Land and Landscape Management in Europe - Common Report 2011

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I. Introduction

Ulrike Weiland

Land management and landscape management are striking issues in Europe: not only the political task of European integration, but also global change and climate change require coordinated sustainable land and landscape management throughout the European territory. This is the subject of the module ‘Land Management’ (L-Sust-M-2-6) in the Joint Masters Programme ‘Sustainable Development’ at the University of Leipzig.

This module introduces the topics land use, landscape, land management and landscape management in the context of sustainability. The students learn and exchange knowledge and experiences about the application of tools and approaches for suitable land and landscape management. Similarities and differences between the European countries are reflected against the background of European integration. The focus lies on urban and urbanized areas; but in addition, also rural areas are taken into consideration.

European spatial development processes are covered as well as European policies that have been elaborated to tackle the challenges resulting from these development processes. The focus lies on regional and local levels. Approaches to and tools for sustainable land and landscape management, as well as the respective institutions of selected European States – mainly EU Member States - are subjects of the module.

This concept imparts challenges to the courses of the module. European strategies and directives, as well as the integrative sustainable development approach underlying European integration, will probably harmonise spatial planning and lead to a higher relevance of land and landscape management tools compared to spatial planning in the future. However today, the European countries show a broad variety in their institutional settings and their planning systems and tools. Planning systems, as well as land and landscape management approaches, are at different stages, and the new European Member States in particular had and have to elaborate new planning systems and management approaches very quickly.

To date, only a few empirical and / or comparative papers on planning and management approaches of the Member States exist. For example, the EU Compendium of Spatial Planning Systems (CEC 1997) does not yet cover EU-27 and is considered to be outdated. The articles of Faludi, Nadin and Stead identify ideal types of urban and regional planning in Europe (see Faludi 2008; Nadin, Stead 2008), but they also indicate evidence for further developments. Since most of the studies presented in this report are case studies or go beyond the framework of spatial planning, these articles could not be taken into account.

This report presents results from two courses of the module: ‘Land management in the European context’ and ‘Landscape management’. The courses were structured as follows: after five lectures covering the main issues of the course the students presented their own elaborations on land or landscape management preferably from their home countries. Suitable approaches, procedures, tools, and incentives for sustainable land or landscape management were presented, and the roles of various stakeholders were discussed.

The report itself consists of three parts: after this introduction (part I), all collegial papers related to land management in the European context are presented (part II). Part III comprises the collegiate papers on landscape management. In this introduction first the term ‘cultural landscape’ is explained, since it delivers the justification for the thematic overlaps in lectures and collegial contributions. Secondly, the main topics of the lectures are presented, and finally, the collegial contributions are characterised briefly.
Cultural Landscape

Land management and landscape management show interference due to the definition of the term ‘landscape’. Landscape here is understood as *cultural landscape* because ‘natural landscapes’ no longer exist in Europe. A cultural landscape comprises “any landscape bearing the impact of human activity, historic or pre-historic”; this landscape concept has emerged from the increasing recognition that human beings are a part of nature (Taylor 2002: 94). This means: cities and the urban fringe are also ‘cultural landscapes’, and landscape management is carried out on 100 % of the European territory. In order to avoid or diminish overlaps, landscape management could be considered the more general approach compared to land management; the latter addresses specific areas on local levels. However, because land management is embedded in European, national, and regional regulations, one cannot focus only on the local level, thus once again introducing overlaps through the back-door. As a consequence, we decided to accept overlaps in the course, but to focus on the main issues of each topic and to arrange the collegial contributions to ‘land management’ or ‘landscape management’ according to the most important issues – while several overlaps could not be avoided.

Lectures Land Management

In the first lecture, regional and urban spatial development processes are presented as challenges for land management, especially the worldwide urbanisation processes and their manifold drivers as well as social, economic, and environmental challenges. Urban growth and urban sprawl, but also the simultaneous processes of urban growth and shrinkage are covered from a European perspective. In the second lecture, examples for two differing directions are presented in the relation between the European Union and the Member States regarding land management. In addition to milestones of the ‘top-down influence’ on land management and planning, for instance European strategies, Territorial Agenda and Leipzig Charter, also ‘horizontal’ or cross-border approaches are presented. The following lectures deal with planning history, theory, and the development of planning cultures according to societal development. Examples of today’s planning instruments are presented in order to show specifically how land can be allocated on the various levels. Finally, the most recent developments of strategic planning and land management as part of it are presented. The next lecture covers the concept of sustainable urban development, including land and resource management as well as process management, respectively governance. Methodical aspects of sustainability indicators are explained. Additionally, a project of sustainable urban development that has been realised is presented. Scenario writing as a tool for urban development is the subject of the last lecture and is exemplified for a large city. The students apply the scenario technique in a practical example of urban or regional development.

Lectures Landscape Management

The presentation of past and recent landscape changes in Europe serves as a basis for the introduction to impacts of the European Union on the Member States with respect to landscape management and environmental protection. Special emphasis is given to the European Landscape Convention (ELC). Since German landscape planning is considered to be a good model by various European countries, it is presented in the following lecture. Lectures four and five cover strategic environmental assessments (SEA) and environmental impact assessments (EIA); because they are based on European Directives, they are relevant for all Member States and their specific forms in the Member States are comparable. As a specific German tool, the impact mitigation rule is presented which could also be a useful model for further Member States. The last lecture deals with risk assessment methods and components due to their timeliness regarding climate change.
Collegial Contributions
This report presents the contributions of the students to the Module ‘Land Management’ in the Joint Masters Programme ‘Sustainable Development’ during the summer term 2011. Due to complementary, but also common issues of the two courses ‘Land Management in the European Context’ and ‘Landscape Management’, both courses are covered here, starting with more general approaches and ending with more specific subjects.

Collegial Contributions - Land Management
The Cradle-to-Cradle (C2C) approach presented by Gijs Dierks is a new way of thinking in product design and architecture that has recently been transformed to spatial planning. New human settlements shall be created from the beginning based on closed material loops. This integrated approach, its model of closed cycles on different layers, was adopted and promoted by the Netherlands Joint Development Agency in 2009. Although it has not yet been fully implemented into planning practice, the C2C model can be regarded as being a useful inspiration for the evolution of planning.

Markus Hundt introduces the concept of Sustainable Urban Development (SUD). Based on the ongoing global urbanisation and urban growth and a definition of SUD, energy, transport, waste and water management are presented as being the most important urban services that need to be delivered in a sustainable way. The Freiburg district ‘Kronsberg’ is considered as an integrative practical example where the conceptual approaches depicted here are applied in practice.

New approaches to Sustainable Land Management in Bulgaria (SLM) on national and regional levels are the subject of the report given by Iliana Madina. Based on a discussion of urban and demographic structures and obstacles hindering the implementation of SLM in Bulgaria, the ‘National Action Programme for Sustainable Land Management 2007 – 2013’ as well as the ‘General Development Plan of the City of Burgas’ are presented extensively. The author reveals a growing interest in implementing SLM in Bulgaria, despite obstacles still remaining.

The various concepts for the Development of New Towns in Russia are analysed by Elena Rubtsova. New towns already had a tradition in Russia under the Soviet Regime as new industrial sites for iron and steel production – with very high levels of environmental and health pollution. Today, a New Town is planned in order to discharge the rapidly growing metropolis of Moscow. The most recent plans for New Towns try to avoid environmental pollution; this is exemplified by the so-called ‘eco-town’ Pravgorod. The author reflects the New Town concept against the financial and demographic situation of Russia and comes to the conclusion that first of all the existing cities, housing and living conditions should be improved before realising New Towns.

A new concept for Transportation in Land-Use Planning in Lithuania is presented by Dovile Stanaityte. Although the spatial planning system of Lithuania is well elaborated and highly differentiated, transport planning shows clear deficits. A concept of Mobility Management elaborated by an international research project could solve the problems.

Carola Bass answers the question: Does the European Green Capital Initiative give impulses to scale up the ‘Green City Approach’ (GCA)? The GCA is much broader than ‘cities with many public green spaces’. The author compares the European Green City Index with the European Green Capital Award, exemplified for the city of Hamburg, and concludes that the award can be considered as a source of ideas for environmentally sound urban development. However, the financial situation of many cities is considered to be an obstacle to cities preventing them to take part in those competitions.

Inès Joubert-Boitat presents the new French EcoDistrict Concept. After the presentation of the French town planning and its evolution, the author introduces the EcoDistrict Concept. At least one EcoDistrict, such as the ‘ZAC de Bonne’ in Grenoble, shall be realized in every French town. The EcoDistrict Concept applies systems thinking on various scales while taking into consideration environmental issues and struggling against urban sprawl. Altogether the EcoDistrict Concept integrates many issues of environmentally sound and sustainable urban development and sets an antipole to traditional French urban planning.
Collegial Contributions – Landscape Management
The third part of this report is introduced by Jannis Lambert’s elaboration on the potential of permaculture for European land use planning, caused by the discontent of the author regarding European policy and planning approaches. The permaculture concept, also based on closed cycles, but additionally on ethics and various principles, has been applied mainly in agriculture and gardening to date. The author transfers the concept to land use planning, presents the example of an existing community in Wales and discusses to what extent the permaculture approach is being applied in Masdar city, Abu Dhabi.

Henrik Beermann reflects definitions and constituent elements of vulnerability assessments. He describes the widely recognized definition given by IPCC and depicts the elaboration of a vulnerability assessment in Saxony that modifies and simplifies this definition. Central terms, such as sensitivity, exposure, adaptive capacity, and vulnerability are explained. It is considered necessary to transcend different understandings of terms and different methodologies in order to make vulnerability assessments comparable and to communicate the results.

