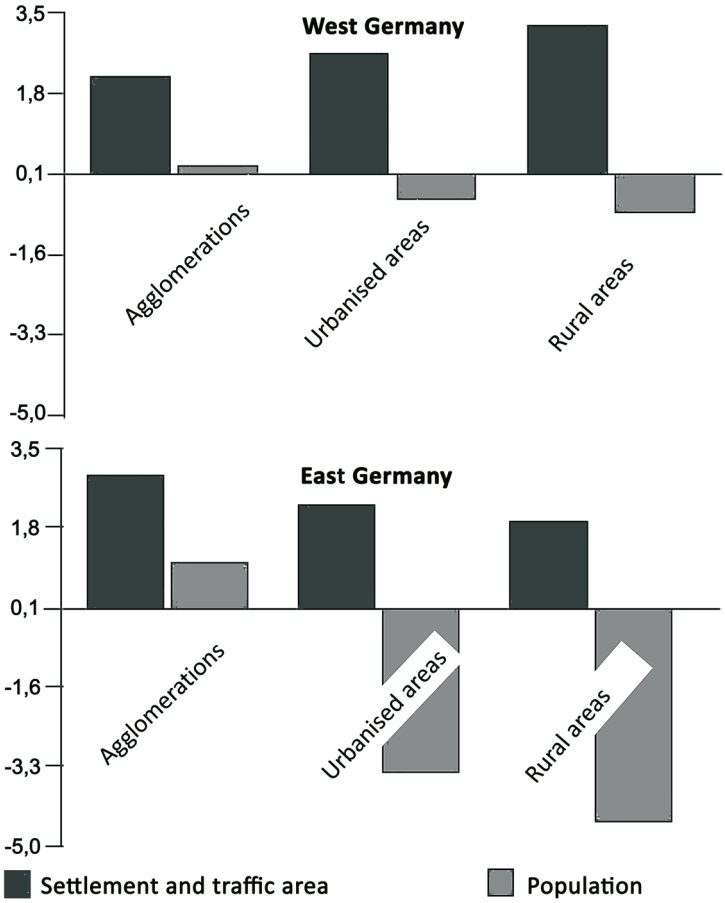

Figure 3: Development of settlement and traffic area (without recreation area) and population between 2005 and 2008 in % (Source: BBSR 2011).

2.1.3 Land use conflicts

The increasing use of renewable energies and the growth of settlement and traffic areas will make demands on around 2.7 million ha rural area up to 2050. Additionally, there will be a loss of agricultural land for ecological compensation.

However, there are some facts that may have positive influence on the availability of agricultural land. The German population is shrinking. The number of inhabitants will decline from 81.8 million in 2011 to 72.3 million in 2050 as related to Szenario 2011 A. In conse-

quence, there will be a reduction in demand for food to 11.6%. In 2011, 14.4 million ha had been used for food and forage crops. The corresponding area is equal to 14.4 million ha * 11.6% = 1.67 million ha and could be used for cultivation of energy crops.

Secondly, the improvement of productivity of agricultural land will reduce the required area for food production. A presumed rate of increase of 10% by 2050 results in savings of 1.44 million ha.

Thirdly, the number of vegetarians is rising. The food production for vegetarians requires a lower quantity of land due to the low productivity of cattle breeding. A reduction of meat consumption of 10% until 2050 would result in savings of 0.9 million ha (taking into account the higher demand for food crops) (Thiemann 2014).

In total, there will be generally enough space for food production and other users in rural areas, if the focus is on self-sufficiency of the German population. On the other hand, the farmers could export agricultural goods. Furthermore, there are big differences between federal states and regions within these states concerning the development of settlement and traffic areas and the dissection and fragmentation of rural areas (cp. Section 2.2.2). Especially in surroundings of conglomerations often land-use conflicts exists between agriculture, nature protection, recreation and urban development exist. For these reasons, there will be often be a lack of available agricultural land on the local or regional scale.

The reduction of usage of agricultural land for non-agricultural purposes is urgently required taking into account the uncertainty of long-term prognoses and the diversity of regional development.