Rita Brandt investigates environment-friendly land use concepts including environmental assessment procedures. After the presentation of sustainable and environment-friendly land use concepts the author depicts structure, history, aims and purposes of environmental impact assessments based on the instructions of the Austrian Environmental Agency.

References
II. Land Management in the European Context

1. “Cradle-to-Cradle” as Planning Tool

Gijs Diercks

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1.1 Introduction and Research Question

In this section, a closer look will be taken at the possibilities to use the design concept of Cradle-to-Cradle (C2C) as a planning tool. C2C is a concept developed by the German chemist Michael Braungart and the American architect William McDonough. Its origins lie in product design and architecture, providing a very radical approach towards sustainability. In 2006, a Dutch documentary triggered a real C2C movement in the Netherlands. The result was that, next to the original fields of product design and architecture, four municipalities started to embrace the concept as a planning tool. Within a few months, everyone seemed to be talking about C2C and its endless opportunities to reshape our society to be truly sustainable. Critics were talking about a hype, arguing that, while the concept might be appropriate for product design, there are still many stumbling blocks. Also, a 100 percent C2C building doesn’t exist to date, raising questions whether it is appropriate to actually start to use C2C as a planning tool (Linssen 2007). Furthermore, even the most enthusiastic advocates of C2C as a planning tool, find many obstacles on their way in the form of current spatial and judicial frameworks, sectoral regulations and financial models (GOB 2009).

Despite the many challenges described in the introduction, C2C is still gaining popularity. More municipalities have to some extent implemented C2C thinking in spatial planning. Although a majority of the cases discussed in this paper have seen some success, the challenges to overcome are numerous. In the light of these recent developments, their success and the challenges, this paper addresses the following research question:

*To what extend is the concept of C2C a useful planning tool?*

In order to answer this question, the section will first discuss the basics of C2C as a concept for product design and architecture. After that, a description will be given of how, in theory, C2C can be used as a planning tool. Using three Dutch case studies, this paper will make an attempt in trying to
see to what extent this theoretical planning tool has functioned in practice, and what this can learn us about the usefulness of C2C as a planning tool.

1.2 Cradle-to-Cradle as Land Management Tool

1.2.1 The Basics

C2C begins with a simple basic premise. According to McDonough and Braungart (2002), all our sustainability problems are a problem of design. Therefore, in order to deal with sustainability problems, one must understand a fundamental difference between how the natural world works, and the way modern civilization is designed. Nature works in cycles of birth and re-birth, cycling nutrients, water and materials in ever self-sustaining physical flows based on regenerating cycles. For most of human history people fit within these cycles and found a balance with the natural world. However, as modern civilization developed – from small agricultural settlements 10,000 years ago, to big industrial cities today – a Take-Make-Waste model changed our interaction with nature from a cyclical to a linear way. This linear model creates cumulative and far-reaching effects to the health of our natural environment. These effects can be found in almost all our sustainability issues today (Cuginotti et al. 2008).

C2C is a response to this fundamental incongruence between the systems of the natural world (cradle to cradle) and that of modern industrial society (cradle to grave). This fundamental design flaw avoids our society to really start thinking about sustainability in a meaningful way. In short, the concept of C2C tells us that, to become truly sustainable, we must change our production processes in such a way that they resemble natural processes. In order to do so, Braungart and McDonough (2002) identified three defining characteristics of nature, and translated them into design laws.

First of all, everything we have to work with, is already here (McDonough 1998). This means that everything is cycled constantly, with all waste equalling food for other living systems. What this means is that nature does not have the concept of waste. An example is that the waste products of a cherry tree, the cherry blossoms, do not end up as a waste product, but as nutrients to its surrounding organisms: the more waste, the better. Second, energy comes from outside the system from perpetual solar income (McDonough 1998). It is a very complex and efficient system that makes modern methods of production look pale in comparison. The third defining characteristic is that it is biodiversity sustains this complex and efficient system of metabolism and creation (McDonough 1998). It is this intricate and symbiotic relationship between millions of different organisms that enables nature to sustain a complex balance.

Based on this understanding, and on the understanding that our society is inherently part of nature, society should design their systems in accordance to this way. The following three design laws are therefore directly derived from the defining characteristics of nature described above, and should be used as a guideline to replace the cradle-to-grave manufacturing model:

— waste = food,
— use current solar income,
— celebrate diversity.

In this way, C2C tries to create an industrial ecology, in which you create an industrial metabolism. The final goal is to create closed material loops. In order to do so, C2C separates between biological and technical metabolisms (see fig. 1).

The biological cycle is based on biological metabolism of constant nutrient cycles that support life on earth. According to McDonough and Braungart, a technical metabolism can be designed that mirrors the biological nutrient cycles. In such a technical nutrient cycle, a closed-loop system is created in which valuable, high-tech synthetics and mineral resources circulate in an endless cycle of production, recovery and remanufacture (McDonough and Braungart 2002, p. 35).
Materials should therefore be either biological degradable (returning to the biological nutrient cycle) or be disassembled in parts so that it then can be applied in new products (returning to the technical nutrient cycle).

According to the authors, creating closed material loops based on the three design principles of C2C helps to think about C2C more constructively. For nowadays, they argue, sustainability concepts are still based on the false premises of a linear process, in which waste is seen as an unavoidable end-of-line product that has to be dealt with as good as possible. Recycling waste, however, is often nothing more than down-cycling it to a product of lesser value. Plastics can only be recycled six times, before it eventually becomes untreatable waste. Instead, C2C says our goal must be to upcycle products, meaning that materials truly maintain their status as a resource within a bigger system, thereby eliminating the concept of waste. In this way waste always equals food, changing our linear Take-Make-Waste model into cyclical C2C model of closed nutrient cycles.

Closing cycles, according to McDonough and Braungart (2002), also helps us in talking about eco-effectiveness rather than eco-efficiency. Eco-efficiency is the notion that sustainability can be achieved by diminishing our impact on the planet. The problem is that it is still based on linear thinking. It is focused on the end-product waste, which is considered bad and has to be reduced as much as possible. C2C argues that this mentality of doing things ‘less bad’ is not good, but just less bad. There is no such thing as ‘zero-waste’, and attempts to achieve such a thing will keep us in the wrong mindset and withholds us from thinking constructively about natural cycles in which waste equals food, and one product or process can add value to another. Therefore, C2C embraces the concept of eco-effectiveness, in which products or processes are not valued for their efficiency (making things less bad) but effectiveness (making things good), ensuring that the entire process of product design is aiming at producing “food” for either the biological or technical metabolisms (McDonough and Braungart 2002). Eco-effectiveness tells us to make a product that has only positive impacts, rather than to see how you can reduce its impact altogether. Think of it as a car that cleans the air while driving, rather than producing less bad emissions.

Concluding, C2C tries to provide an answer to sustainability problems arising from linear Take-Make-Waste or cradle to grave systems. By creating closed nutrient cycles, it enables us to move away from efficient recycling, to effective upcycling. This simple concept of closing nutrient cycles enables us to think of sustainability in a more meaningful way. Rather than trying to reduce the impact of one process, we can think of how one process can actually have a positive impact, and add value to a bigger system.
1.2.2 Extending C2C to a Vision for our Society

The concept started as a new way of thinking about our core industrial processes, namely the production of goods. It had a perfect business case for this as well: waste is stupid. This has appeal, since it is true from both a sustainability and a business point of view. McDonough and Braungart helped companies, among which Nike, to develop products that could be truly upcycled in both either the biological or technical nutrient cycle by using smart design and the right materials. A certification scheme has been created, certifying over 300 products by 2010 (C2C Products Innovations Institute 2011).

However McDonough and Braungart believe that the concept of a cyclical C2C design could not only be applied to industrial processes, but to all human systems (Cuginotti et al 2011). A first step in this direction was C2C architecture. Its philosophy is that a building should be like a tree. This means it should clean water and air, generate energy, retain soil, etc. As a result, the design should not be an enemy of its environment - which is so often the case - but that it creates synergies with its surrounding and hence add value to it. Like with the product design, C2C architecture is based on closing material loops for the technical nutrient cycle - relating to the materials used for the building itself - and for the biological nutrient cycle – relating to all the different flows of water, energy and waste related to the building.

The next logical step of applying the C2C concept to all human systems is that of expanding it to the scope of the city. The argument being that if a building can be designed like a tree, a city could be designed like a forest. This asks for a translation of the C2C design laws for product design and architecture, into a planning tool for spatial development. This will be discussed in the next section.

1.3 C2C as a Planning Tool

1.3.1 C2C as a Planning Tool: the Theory

When the C2C movement started in the Netherlands in 2006, four Dutch municipalities got interested in using C2C principles as a directory for certain spatial developments in their region. In order to do so, a C2C planning tool was needed. As a response, the Joint Development Agency (in Dutch, the GOB) of the central government created a pamphlet about using C2C as a spatial planning tool. This has now been used as a source of inspiration by many more municipalities. The planning tool is based on the three C2C design laws of waste equals food, use current solar income and celebrate diversity, as mentioned in section one. However, realizing that these three laws were not even perfectly obeyed in architecture, the GOB used these laws rather as a source of inspiration. They also specifically looked at overlaps with other current planning tools, making the possible implementation of the tool much more likely (GOB2009). Now, a theoretical description of the planning tool will be given by explaining the three main concepts of the tool: integrated approach, closed cycles and different layers.