3. Approaches for reduction

Generally, approaches in urban and rural areas can be identified. Measures in urban areas try to avoid soil sealing in agricultural areas by using the potential of building land in inner areas. On the other hand, methods in rural areas should attempt to minimize the negative consequences of non-agricultural measures for agricultural areas.

3.1 Urban areas (Avoidance of soil sealing)

The priority of urban development is a very important land policy target in state development programmes and regional plans (BBSR 2011). The most important points are the monitoring of the potential in urban development, the mobilisation of these potentials by cooperative procedures, and the prediction and consideration of future development.

3.1.1 Detection of inner development potentials

The urban development potential is the “theoretical potential” of building land in urban areas (independent of market availability and definite intention of use). The most important parts are brownfields, gaps between buildings and densification potentials. Brownfields are abandoned areas with or without buildings that have been previously covered with buildings. Gaps between buildings are potential plots without buildings. Densification potentials

are unused parts of plots with buildings (e.g. additional constructions or constructions in the inner courtyard) (Hecht and Meinel 2014).

The monitoring of urban development potentials is the basis for effective land management and must be orientated to its requirements. The interpretation of "brownfields" should not only include contaminated sites but all abandoned sites including residential buildings (Ferber et al. 2013).

In the case of contaminated sites, information about contamination and marketability should be included. These sites often have a good location and infrastructure, but the lack of information concerning the contamination reduces the marketability. In the first step, brownfields should be divided in different classes (e.g. "no contamination risk", "limited contamination risk" and "unlimited contamination risk"). The second step is a detailed analysis of the existing contamination, especially of those areas that have good marketability (e.g. good location, cooperative owner, etc.). The result should be a detailed plan of the area that defines unpolluted parts, parts that need a remediation and parts that can be paved over as protection measure. The analysis should also include information about the resulting costs (Dahlmann et al. 2007).

The investigation of information for the monitoring system demands significant efforts. It is often realised through a manual analysis of maps and aerial photos in conjunction with on-site inspections. For this reason, small municipalities in particular shy away from the resulting expenditure of personnel and costs and only a third of all municipalities have a systematic monitoring system of inner development potentials. Approaches for the (semi-) automated detection of vacant lots are available and are subject of ongoing research due to over-coverage. Semiautomatic approaches are a combination of manual analysis and application of geographic information systems.

A first approach for the full automatic detection in Germany was attempted using ATKIS (Authoritative Topographic-Cartographic Information System), HU-DE (Official Building Polygons Germany) and HK-DE (Official House Coordinates Germany). ATKIS has been used because it was available all over the entire country. The German cadastre data is actually in the process transformation into the new Authoritative Real Estate Cadastre Information System (ALKIS) and only available in some federal states. Plots with buildings were not included in this approach due to the used data. A control by manual analysis showed big over-coverage. The proportion between automatically detected inner development potentials and real ones was 3 to 1. The most important reasons are the high geometric abstraction of ATKIS and the missing plot geometry (Hecht and Meinel 2014).

An advancement of this approach was realised in the federal state of Saxony by using data from ALKIS and the preparatory land use plan. The control was realised by aerial photos and communal representatives. In 12 municipalities, 3369 theoretical inner development potentials have been detected with some 50% being confirmed as having real potential. Accordingly, the result was much better than in the first approach but there is still a big overestimation of potentials. The most relevant reasons are the actuality and quality of the

basis data and disregarded conflicts. 560 gaps between buildings have been detected wrongly due to missing buildings in ALKIS. The reason is generally missing information by the property owner. 334 buildable plots have been identified wrongly because of the low resolution of the preparatory land use plan (e.g. a playground in a residential area following the plan cannot be used as building land due to its actual use). Further 550 wrong determinations resulted from disregarded conflicts with building activities like flood protection and emission control.

In consequence, the percentage of identified real inner development potentials may increase up to 80 or 90% by improvement of ALKIS and incorporation of further geographic data (e.g. flood protection areas, emission control information or slope gradients). However, a communal control by manual analysis of maps and aerial photos will always be necessary. Finally, further information is needed to evaluate the chances for mobilisation (e.g. interests of owners, demand on the market) (Gutting 2015).

3.1.2 Mobilisation by cooperative procedures

The second step is the mobilisation of detected inner development potentials. 59 instruments of mobilisation have been analysed in an empirical survey in ten municipalities in the federal state of Baden-Württemberg (47 existing instruments and 12 instruments in development) (Munzinger 2015). In relation to this study, the most important barriers for a development are contamination risk, low profit, missing utilisation concept, the costs of preparing examinations, and existing buildings. The major incentives are an improved application and granting of subsidies, lower real estate transfer tax, improvement of tax depreciation, low-interest credits and facilitation of interim usage of plots and buildings.

While most of public property owners have a positive motivation, a large number of private property owners and investors have a tendency towards negative action. Most of the existing instruments are focussed on pressurising the property owners (push-factor) and have a lack of incentives (pull-factor). The highest ratings in the private sector have cooperative instruments. Furthermore, the closing of knowledge gaps of the population and the binding of instruments have positive effects on acceptance.

In consequence, the system of financial support must be improved. An integrated and interdepartmental policy of the Federal Government and the federal states is needed. A “subsidies navigator” could facilitate the application process (Munzinger 2015).

Furthermore, the push-factors should be optimized. One option is the reform of real estate tax. The definition of higher tax rates for unbuilt plots is quite common in many countries to pressure the land owner to start building activities on the plot. An interesting example is Rio de Janeiro. In Rio the building permission is combined with an obligation to finish the corresponding building activities within a defined space of time. If the owner does not comply with this obligation, the taxes increase in a 5 years cycle. The tax rate may double every year and may reach a maximum rate of 15% of the cadastral value at the end of the cycle. Additionally, the municipality has the right of compulsory purchase at this point in time (Hendricks 2015a).

3.1.3 Consideration of future development (demographic change)

The demographic change has a big influence on the adequate supply of living space. While conglomerations have to fight a lack of available residential properties, shrinking areas have to face the vacancy problem. In both cases, an optimal solution has to be found.

In cities like Mainz (capital of the federal state of Rhineland-Palatinate) the increase of living space is smaller than the population growth (cp. Tab. 1). The average living space per person in 2000 was 43.4 m². Accordingly, the total living space was 7,936,558 m². In 2011, the statistical average living space per person was 46.5 m² and the required living space would have been 9,344,500 m². But only 5771 flats have been constructed. This is equivalent to 577,100 m² living space, if the average size of a flat is around 100 m². The increase of needed living space was around 1.4 million m² but the additional production was only 0.58 million m² (Ziegler 2013). For this reason, monitoring systems of the real estate market as well as high quality predictions are needed to get an adequate offer of living space. The priority of inner development is important to minimize the development of new settlement areas.

Table 1: Agglomeration Mainz: Development of Population – Residential buildings – Flats between 2000 and 2011 (Source: Ziegler 2013)

Indicator	Year 2000	Year 2011	Change in %
Population	182,870	200,957	+ 9.9 %
Residential Buildings	28,238	30,137	+ 6.7 %
Flats	95,548	101,319	+ 6.0 %

The situation in shrinking areas is vice versa. In Kusel (a rural district in Rhineland-Palatinate) an increasing number of flats but a decreasing population was observed between 2001 and 2011 (cp. Tab. 2). The total living space in 2000 was 3,580,168 m² (= 78,685 x 45.5 m²/person). The required living space in 2011 was 3,491,813 m² (= 71,848 x 48.6 m²/person). The available living space was 3,951,528 m² due to the construction of new flats (based on a higher average size of flats in rural areas, 130 m²/flat) (Ziegler 2013). These numbers demonstrate a typical problem in shrinking areas. Many municipalities develop new housing areas based on a diffuse hope for immigration and worsen the problem of vacancies in other parts of the village (especially in the centre) or in neighbouring municipalities (parish-pump mentality).