**Integrated approach**

Planning a city that should resemble a forest needs a very different approach than the current sectoral approach. One must let go of the classical view in which areas with a specific purpose (living, working, recreation, nature) should be treated unconnectedly from the other areas. Instead, the various functions of living, working, recreation, transport, nature, food production, etc. are fully integrated. This is not to say that all various functions should take place in the same location. It only emphasizes that planning, just like a building, should not be an enemy of its surroundings. Rather than focusing on negative trade-offs between different land-uses, one should look at how one aspect can positively impact another one. This different view (using C2C glasses) should be the starting point of any spatial development programme.
Closed cycles
Achieving such an integrated planning approach can be done by applying the first C2C law of waste equals food. This means that one has to identify all different flows in an area (materials, energy, water, mobility, see fig. 2) and try to design these flows in such a way that they form closed cycles, eliminating the concept of waste (GOB 2009). Closing the cycles should be done at different scales. In C2C architecture, attempts are already made on the scale of a building. C2C spatial planning tries to expand this to different larger scales, as is illustrated by the figure below.

![Figure 2: C2C Planning Matrix (GOB 2009, p. 11)](image)

It is important that one should start to try to close the material loops at the smallest possible scale, and then expand the scale step by step when cycles cannot be fully closed. For instance, looking at the matrix above, it might be sensible to design water flows in cycles on the scale of a house, but waste management at the scale of a neighbourhood and mobility at the level of bigger spatial areas. This is very much like a forest, where there are already many small ecosystems with closed cycles of material flows on the level of leaves, expanding to trees and finally the forest ecosystem as a whole.

Different layers
When closing cycles of material flows in different spatial areas, it is important to realize that a spatial area has different layers (see fig. 3). This is very much in line with the older land-use tool of integrated assessment, in which different layers are taken into account. GOB (2009) identified four different layers, as identified in figure four. From the bottom to the top, these are the physical base layer, the soil properties layer, the land use layer, and the top layer of social interactions.
The matrix of figure three for instance, depicts the actual physical constructions, thus only taking the land use layer into account. A proper investigation of all different flows in area would also consider different layers, changing figure three in a three dimensional matrix. Another interesting element of identifying different layers is that one can identify different ‘speeds’ in which changes occur in each layer. Time is a very important element when identifying different flows, and the layer approach enables planners to look for ways that can close these different cycles of different flows in both space and time (GOB 2009).

The most important contribution of this layer approach is that it forces planners to make use of the existing capital of people, landscape and resources. This is closely related and gives an interpretation to the third design law of C2C: celebrate diversity (Stouthuysen and Roy 2010). It is about working with what is already there, and connecting this as good as possible. The building elements (land use layer) match the areas various flows (the water, air, food, and energy of the soul properties layer and the physical base layer). The social interactions layer are matched with the land use layer and, consequently, with the soil properties layer as well (Stouthuysen and Roy 2010).

**Sustainability as a starting point: a sustainable land use evolution**

This section showed that there is a theoretical basis for using the concept of C2C as a planning tool. The second law of C2C, use current solar income, was not elaborated upon, since it is not directly an element of spatial planning. That it will be possible to generate enough solar energy (considering wind is also solar) to power a city, is most likely possible, but not in the scope of this paper. However, it is more relevant that this section gave practical tools for the implementation of the two other laws of ‘waste equals food and celebrate diversity’. The three main concept discussed in this section were that a spatial planner should take an integrated approach to different spatial functions, attempt to close cycles and consider different layers. In this way, beneficial links can be created between building elements and the physical layer, the various flows (water, air, energy, food), and the (social) functions needed in the area.

The C2C strategy, as with product design, helps to maximize the positive effects on ecology, economy and equity, rather than trying to minimize negative trade-offs between people, planet and profit. Its starting point is to see how one type of land use can add value and create a positive impact to another type of land use, rather than trying to diminish it impact altogether. Therefore, there is an emphasis on effective land use, rather than efficient land use.
1.3.2 C2C as a planning tool: in practice

In the previous section, a theoretical framework was given of what a C2C planning tool might look like. In this section, four examples will be shortly discussed, in which an actual attempt was made to apply C2C principles to spatial development. Three of them are located in the Netherlands, and one in China. They all differ in their level of success, and especially in the extent to which they applied C2C principles.

**Huangbaiyu, China**

The most radical implementation of C2C principles in spatial development was planned in China. The Chinese government presented this challenge to Braungart and McDonough, asking them to design a pilot C2C city, named Huangbaiyu. They started an extensive study about all the physical flows (ground layer, hydrology, sun, wind), biological flows (natural habitats, biodiversity) and social flows (what do people do, and what do they need). In their ideal design, all these flows in different layers were taken into account and were designed in closed cycles. The building elements matched the various flow, by considering natural sunlight, and air and water flows when planning a building. Also, the social layer matched the land use layer, by for instance creating livelihoods for local farmers within the city. Thus, the three main elements of C2C spatial planning were all taken into account: an integrated approach to different spatial functions, attempt to close cycles and consider different layers. However a true C2C city was never realized. The project failed, not living up to the high ambitions (van Hoorn 2006).

**Clover 4, Venlo, The Netherlands**

Venlo is located in the southeast of the Netherlands, close to the border with Germany. It has an important agro-industrial sector, with many pig farms and greenhouses. It also has a big processing industry for the shipment of products from the port of Rotterdam to mainland Europe. In project Clover 4, the municipality of Venlo tries to develop all these different functions and make them more competitive, but doing so in a sustainable way by using C2C principles. They project is called clover 4, because it is a business area designed in the form of a field of clover, with clusters of four companies together, creating the form of a clover with four leaves (see fig. 4) (GVDC 2010).

![Clover 4 Project](image)

*Figure 4: Project Clover 4 (GVDC 2010, p. 68)*

The clusters of four companies are a combination of different companies from the different industries (pig farming, greenhouses and processing industry), so that synergies between these different industries can be created. The waste of the pig farm (manure) can be food for the greenhouses in terms energy (bio-fuel). The design helps to integrate water- and energy systems, (waste resp.) material cycles and the reduction of truck movement (GVDC 2010). Located in the heart of the clover is a green zone for the purification water. Clean water can serve as irrigation water for the glasshouses. This preserves the natural balance in the area. A biomass energy plant converts waste from the glasshouses and the processing industry, pig manure and green waste from the landscape and surrounding villages into biogas. The biogas is fed into small combined heat and power plants that supply electricity and heat to each Clover 4 (GVDC 2010). The project is not as holistic as in China,
were all layers were considered and attempts were made to close all cycles of the different flows. Its scope is limited to creating different synergies within the land use layer. While the soil properties layer is taken into account a little bit by the purification of water, the physical base layer and the social interaction layer are neglected. The project is ambitious in trying to close the cycles of all flows energy, water, and materials. Since it is not finished yet, a final evaluation cannot be given.

Park 20/20, Hoofddorp, the Netherlands
Park 20/20 in Hoofddorp is an office park currently under construction that should give place to several state of the art C2C buildings, using C2C materials. The park will be self-sufficient in its energy and water supply. It also specifically aims at a better integration between the social interactions layer and the land use layer, by putting peoples wishes in the centre of its design. Many green spaces, sport- and shopping facilities, financial and ICT services, restaurants, a medical centre and a kindergarten should make this park not only sustainable, but also designed for the people working there (Park2020 2011). Like Clover 4, it is not 100 percent C2C, since it does not provide a fully integrated approach to all different spatial functions, it does not close all cycles and fails to consider all different layers. The project is less ambitious then the project in Venlo, since it does not try to combine different industries or spatial functions to create synergies and add value to each other. It will remain a one-sided office park, with the only synergy a combined energy and water system.

Almere, The Netherlands
The city of Almere currently has 185.000 inhabitants, but plans to grow to 350.000 inhabitants in 2030, becoming the fourth largest city of The Netherlands. In 2006, the municipality had very high ambitions in doing this according to C2C principles, and thereby becoming a model city for the rest of the world. In practice, little concrete results can be shown, that are truly C2C. There are many projects in order to make the city sustainable, but they look more like regular sustainability efforts, such as use of renewable energies, energy-efficient housing and better waste management (Gemeente Almere 2008). The overall planning of the growth does not seem to use true C2C spatial planning. The only tangible result that can be seen is a book called ‘The Almere Principles’, in which seven principles, loosely based on C2C principles, are stated that should functions as a guide for further developments: cultivate diversity, connect place and context, combine city and nature, anticipate change, continue innovation, design healthy systems, empower people to make the city (GemeenteAlmere 2008, p4). They are not very concrete, and are hard to measure, and seem more like an inspiration for sustainable spatial development, instead of it being an actual planning tool.

1.3.3 Reflections from the community of practice
The Dutch municipalities experimenting with this new planning tool decided to create a community of practice, in which they could share their experiences and provide useful information for each other and possible new participants in the future (COP 2008). In general, they endorsed what this paper established in the previous section: applying C2C principles to spatial planning in practice, showed that the extent to which all principles can be implemented, and the extent to which all original ambitions were met, differ greatly between the projects. However, all municipalities involved said it was not due to lack of inspiration or possibilities that this was the case. Often, the biggest obstacles were in the form of current spatial and judicial frameworks, sectoral regulations and financial models (COP 2008). In Venlo, for instance, it was hard to create clusters of four companies that were all interdependent of each other. For what would happen if one of the companies would go bankrupt? In Almere, the goal was to create many different values for people, planet and profit, but investors in project are mainly interested in the financial value of a profit, not the environmental or social value. All these problems showed that it is very hard to implement a new planning scheme that it so different from business as usual practices (COP 2008). However, despite these troubles, all actors involved thought that using C2C principles in the planning stage of their project was very valuable, even though 100 percent C2C spatial planning could not be achieved, or original ambitions had to be tuned down a bit. Unanimously, participants pointed out that C2C is a useful inspiration, helping to set new and ambitious goals and challenging to think and handle differently (COP 2008).
1.4 Conclusions and Outlook: Value of C2C as planning tool

The concept of C2C tries to provide an answer to sustainability problems arising from linear Take-Make-Waste or cradle to grave systems. By creating closed nutrient cycles, it allows us to move away from efficient recycling, to effective upcycling. This simple concept of closing nutrient cycles enables us to think of sustainability in a more meaningful way. Rather than trying to reduce the impact of one process, we can think of how one process can actually have a positive impact, and add value to a bigger system.

Attempts by Dutch municipalities to expand the concept from product design and architecture to spatial planning, moved the GOB to create a C2C planning tool. We have seen that in theory, applying such a tool can give an integrated approach to different spatial functions, and attempts to close cycles over space and time by considering different layers. In this way, beneficial links can be created between land use elements and the physical layer, the various flows (water, air, energy, food), and the (social) functions needed in the area.

In practice, we have seen that the actual results are not as radical as stated above. While the ambitious Chinese project was not realized altogether, the developments in Venlo and Hoofddorp only implement C2C principles partially. In the example of Almere, there are no concrete examples of how C2C principles will be implemented, and they seem to be using the concept only as a source of inspiration to think of sustainable spatial development.

The answer to the research question, to what extend is the concept of C2C a useful planning tool, can therefore not be answered entirely positive. It is clear that it is definitely not a practical instrument that helps a planner step by step in order to create a radical state of true sustainability in spatial planning. However, this is not to say that the concept of C2C can be completely dismissed as a useful planning tool. As was indicated by the community of practice, it was often not a lack of inspiration and goodwill of stakeholders, but existing spatial and judicial frameworks, sectoral regulations and financial models that frustrated further implementations. According to me, it is logical that this happens, and it is naïve to think that planners can radically change common practices overnight. However, it is important to realize that it is thus necessary that, in order to achieve a more radical form of sustainability in our society, these common practices and their legal frameworks and financial models should change. The C2C planning tool can be a part of this change. Therefore, it is better to see the C2C planning tool as a part of a more evolutionary process of sustainable spatial development. In this light, the research question can be answered more positively, by saying that the planning tool has proven to be a useful inspiration, helping to set new and ambitious goals and challenging to think and handle differently.

It is also important to realize it is not unique in doing so. As pointed out before, the planning tool uses elements that are already well known by planners, such as an integrated approach and the integrated assessment of identifying layers. Also, its ideas of a cyclical design can be found in for instance industrial ecology or permaculture. This only strengthens the idea that a C2C planning tool can be a part of a larger evolutionary process of sustainable spatial development. This gives right to the existence of the tool, and perspective to a much better usefulness in the future.
1.5 References


2. Sustainable Urban Development

Markus Hundt

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2.1 Introduction

Since the dawn of the 20th century the ever growing urban areas have become the topic of many discussions. The modern cities have become places of urban environmental degradation and wasteful use of resources. This is proving to be very problematic not only for present but also for future generations. Many cities tend to be large consumers of goods and services, while draining resources out of external regions that they depend on. As a direct result the ecological impact of cities extends beyond their geographic locations. There are many concerns raised at the environmental damages and depletion of non-renewable resources and rising levels of pollution in urban areas. Along with the rapid expansion of urban population around the world there has arisen a wide awareness about minimizing the environmental costs of urbanization. The idea of sustainable urban development has emerged because the greater cities have a negative impact on the environment. The ultimate goal is to counter these negative effects of growing urban areas.

2.2 The Problematic of growing cities

During the 1950s only one out of three people lived in greater towns or cities. Today half of the world’s population lives in cities, a share that is likely to reach 70 percent in 2050. Cities consume as much as 80 percent of energy production worldwide and produce as much of the global greenhouse gas emissions (World Bank 2009, p.15; see fig. 1.) As development proceeds, greenhouse gas emissions are driven less by industrial activities and more by the energy services required for lighting, heating, and cooling in the cities.
Urban regions are known for their use of natural resources and generation of toxic substances. They also import goods and services, and export waste products, leaving an impact not only on their immediate environment but also on distant environments over a longer time period. The challenge for urban governments is to provide adequate living conditions. Cities always have been a catalysts of social, cultural, and intellectual evolution. That’s why cities play a vital role in facilitating sustainable development both in the local context, and within a wider, global perspective. (Marashi 2006, p.1)

2.3 The Concept of Sustainable Urban Development

2.3.1 Definition

Sustainable urban development specifically means achieving a balance between the development of the urban areas and protection of the environment. Sustainable Urban Development also means improving the quality of life in a city. It requires an integration of economic, social and environmental approaches towards development. Sustainable urban development refers to attaining social equity and environmental protection while minimizing the costs of urbanization without leaving a burden on the future generations (Chattopadhyay 2008, p. 2).

The ultimate goal of sustainable urban development – according to many authors - is to achieve the following elements (Næss 2001, p. 506):

– reduction of use of non-renewable energy resources and emissions of greenhouse gases in the urban area down to a level compatible with the ecological and distributional criteria for sustainable development at a global level,
– minimizing the destruction and/or degradation of rural and natural lands,
– minimizing the emissions of toxins and wastes into the air, soil and water,
– replacement of open-ended flows, where natural resources are transformed into waste, with closed loops relying to a higher extent on local resources,
– a sound environment for the city’s inhabitants, without pollution and noise damaging to the inhabitants’ health, and
– creation of green areas to give opportunities for the population to experience and become emotionally related to nature.
Sustainable urban development is also the ability to make development choices which respect the relationship between the three "E's": economy, ecology, and equity:

- **Economy**: all economic activity should serve the common good, be self-renewing, and build local assets and self-reliance;
- **Ecology**: means that humans are part of nature. It is a fact that nature has limits, and communities are responsible for protecting and building natural assets;
- **Equity**: is the opportunity for full participation in all activities, benefits, and decision-making of a society.

### 2.3.2 The Sustainable Community

Sustainable communities are defined as towns and cities that have taken steps to remain healthy and sustainable over the long term. There planes of sustainability is embraced and actively promoted by all of the key sectors of society. These communities value healthy ecosystems, use resources efficiently, and actively seek to retain and enhance a locally based economy. Partnerships between and among government, the business sector, and non-profit organizations are common (VROM 2010, p. 17).

Partnerships are needed because complex urban problems cannot be solved by single government bodies or agencies alone. The solving of problems is a shared responsibility that is requiring action on the part of all stakeholders. Public debate in these communities is engaging, inclusive, and constructive. Unlike traditional community development the sustainable development involves the whole community; ecosystem protection; public participation; and economic self-reliance. In applying the concept of sustainable development of communities there must be an emphasis on:

- the efficient planned use of urban space,
- minimizing the consumption of essential natural capital, and
- multiplying social capital.

Mobilising the citizens and the government is important for the coordination of these ends (Williams 2000, p. 13).

### 2.4 Sustainable management of urban basic services

#### 2.4.1 Urban services

In order for a city or urban area to be sustainable it needs to produce and manage basic services like water, waste, energy, and transportation in a way that it conforms to the principles of sustainable development. The city should be able to produce and distribute the services in an economic, environment friendly and equitable way. Mostly the delivery of the services like water, energy, waste, transportation, is based on non-renewable energy sources.

#### 2.4.2 Energy Management

Energy availability is a vital factor in urban life. It assures economic development and quality of life, with impacts on employment rates, social, and cultural conditions. Figure 2 shows that the greatest amount of carbon dioxide emissions is produced in urban areas and that the energy demand is still mostly satisfied by non-renewable resources. Given the significant energy use in urban areas, and all the associated environmental issues, it is important to promote sustainable energy management. The critical factor is energy efficiency, which refers to the adoption of improved technologies and practices in order to reduce the energy required to provide the same output or level of service. Energy efficiency means doing more with less. The development and use of renewable energy in urban regions can be accelerated by clearing away various economic, technical, and institutional constraints, especially those linked to the adoption of specific technologies such as harnessing solar and wind power. (Girard 2006, p.5)
For a sustainable way of energy management it is necessary that the energy efficiency of buildings must be improved. This concerns both existing and new buildings (LEIPZIG CHARTER, 2007, p. 3). The renovation of housing stock can have an important impact on energy efficiency and the improvement of a resident’s quality of life. Optimized infrastructure networks and energy efficient buildings will lower costs for businesses and residents alike. One way to satisfy the growing demand for green energy is the “solar city.” The so-called “solar city and region” is characterized by a new and original mix of renewable energies. Solar cities and regions will directly use sunlight and wind power to produce energy. Hydrogen can be used for heating and cooling buildings and water through the use of fuel cells (Girard 2006, p. 5). Fixed fuel cells will likely become more widely utilized in the coming decades. The figure shows a solar city by the example of the Swedish city of Gothenburg, which plans to become solar city, till the year 2020.

Figure 2: Emissions from Urban and Nonurban Areas (World Bank 2010, p. 19)

Figure 3: Example of a solar city (Chino 2009, p. 1)
Local government can support the expansion of renewable energy supplies through purchase of green electricity and accommodation of renewable energy technologies in its own buildings and facilities, such as photovoltaic systems and solar water heating (Lui, Singh 2009, p. 4). Public complexes are often good candidates for distributed energy supply options such as co-generation of heat and power using natural gas.