Table 2: Rural district Kusel: Development of Population – Residential buildings – Flats between 2000 and 2011 (Source: Ziegler 2013)

Indicator	Year 2000	Year 2011	Change in %
Population	78,685	71,848	- 8.7 %
Residential Buildings	24,689	26,727	+ 8.2 %
Flats	34,088	36,960	+ 8.4 %

The village development has to take into account the demographic development. Due to the shrinking problem, inner development generally should have priority over outer development. The local government needs a strategy to manage the deficient capacity utilization or vacancies especially in the village centre. This strategy has to be based on a detailed statistical analysis of actual and future vacancies and plots without buildings. A good example for this kind of analysis is the "vitality check" (Vitalitäts-Check 2.0), a tool developed by the Bavarian Ministry of Agriculture and Forestry. Important indicators of population development, land use, settlement structure and land policy, supply and accessibility, civil engagement and economy and employment market are used to describe the restrictions and challenges of inner development. Furthermore, the strategy has to be harmonised with the regional development planning to improve the coordination of the municipal planning and to ensure an adequate development of housing areas and commercial areas (Hendricks 2015b).

3.2 Rural areas (Optimised land usage)

In rural areas, competing claims on soil utilization exist (e.g. agriculture and forestry, nature protection, recreation, settlement and infrastructure, tourism). All non-agricultural measures result in a loss of agricultural area. Soil sealing for new settlement and infrastructure has a doubled negative impact. On the one hand, a loss of land for the new development and, on the other hand, the requirement of ecological compensation. There are no exact statistical numbers available, but in literature the assumption that on average the needed area for ecological compensation is as big as the needed area for the development can be found (Uventus 2011). For these reasons, an optimization of land usage is needed. Fundamental tools are pooling of areas for ecological compensation, second generation of land consolidation, multiple usage and production-integrated ecological compensation.

3.2.1 Pool solutions (build-up of land stocks for ecological compensation)

Through several legal changes in planning law since the beginning of the Nineties of the last century, the strong linkage between impact and compensation became more flexible. The spatial and temporal flexibility led to the build-up of land stocks for ecological compensation at the local and regional level. Crucial advantages are the higher ecological effectivity of network solutions and lower costs of establishing, maintenance and control.

Apart of the realization of compensation measures pooling concepts may include planning, maintenance and monitoring. Compensation measures may be realized before interventions in ecological systems occur. They can be saved in an "eco-account". The success monitoring should contain implementation control, status control and function control. The status control examines the adequate realization of compensation measures. The first status control is equal to the implementation control. The function control is used for the check, if the realized measures had the intended ecological effects. Important criteria for the quality of pool solutions are the type and extent, the spatial concept, the evaluation and balancing procedure and the long-term safeguarding. Furthermore, production-integrated measures (generally extensification) and activities in forests should be able to be integrated. Both are

quite new instruments that enable ecological compensation without usage of agricultural land.

The pooling concept should be based on profound analysis of competing claims on soil utilization and potential compensation areas. Generally, it is an intercommunal concept and it has to be integrated in existing planning. The public acceptance is higher, if it has been developed by an interdisciplinary working group of different administrative bodies and public agencies. Another important point is a linkage between compensation measures and building activities.

In case of intercommunal co-operations, the structure of digital data has to be harmonized for visualization and management of the land stock. Another problem is the existence of different local assessment systems. This leads to different evaluations of the negative impact of building activities as well as the positive impact of compensation. For this reason, the conversion between different systems or the establishment of a uniform system is a fundamental challenge of the pool solutions.

"Quality instead of quantity" is an important principle to save agricultural area. High-grade compensation measures lead to a higher ecological appreciation per square meter than low-grade measures. A good example for high-grade methods is hydraulic constructions. Another alternative is the development of forest areas. Generally, a new forestation is higher ranked than the extensification of agricultural areas. On the other hand, the ecological improvement of existing forest areas is lower ranked (Uventus 2009).

Following on the implementation control, additional status and function controls have to be realized. The time interval depends on the type of compensation (from one to five years). The focus should be on production-integrated measures. The total period of this monitoring should be 30 years and a reasonable interval for documentation is every 5 years.

The safeguarding of implementation and maintenance may be realized by contracts, entry in the land register or administrative acts or similar legal regulations.

3.2.2 Second generation of land consolidation

Many land consolidation procedures were realized in the Sixties and Seventies of the last century. However, the mechanising of agricultural production changed significantly in the past decades and therefore the requirements of an agrarian structure. The optimal size of a field increased from 2 ha to 20 ha. For this reason, a second generation of land consolidation is often necessary.