### 2.4.3 Transport Management

Besides the growing level of air and water pollution, road traffic noise pollution has been recognized rising as a new threat to the inhabitants of cities (Chandioa et al. 2010, p. 117). Urban and interurban transportation systems are a particular area where dramatic change is possible, and necessary. The modern city is based on mobility. The railway, and later the automobile, made the vast expansion of cities into metropolitan areas possible. Over the course of the last century, urban areas have witnessed a process known as suburbanization. With the rise of new technologies transport became fast, efficient and cheap, so households could afford to leave the city and enjoy life in the suburbs or countryside and still travel to work in the city. It was only natural that services and manufactures follow their customers or employees to the suburbs creating the urban-rural landscape surrounding most of our cities today (Wegener 2009, p. 3). The process of suburbanization brings with it a certain amount of negative aspects, such as declining city centres, loss of open space, long travel times and growing emissions of greenhouse gases, air pollutants and traffic noise. It also ignores the necessity to reduce greenhouse gas emissions to counterattack the effects of the climate change, and it ignores the fact that cheap mobility will not be here forever (Wegener 2009, p. 3). It is essential for the development of cities and the quality of life, that there is a sustainable way of inner-city transport. Particular attention of city planners should therefore be paid to traffic management and interlinking transport modes, including cycling and pedestrian infrastructure. Figure 4 shows that bicycling is not only a sustainable way of transportation in urban areas, but also an effective one.

![Figure 4: Comparative table of journey speeds in the urban environment (ECMT 2004, p. 23)](image)

The approaching crisis in energy, and environmental sustainability, mean that modal shares of daily passenger trips by automobile and by transit should be almost reversed, goods movement systems become much more efficient, and vehicles become far more efficient to build and to operate. When mobility becomes more expensive, accessibility becomes again an important location factor. Households move closer to their work places and firms closer to their customers, suppliers and
workers, so farther away destinations are replaced by nearer ones that can be reached easier by bicycle or foot. (Wegener 2009, p.16)

2.4.4 Waste Management

Waste management is one of the most visible of urban services. These services are a major employer and consume a large proportion of the operational revenue of a city. As such, effective and sustainable waste management goes hand-in-hand with local governance. Waste management is critical to the protection of public health, safety and the environment. The uncontrolled disposal of waste can threaten water resources and place significant environmental health risks on those living nearby. The generation of solid waste in urban areas continues to grow as a result of urbanization requires special attention for collection and disposal. The solution is generally considered to be prevention rather than clean-up, and the preferred options are the four R's: reduce, reuse, recycle and recover (Williams 2000, p.20).

— Reduce: The most efficient way of dealing with waste is by not creating it in the first place. The people have to rethink their consumer habits and practice source reduction. Two systemic approaches to encourage source reduction are “Life Cycle Analysis” and “Cradle-to-Cradle” management.

— Reuse: Waste can be used twice or more. Reuse of waste like metals, glass, paper, plastic, textiles, organic waste and water will reduce demand for energy, raw materials, fertilizers and fresh water sources.

— Recycle: Recycle means to pass an object again through a series of changes or treatments with a view to its reuse. The popular categories for recycling are: Paper, Plastics, Glass, and metal. There are many benefits, such as: waste reduction, energy savings, cost savings, reducing the extraction of raw materials.

— Recover: Recovery means to adopt a waste object to a new use by extracting energy or utility from it. A popular option is waste-to-energy facilities that burn wastes for fuel to produce heat or power for domestic or industrial use.

2.4.5 Water Management

The two most important fundamental needs of towns and cities are a sufficient supply of drinking water and the removal of polluted water. With the growing of urban areas, the demand of clean drinking water is growing too. The figure shows several modern issues of water management. The world water crisis receives growing attention, and the increasing scarcity of clean water has been described as one of the most important issues facing civilization in the 21st century (Winz 2004, p. 2). Although it is a global problem, the solutions can only be found at regional levels, because water is a regional resource (Winz 2004, p. 3) There are several key strategies to achieve water sustainability:

— Technological solutions like: water recycling, desalination, rainwater tanks

— Demand management: education, pricing, consumptive restrictions and appliance rebates

— Best Management Practices in development : Water Sensitive Urban Design and decentralized or localized management

As for efficient practices, water consumption can be limited by using raw water, recycled water for gardening and landscaping. Increasing wastewater charges will be easier if there is better monitoring and information disclosure and if more wastewater is treated for reuse. In the state of Vermont, U.S.A., a wastewater treatment system uses a series of tanks containing plants and other organisms to naturally clean wastewater that serves 500,000 people per year (Chattopadhyay 2008, p. 6).
2.5 Kronsberg a practical example

Kronsberg is a district of Hannover, the state capital of Lower Saxony. Kronsberg is the city’s largest remaining area for building development. The Kronsberg city district was built applying all the most modern expertise on ecological construction and habitation with regard to:

— energy efficiency optimization,
— water management,
— waste management,
— communication, skilling, and qualification measures.

The ultimate goal of the content of energy efficiency optimization at Kronsberg was to reduce CO₂ emissions by at least 60% (Menze 2007, p. 16). The consumption of energy was reduced through “Low Energy House” building methods. The energy provision was further optimized by means of a differentiated district heating system fed by two decentralized cogeneration plants, and specific economy measures on the consumer side. A further reduction in CO₂ emissions was achieved by integrating wind power projects into the energy supply (Menze 2007, p. 16). Two wind turbines were erected at Kronsberg. Over a hundred social housing apartments are heated from solar collectors that also feed into a sunken thermal storage tank. This means that solar energy can be used from spring through to December, covering around 40% of the total heating needs of the homes (BSHF 2005, p. 9).
On public streets, rainwater runs off into soak away trenches, called the “Mulden-Rigolen” system (see fig. 6).

Rainwater is also collected from roofs and paved areas and released in residential areas where it supplies design elements such as open ponds or watercourses. Rainwater management had a shaping influence on the design of the district of Kronsberg. Making the theme of water visible has been a priority, to raise public awareness of the crucial importance of this element (Rumming 2011, p. 9). So far, there have been no adverse effects on groundwater regeneration in nearby woodland, and water levels in the existing drainage ditch system have remained constant (Rumming 2011, p. 8).

The general idea of the waste management concept was to replace conventional waste disposal strategies with preventative waste management planning. Consistent waste avoidance and recycling was practiced from the beginning of the planning and construction phases (Rumming 2011, p. 8). In Kronsberg several innovative collection systems were installed, like attractively designed containers close to the houses and pre-sorting bins in the apartment complexes for comprehensive waste separation (BSHF 2005, p. 9). Recycling rates of over 80% were achieved (Mönninghoff 2011, p. 24; see fig. 7).
Detailed monitoring of the monthly consumption of all apartments showed that the measures had led to a 27% reduction in CO₂ emissions caused by space heating, hot water and electricity across the settlement (Rumming 2011, p. 7). District heating that produces both heat and electricity saves on primary energy and a further 19% of CO₂ emissions. The installation of the wind turbine generators saved a further 28% of CO₂ emissions (Rumming 2011, p. 11). This means that the amount of CO₂ released into the atmosphere is 74% less than the average.

2.6 Conclusions

Urbanization is a process which has not come to an end yet. With urban areas growing all over the world, the problems created by these cities are also growing and these processes will not just stop. So thinking of ways for sustainable urban development becomes more important than ever. Sustainable development requires sustainable communities. It is important to prevent pollution and the waste of resources in these communities in the first place. A problem in the context of sustainable urban development is that in the long-term environmental problems often appear to people as far and abstract. But sustainability means doing development differently to achieve long-term rather than instant benefits. To achieve this goal it is absolutely necessary to get the citizens of the urban areas involved, because public participation is itself a sustainable development strategy. Therefore social equity is not only desirable but essential. Inequities undermine sustainable development. It is also a problem that the society fails to make a paradigm shift from economic development to sustainable development. The problematic with the solutions which are provided by sustainable urban development is to make sure that they are not creating new problems.

2.7 References


3. Land Management in Bulgaria: Programmes and Planning for Sustainable Development

Iliyana Madina

3.1 Introduction

3.2 Problems and obstacles hindering the implementation of SLM in Bulgaria

3.3 National Action Programme for Sustainable Land Management 2007 - 2013

3.4 General development plan of city of Burgas

3.5 Summary

3.6 References

3.7 Annex

3.1 Introduction

Bulgaria is a small country in Eastern Europe. Its east border is the Black Sea, and it is situated between Rumania, Serbia, Macedonia, Greece, and Turkey. Bulgaria is an EU-Member since 2007. The country has gone through different political regimes and influences. All of them impact the economical, political, demographical, social and cultural development of the country. The objective of this section is to investigate and to analyze how the concept of Sustainable Land Management (SLM) is integrated in Bulgaria, and what kind of influence this concept has.

This section is structured as follows: first, some of the main problems and obstacles hindering the implementation of SLM in Bulgaria are discussed. After that the main direction of the present National Action Programme for SLM 2007-2013 is explained. Then, the implementation of that programme on regional and local level is presented using the example of the general development plan of one Bulgarian city, the city of Burgas. Finally, some conclusions are drawn.

3.2 Problems and obstacles hindering the implementation of SLM in Bulgaria

The territory of Bulgaria covers about 111,000 sq. km.\(^1\) Compared to Germany that is a little bit larger territory than Bayern and Baden-Württemberg together.\(^2\) The comparison of the population between those areas gives some specifics. According to the last census 2011, Bulgaria has less than 7.5 million inhabitants\(^3\). According to the Federal Statistical Office of Germany, the population of Baden-Württemberg is more than 10.5 Mill. people, and the population of Bayern equals more than 12.5 Mill. inhabitants. This comparison may indicate further problems caused by the lower number of inhabitant in Bulgaria.

Figure 1 shows that the population in Bulgaria is also very unevenly allocated. There are four large cities: the capital Sofia, the two largest cities on the Black Sea and Plovdiv. According to the census 2011 about 1.3 million live in Sofia, and this is the only city in Bulgaria with more than a million citizens. Plovdiv has more than 300,000 people. Varna at the Black Sea has more than 300,000

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inhabitants, and in Burgas live less than 200,000 people. That means that about a quarter of the population of Bulgaria lives in those four largest cities.

Figure 1: Settlement network in Bulgaria (Operational Programme “Regional Development” (2007-2013)

Another interesting characteristic is the dispersion of the cities. Figure 1 shows that the majority of the largest cities is situated in the South. Special attention has to be given to the Nord-west region where the settlement network is very poor. This causes negative impacts on the population and the economical development there, e.g. the population in this region has decreased with about 20% for the last 10 years and according to Eurostat this is the poorest region in the EU.

The decrease of the population in Bulgaria is caused because of negative growth but also because of the emigration. Consequently there are more and more regions in Bulgaria which are not inhabited. That means that actions are needed that make those regions more attractive for living. But the problem in Bulgaria is not only the inner migration, but also the emigration outside the country. During the last 10 years about 200,000 people have emigrated, i.e. one whole city with the size of Burgas which is the fourth largest city in Bulgaria.

The uneven dispersion of the cities in Bulgaria causes not only demographical and economical problems, but also environmental problems. The imbalance of the allocation of the population and the differences in the economical development are just some of the problems, but larger cities have to cope with the degree of environmental pollution which varies among the different regions.

All those specifics have to be taken under consideration when talking about SLM in Bulgaria. Later it will become clear, why those demographic, economic and environment differences cause problems for the implementation of SLM in Bulgaria.

Another important impediment, hindering the implementation of SLM in Bulgaria, is the influence of the past communism regime. Bulgaria was under this regime till 1990. One of the main ideas of the communism was that the real property belongs to the state. In the case of Bulgaria, the land was privately owned, but it was controlled by the state. So the state has taken the control over the land

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5 See Skandalno, 2011, online available
without any compensation to their owners, and all the land was merged into a giant state farm. After the fall of the communism there was a demand for return of the taken land to their owners. One of the difficulties was to determine the validity of the many claims. Another one was the result that the farmer land is now so fragmented that the remaining parcels are not exceeding 5 hectares. In part 4 practical examples are given which explain the obstruction of the implementation of SLM due to the results of the communism.

Another problem for Bulgaria is that the concept of SLM has to be considered new in the country. According to my researches the earliest information on SLM is from the year 2000. But those first steps in this direction were not coordinated and they didn’t follow an official programme or plan, but were rather single efforts to integrate SLM on certain levels or in certain regions. With joining the European Union in 2007 Bulgaria had to integrate all those directives and norms and to adjust its legal system to the European system. But according to the programme “Capacity building for SLM in Bulgaria” from 2005, Bulgaria doesn’t have all needed information on all levels. The response structure and the trained personnel are also not enough as well as the coordination between government, institutions and citizens. Other weaknesses are still missing or not sufficient incentives for SLM and the lack of knowledge.

Those problems and obstacles have always existed and were known before. But for the first time, an adequate reaction can be found in the National Action Programme for SLM 2007-2013.

3.3 National Action Programme for Sustainable Land Management 2007 - 2013

This is one of the first national programmes, which tries to cover all the aspects which are needed for developing, spreading and implementing this concept. The programme is developed in accordance with the United Nations Convention to Combat Desertification, part 3, section 1, articles 9 and 10. According to this programme the SLM has to be built on the so called “5 pillars of sustainability”: (1) productivity (to maintain or enhance services), (2) security (to reduce the level of production risks), (3) protection (to protect land resources and prevent their degradation), (4) viability (be economically viable) and (5) acceptability (be socially acceptable). The main steps of this programme are to analyse the present situation, to draw conclusions based on those analyses, to plan certain actions or to give directions for needed programmes and to monitor whether objectives are followed on every step.

One very important part is the financing of the programme. The National Action Programme is going to have national and international financing. The resources are mainly from European unions’ fund and a small part is going to be covered by the state budget. In the past years finding the needed financing was also a big challenge for SLM, but with the achieved success in this field and the joining of EU that is no more such a big problem.

The National Action Programme has five main strategic axes which will be presented in the following. For each strategic axis the responsible institution and the needed financial resources are stated, as well as which actions and specific programmes or plans are required.

**Strategic Axis I: Improvement of the legislative framework and policies for sustainable land management**

This strategic axis has three main directions. Firstly it has to develop the legislative framework and respective policies if and where needed. This should be done on each level, i.e. not only on the national, but also on regional and local levels. The already existing frameworks and policies have to be

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12 See loc. cit.
13 See loc. cit., p. 50-56.
improved and integrated on each level, so that those legal forms do not only exist on paper, but are understandable for everyone and their requirements are followed.\textsuperscript{15}

Secondly, the institutional capacity has to be strengthened\textsuperscript{16}, because further actions and improvements of this programme are not possible without adequate resources. There were already programmes in this area e.g. “Capacity Building for Sustainable Land Management in Bulgaria 2005-2008”, but the analyses have shown that the needed amount of qualified staff is still not covered.

The coordination, communication and partnership mechanism are an integral part of this process and they are the last direction of this axis.\textsuperscript{17} As an example for achieving already some of this strategic direction could be given the coordinated actions between the different Ministries for establishing programmes, compilations of estimates etc. or between Ministries and regional institutions.

\textbf{Strategic Axis II: Maintenance and improvement of the productive and ecological potential of the land resources and their sustainable exploitation}

There are four main directions of achieving this strategic axis. The first one is to limit erosion processes.\textsuperscript{18} The programme plans big investments in new methodologies and technical tools for assessment and prognosis for erosion processes. There should be determining priority areas to combat erosion as well as to be created preventive protection and rehabilitation of such areas. Special attention is given also to the protection of water resources.

The strong negative influence of the communism can be mentioned here. The result of this regime is the existing strong land fragmentation, which make difficult the realization of big national projects, because the land belongs to many private owners. So if the government wants to realize some project it has to have the agreement of all the owners, otherwise the project has to be limited only on restricted areas, which are government property or their owner have given their assent.

On the other hand the uneven dispersion of larger cities and therefore the population is the reason for special attention of resources in less favoured areas, e.g. the Nord-west region.\textsuperscript{19} The problems in such areas are the lack of knowledge and information or even lack of willingness to initiate SLM. That is why main objective of this programme is to stimulate the dissemination of such information and also to consider financial support for initiative in the sphere of SLM. Another possibility for those regions is to grow non-traditional crops and even the so called energy crops, but the achievements in this area till now are not very satisfied yet.

The last direction here pays special attention to the storage and use of waste biomass.\textsuperscript{20} The idea is to be raised the use of alternative energy resources, and to stimulate its production as well as the development on utilization of different kind of biomass.

\textbf{Strategic Axis III: Science and education in support of the SLM policies}

This strategic has two main directions. The first one is preparation and implementation of educational programmes for SLM on all levels of the educational system.\textsuperscript{21} The existing specialized agricultural schools, colleges and universities in Bulgaria do not have the needed programmes for conservation and sustainable land use. Hence there should be actions for enrichment of existing educational programmes, including specialized information for protection of biodiversity, combating desertification, predicting changes in climate etc. The aim is to be prepared specialists in sustainable land management.

\textsuperscript{15} See loc. cit., p. 48-53.
\textsuperscript{16} See loc. cit., p. 61-62.
\textsuperscript{17} See loc. cit., p. 62-63.
\textsuperscript{18} See loc. cit., p. 65-68.
\textsuperscript{19} National Action Plan for Sustainable Land Management 2007-2013, p. 69-70.
\textsuperscript{20} See loc. cit., p. 70-71.
\textsuperscript{21} See loc. cit., p. 78-79.
Examples for achieving already this objective is the establishment of new programmes in some universities, e.g. the master programme “Sustainable Land Development” in the Agricultural University Plovdiv or the bachelor and master programme “Bio management and sustainable development” in Sofia University.\(^\text{22}\) The achievement of this objective is relevant with training teachers and professors in this scientific field.

The second direction is dissemination of information, knowledge and know-how for SLM. There are also some results in this field.\(^\text{23}\) There are already possibilities to attend national or international seminars and to meet experts in SLM. But all this information reaches only people who are interest and have the possibility to reach those opportunities. And going back to the problems and impediments for SLM it could be drawn the conclusion that there are still many people who do not have such an information. May be because those are elderly people and they live in a distant region, may be they do not have internet access and they have never heard of SLM, so they can’t be interested in something they don’t know. That is the big challenge for this programme, to disseminate the gathered information and knowledge to everybody and in any region and area.

**Strategic Axis IV: Integration and application of the SLM policies on the local level**

As it was already mentioned above, it is not only important to be developed such programmes, but the government realizes, based on his past experience, that the success of such programmes depends on its integration and application on local levels.\(^\text{24}\) The shown strategic axis can be considered more as theoretical part that is being developed on national level, but the practical realization is entirely on local level. In this context is the example later. It explains how this programme influences the working out of general development plan in one Bulgarian city.

The other two direction of this strategic are development, implementation and encouraging of SLM practices from municipalities as well as dissemination of information and training on municipal level which will help to build a capacity to handle with SLM.\(^\text{25}\)

**Strategic Axis V: Improvement of information exchange, engagement and participation of civil society in the decision-making process for SLM**

With this strategic axis the programme tries to involve as many stakeholders as possible.\(^\text{26}\) This should be done through establishment of an internet-based information platform, information on news and events, engagement of media of mass communication etc.\(^\text{27}\) The main attention of the entire programme is to concentrate on the sharing of the information which is already gathered. This is a result due to problems in the past, when the Bulgarian government had already information on many topics concerning SLM, but this information wasn’t used and wasn’t available for larger audience. May be that’s why it is paid such an attention in this programme on accesses to such an information on national, regional and local level.