Generally, land consolidation procedures offer the possibility to support the creation of habitat networks. Therefore, they can be used to link formerly isolated areas for ecological compensation in land-stocks (cp. Section 3.2.1).

Additionally, many roads are no longer useful due to the increase in field sizes. The unsealing of these areas is another important tool for ecological compensation and to increase the agricultural area.

3.2.3 Multiple usage

The combination of different land usages is another option to conserve agricultural land. In particular the joint realization of measures of nature protection, recreation and water management can be helpful to reduce the loss of land. Vegetation strips along streams and ditches as related to the European Water Framework Directive can be used to provide ecological compensation measures. Another alternative is the combined use of water retention, nature protection and recreation. Furthermore, multiple usages are an interesting option for the revitalization of brownfields, especially in case of large areas.

3.2.4 Production-integrated ecological compensation

The production-integrated ecological compensation is mainly focussed on the extensification of agriculture. The extensification is mainly implemented by reduction of fertilizer and pesticide application. The corresponding controls can be realized by analysis of soil samples and vegetation species (Uventus 2009). The eligibility of extensification for ecological compensation is regulated in the Federal Compensation Ordinance from 2013.

4. Conclusion

Especially in surroundings of conglomerations land-use conflicts often exist between agriculture, nature protection, recreation and urban development exist. For this reason, the reduction of usage of agricultural land for non-agricultural purposes is urgently required.

Generally, different approaches in urban and rural areas can be identified. The monitoring of inner development potentials must be orientated to its requirements. In the case of contaminated sites, information about contamination and marketability should be included. Approaches for the (semi-)automated detection of vacant plots are available and are subject of ongoing research due to over-coverage. In the near future the percentage of identified real inner development potentials may be increased up to 80 or 90%. However, a degree of communal control will always be necessary.

One of the most important barriers for a development of urban potentials is the deficient system of financial support. Accordingly an integrated and inter-departmental policy of the Federal Government and the federal states is needed. Furthermore, the push-factors should be optimized. The definition of higher tax rates for unbuilt plots is a good option to pressurise the land owner in starting building activities on the plot.

Demographic change has a big influence on the adequate supply with living space. In conglomerations monitoring systems of the real estate market as well as high quality predictions are needed to get an adequate offer of living space. The priority of inner development is important to minimize the development of new settlement areas. The local government in shrinking areas requires a strategy to manage the deficient capacity utilization or vacancies especially in village centres. This strategy has to be based on a detailed statistical analysis of actual and future vacancies and plots without buildings.

Pooling concepts for ecological compensation in rural areas are generally intercommunal concepts and should be developed by an interdisciplinary working group. "Quality instead of quantity" is an important principle for the planning of compensation measures. The conversion between different local assessment systems or the establishment of a uniform system is a fundamental challenge of the pool solutions. Finally, the safeguarding and control of implementation and maintenance are very important.

The most important point of the second generation of land consolidation is the reduction of the road network and the unsealing of the corresponding areas. In particular the joint realization of measures of nature protection, recreation and water management can be helpful to reduce the loss of agricultural land.

The production-integrated ecological compensation is mainly focussed on the extensification of agriculture.

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Across Europe, land is constantly the subject of enormous and widely varied pressures. The land we have is shrinking in area due to numerous reasons, including those that are directly related to climate change and migration. In fact all disciplines that have responsibilities for the husbandry use, management, and administration of the land are forced to address the problems of how to plan and how to utilise this increasingly valuable resource.

The papers contained within this book emerge from two symposia held in 2014 and 2015, which now have been arranged along four general themes reflecting the multi-disciplinary nature of the disciplines concerned with land. The first part is dedicated to the interpretation of key terms in their context and the dissimilar conceptual approaches in the governance of different states. It is followed by papers that identify the process of decision-taking: how to organize and co-operate. One large section addresses the identification of land pattern changes and the reason for it. The papers in the final cluster deal with the general theme of strategies and measures used to steer future evolution in land policies.

The publication addresses various needs that have to be balanced: the tasks of living space in the face of societal and demographic changes, infrastructure supply, challenges of an increasingly urbanised region, food production, 'green energy', natural hazards, habitats and cultural landscapes protection.

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