Further direction of this strategic is the development of network of NGOs in support of SLM practices.\(^\text{28}\) According to the programme the small NGOs should be supported in their activities in the area of SLM, they should be encouraged to participate in national networks, relevant to SLM etc. The last direction is promotion of public-private partnership for implementation of SLM measures.\(^\text{29}\) This is again with the intention to involve more stakeholders and to stimulate practices of SLM. The present National Action Programme for SLM 2007-2013 tries to cover all the issues, all stakeholders and all regions where the integration or improvement of SLM practices are needed. From


\(^{24}\) See loc. cit., p. 82-84.

\(^{25}\) See loc. cit., p. 85.

\(^{26}\) See loc. cit., p. 86-87.

\(^{27}\) See Ministry of Environment and Water of Bulgaria, available at: http://www2.moew.government.bg/index.html


\(^{29}\) See loc. cit., p. 90-91.
the structure of the programme can be considered that those actions are rather theoretical and they have the objective to give only the main directions and some kinds of support. Concerning the above mentioned problems and obstacles in part 2 can be drown the conclusion, that the government realizes those problems. May be that is why it is paid such an attention to the dissemination of the available information and knowledge among any stakeholders and is given special attention to the less developed and unfavourable regions.

The impact and the result of this National Action Programme for SLM are going to be present with an example of general development plan of one Bulgarian city. This has to give a better idea of the real integration and influence of the concept of SLM not only on national but also on regional and local level.

**3.4 General development plan of city of Burgas**

City of Burgas is the fourth largest city in Bulgaria at the moment. It is located between the Black sea and tree lakes. It was a small fishing village, but it has already a long history and now the city of Burgas is an important economical centre because of its location and its sea and air port. Figure 2 shows the present situation in the city of Burgas and figure 3 – the future changes according to the general development plan.

The increase in the population of the city exceeds the prognosis and its specific location cause demand for enlargement of the housing estates around the lakes (see Figure 3, the new brown field).\(^30\) According to the general development plan each one of the new housing estate should be surrounded by parks.\(^31\) The so called “green system” of the city is planned to be a buffer zone between the housing estates.

![Figure 2: Present Situation](http://file.burgas.bg/OUP/Diagnoza_22_03_10.jpg)

![Figure 3: Planed changes](http://file.burgas.bg/OUP/Prognoza_22_03_10.jpg)

The brown colour symbolises housing estate and the purple one production sites. The small red dots are buildings for public service. Only a few green fields, which are parks and gardens, are on Figure 2 mainly in the region called “sea garden”.


\(^{31}\) See loc. cit., p. 7-8.
Figure 4 (see annex) shows an existing park, which was neglected in the last years. According to the general development plan the present planting have to be enriched and the main idea is to be combined the ecological part with sport activities.\textsuperscript{32} There should be built swimming pools, sports grounds, e.g. for skateboard, street ball, basketball, handball, etc. There is also going to be an area with a covered ice rink for ice skating, environmental information centre and environmental centre for bird watching. All the parks in city of Burgas have to have in the future similar pattern and they should be connected through pedestrian and bicycles (figures 5, 6). In the future 17\% of the city’s territory has to be used for this “green system”. Hence the enlargement of the city for this period is going to be 49\% of the new area for “green system” and 51\% of this new area should be urbanized.

Special attention is paid to some areas with rich flora and fauna.\textsuperscript{33} Some of those areas are already protected, e.g. all of the 3 lakes. Their borders on the land are also determined. One very important point is not only the protection of those areas, but also the fact that the further development of the city around them should be done without destroying or polluting them.\textsuperscript{34}

Another main objective of this plan is the reduction of the city’s pollution. The achievement of this objective has to be done by removing the production activities outside the city.\textsuperscript{35} The so called real production should be located on the Nord and West of the city. Inside the city’s area should be only facilities for health centres, shops and catering for daily needs of workers, office buildings and scientific experimental facilities to businesses, garages and parking lots, housing security etc. Hence the purple areas on the both maps remain almost unchanged, but the production areas have different status so that the most polluting production activities are not inside the city (Figure 2 and 3).

Serious problem at the moment causes the constantly increased traffic especially during the summer, because of the specific location of the city.\textsuperscript{36} The main and almost only way to go from Nord coast to the South or from the inside the country to the South is basically through the city (Figure 5). The huge project of reducing the traffic in centre of Burgas is the construction of bridge leading the traffic around the city and over one of the lakes. Its construction shouldn’t affect the natural flora and fauna of the lake. There was a discussion last year (2010) if a tunnel under the lake is a better solution, but at the end the idea of the bridge was accepted.\textsuperscript{37} The reduction of the traffic in the city centre should be also combined with the increased use of sea transport.\textsuperscript{38} For achieving this objective it is intended to be developed the inner sea transportations. The idea is to be reduced the use of land transport and to be accepted and spread sea transport between the housing estates. The reduction of the pollution should be also achieved through the extension of the trolley bus network (bus using electricity, see fig. 7 in the annex).

There is already an approved project of the European programme “Jaspar” for entirely modernization of city transport in Burgas.\textsuperscript{39} The Financing is 49 Mill. Euro, and this includes this extension of the trolley network with 19 km, as well as the purchase of 20 new trolley buses and 100 new buses. The reduction of the pollution is also going to be made by the use of methane (marsh gas) from the new public transport vehicles. This is an earth gas, which can be found in much bigger quantity compared to the petrol for example.\textsuperscript{40}

\textsuperscript{32} See Municipality of city of Burgas b), available at: www.burgas.bg/uploads/72c2f0c52b425627e9be238d9f178654.doc
\textsuperscript{34} See The city, 2011, available at: http://stroitelstvo.info/urban/2011/05/02/1083214_noviia_obshh_uroistven_plan_na_burgas_ochakva/
\textsuperscript{36} See Municipality of city of Burgas a), p. 5-6, available at: www.oup-burgas.org/UserFiles/File/RESUME.pdf
\textsuperscript{40} See Data.bg, 2009, available at: http://news.data.bg/4/economics/54715/%D0%BC%D0%B5%D1%82%D0%B0%D0%BD%D1%8A%D1%82_%D0%BD%D0%B5_%D1%80%D0%B5%D0%B4%D0%B8%D0%BC%D1%81%D1%82%D0%B2%D0%B0_%D0%BD_%D0%B8_%D0%BD%D0%B5%D0%B4%D0%BE%D1%81%D1%82%D0%B0%D1%82%D1%8A%D1%86%D0%B8
It is not as expensive as the petrol and from the alternatives of the petrol, for the vehicle, the methane has the smallest negative impact on the environment. That is why according to that European programme “Jasper” another objective is the construction of methane stations.

In summary the main objectives of this general development plan are to transform the city of Burgas from industrial city, which is at the moment, to ecological and touristic city. The industrial zones are going to be relocated outside the city and the “green system” is going to be a significant part of the city’s territory. The modernization of the present transport system is also priority objective, which includes modernization of road networks and vehicles. Special attention is paid also to the historical and cultural monuments in the city of Burgas, but there aren’t any specific goals at the moment.

All those objectives correspond to the main problems and impediments in Bulgaria. Making the city of Burgas more ecological, more green and more healthy to live in can be used as an attractive tool to keep the people in the city. Hence the higher emigration percent could be reduced because of the conditions in the city. On the other hand those changes could make the city preferable place for companies to open offices and locate their business there, which also means more working places and again that can attract the people to stay in the city.

The discussed impediments for SLM in Bulgaria caused also some problems. The fragmentation of the land as a result of the communist regime hindered the achievements of some objectives. There are still claims of private land owners for ownership of specific territories or areas, but those territories or areas have other statute according to the general development plan. For example such a claims cause difficulties by building some of the housing estates, parks and even the new bridge over the lake. All those claims impede the realization of the general development plan, because their validation has to be determined before the project continues.

The following characteristics of the general development plan of city of Burgas distinguish this plan with already existing general development plans. They can also be evidence that not only the present problems in Bulgaria are considered but more importantly it can be recognized the influence from the strategic axis of the National Action Programme for SLM 2007-2013.

This plan is worked out by the local municipality, which means that part of the national action plan’s objectives are achieved, e.g. the involvement of the municipality in SLM topics, the use of this knowledge by preparation of local plans and by leading the local policy. On the other hand, the general development plan is improvement that the local municipality has the capacity to work out such a plan. Other interesting characteristic is the approval of the general development plan by the Ministry of Regional Development and Public Work. That means that the government is interested of the sustainable development of the city and they can give extra advices for improving the general development plan, because of the larger amount of information, knowledge, know-how etc. they have.

The general development plan of city of Burgas has also become the Environmental assessment by Regional Inspectorate of Environment and Water. That environmental assessment is made concerning the ecological norms and all European environmental requirements. Any scheduled changes are going to be made without endangering human health and they won’t affect the protected areas. Consequently there is an involvement of institutions on local, national and regional level, i.e. coordination and cooperation between the authorities on different levels, which shows the result according to the strategic axis I, IV and V of the National Action Programme for SLM.

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44 See Besove, 2011, available at the internet
Another specific characteristic of the general development plan is the participation of the local institutions and citizens of Burgas by working out the concept of this plan. There was a research among the citizens of city of Burgas between 25 and 40 years how they imagine the development of their city in the next 30 years. Hence their needs, ideas and views were taken into consideration, so another of the strategic axis from the National Action Plan for SLM is achieved, i.e. the local institutions and citizen are informed and more competent about the SML issues or problems and some of them have being involved in the actions by applying that SLM in their own city.

The last but not least characteristic is the expected annual inspection control on the implementation of the plan. That is very important so that all those schedule changes and development don’t stay only on papers (as many of the programmes and plans in Bulgaria which are made, but unfortunately are not realize at the end).

3.5 Summary

According to my research and the presented National Action Programme and General Development Plans, the European regulations for SLM are already part of the national, regional and local policy in Bulgaria. The authorities are trying to follow the approved programmes and plans on each level. There is already a trend of growing interest, meaning and awareness of the need of SLM among government, institutions and citizens.

But this example of general development plan is one of the few examples, because of the big difference between the developments of the cities in the different areas, which influence also the implementation of SLM practices. It is not a secret that the implementation of such a concept for SLM in one developed city is much easier compared to the implementation of those practices in cities and areas without the needed human resources and knowledge. May be that’s why the government plans much more financial resources for bigger city and in addition to that the developed city may work out easily plans so they can become money from other European programmes (like the additional financing for the modernization of the public transport in city of Burgas).

So actually there is also a negative affect from the application of the SLM because the SLM intensify even more the differences between larger and smaller cities as well as developed and not so developed areas in Bulgaria. This cause stronger inner migration to the larger cities, because of the better conditions for living there and increase the number of small towns and villages that become deserted.

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3.6 References


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47 No extensive URL for Cyrillic references
3.7 Annex

Figure 4: Park development plan “Lake”
(http://www.burgas.bg/uploads/38adf0ba8bcafa91549e777b1d7ba139.jpg, 03 May 2011)
Figure 5: Transport System of city of the Burgas region
(http://file.burgas.bg/OUP/Transport_22_03_10_Ob6tiina.jpg, 03, May 2011)
Figure 6: Transport System of city of Burgas
(http://file.burgas.bg/OUP/Transport_22_03_10_Ob6tina.jpg, 03 May 2011)
Figure 6: Public Transport in city of Burgas – trolley bus

Elena Rubtsova

4.1 Introduction

4.2 The development of “New Town Building” in Russia: Yesterday, Today and Tomorrow

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4.4 References

4.5 Appendix

4.1 Introduction

The idea of building New Towns in Russia is not new. However, in comparison with the past where the main purpose was building an industrial city to provide a country with raw materials like steel (for example, Magnitogorsk), today the idea is to provide a new quality of life. The question of the sustainability of new cities is one of the core elements of the future construction of new towns. The focus of this section is to show these steps in Russia. The purpose of this section is to show how the idea of building new towns in Russia developed, how it looked in the past, how it looks today and finally how it will look in the future. Therefore it is important to firstly give the specific characteristics of the country, in order to see what the conditions and the existing problems are. Then, the historical, political and social influence on urban design in New Towns is described. The main part of this research is the analysis of the New Towns: Magnitogorsk (yesterday), Project A101 Moscow (today) and eco-town Pravgorod (tomorrow). The presentation of Magnitogorsk and the eco-town Pravgorod will be shorter, as the aim of this section is to focus on today’s perspective. The section will end with a conclusion to demonstrate whether New Towns meet the high expectations and solve the described problems.

In the context of this section, “New Towns” are defined as “planned communities” based on the definition of Dan Handel, an architect who graduated from Harvard School of Design.48

4.2 The development of “New Town Building” in Russia: Yesterday, Today and Tomorrow

4.2.1 Country Data

Russia is a federal semi-presidential republic. Its capital and its largest city is Moscow. It has an area of 17,075,400 square km and is the largest country in the world. Its population is above 140 million people, and about 73 % of population lives in cities. The Russian Federation is the world's 10th largest economy by nominal GDP or the 6th by purchasing power parity, with the 5th largest nominal military budget. Life expectancy is about 65 years.49 The average per capita income is about 670 €.50


Blacksmith ranks three Russian cities in its ranking of the “World’s Worst Polluted Places”\textsuperscript{51}. This shows that environmental pollution is a major problem in Russia. The Institute for Economics and Peace states that Russia ranks no. 7 of the most insecure countries in the world.\textsuperscript{52} The majority of the population is living in cities due to the difficult economic situation in the countryside and also because of the possibilities available in cities. But the big cities like Moscow are overcrowded, and there are many problems concerning the transportation system, air pollution (CO\textsubscript{2} emissions), etc. Speaking about Moscow, with its population of 11.5 million (or 14.3 million, including the people who are only working there and also approximately 1 million living there illegally)\textsuperscript{53}, Moscow is the largest city in Europe. Moscow has always been the capital of Russia and its largest city. But its growth has been dramatic. Figure 1 shows that the population in 1911, exactly hundred years ago, was less than 2 million people.

\textbf{Inhabitants}

\begin{center}
\begin{tikzpicture}
\begin{axis}[
    xlabel=Year,
    ylabel=Inhabitants,
    xmin=1900, xmax=2010,
    ymin=1, ymax=100000000,
    ytick={2000000,4000000,6000000,8000000,10000000},
    yticklabels={2,4,6,8,10},
    width=\textwidth,
    height=6cm,
    grid=both,
    grid style={line width=0.1pt, draw=gray!10},
    major grid style={line width=0.2pt, draw=gray!50},
    axis x line*=bottom,
    axis y line*=left,
    axis line style={draw=none},
    tick align=outside,
    tick pos=both,
    xticklabel style={anchor=north west,align=right},
    yticklabel style={anchor=south east,align=left},
]
\addplot[black,mark=*,mark options={mark size=3pt},smooth] table [x expr=	hisrowno{0}+1900, y index=1] {data.csv};
\end{axis}
\end{tikzpicture}
\end{center}

\textit{Figure 1: Moscow Population Graph. Source: Siberianlight.net (08.07.2011)}

Since then, the growth of Moscow has been rapid, with the exception of a big drop in population during the Russian Revolution and the Russian Civil War. Since the 2002 census, which recorded the population of Moscow as 10,382,754, the population has grown by an impressive 10.9%. This compares with a drop of 1.6% in the country as a whole over the same period – the population of Russia in 2011 is, according to the census, 142,905,200 people.\textsuperscript{54}

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Many people who live in Moscow have to deal with the specific conditions like a long-distance commute to their jobs. It is also impossible to use a car because of chronic traffic jams. To facilitate this situation was the idea to create a completely New Town in the suburb of Moscow inclusive the whole infrastructure this project will be described in details in part 4.2.4.

4.2.2 Historical, political and social influence on urban design in New Towns

Before the New Town projects are presented, it is important to give an overview of the historical, political and social influence on urban design in New Towns to see the conditions and the existing problems in Russian city development. For international research, Russia is also interesting because historical, political and social changes directly influenced the building of new cities.

Some cities played a strategic role, e.g., during World War II, where they provided the raw materials (e.g., iron ore) the country needed for military purposes. After the Communist Regime, Russia became more open, and if during the Soviet time the International Community had no opportunity for research, now there are more possibilities. During the last Conference of the Institute of New Towns in the Netherlands in November 2010, one of the topics was the development of the New Towns in Russia.

Cities in Russia show specific characteristics that dominate their urban development. The population figures show strong fluctuations. In Russia, many cities shrink, except for Moscow where the population tends to grow exponentially (see figure 1). Across several generations, people have been living in monofunctional apartment neighbourhoods and have worked in industrial areas. The modest income of the vast majority of the people created a mass-housing-only condition. A reduced availability of advanced construction technologies is compensated by the deployment of a low-cost workforce and rough, standardized construction methods.

“The oligarchic organization of politics and society creates a considerable difference between rich and poor, resulting in a tendency towards self-referential and closed-in urban developments.”

In Russia, there are no concerns about land scarcity due to the enormous size of the country and the diminishing population. Of course, that is not the case for Moscow where scarcity of building land is a major problem and site development is nearly impossible.

In Russia, the car is prioritized by the majority of the population as the ultimate status symbol. In many cases these conditions result in monster-cities that show catastrophic profiles in their ecological footprint, transport policy and housing conditions. Still, one cannot say that these cities do not show vibrant urban qualities, which one can see in the centres of Moscow that are highly desired mixed-use areas.

In: http://www.newtowninstitute.org/pdf/101101_readerpolitics.pdf (17.05.2011)

In: http://www.newtowninstitute.org/pdf/101101_readerpolitics.pdf (17.05.2011)

57 Ibid.
4.2.3 New Towns yesterday – Magnitogorsk

The city of Magnitogorsk is a planned industrial city in the southern Ural Mountains, in Chelyabinsk Oblast in Russia. It has one of the largest iron and steel works in the country, Magnitogorsk Iron and Steel Works. The city was purposefully proposed in the first of Stalin's Five Year Plans, and after the site was selected in 1929, its construction began with extreme rapidity.58 (See the image of the city in figure 1 in the appendix).

Magnitogorsk was developed under the leadership of Ernst May, an immigrant from Germany and one of the key figures of Neues Bauen.59 According to original plans, Magnitogorsk was inspired by Gary, Indiana and Pittsburgh, Pennsylvania, at the time the most prominent centres of steel production in the United States. At the beginning of the 1930s, the city was a showpiece of Soviet achievement. By the end of 1930s Magnitogorsk was declared a closed city because of the beginning of World War II, where the city played an important role supporting the military with raw materials. During perestroika, the closed city status was removed.60

Now Magnitogorsk is highly developed, particularly its transport and education system, but also its culture and sports facilities. But some problems still exist and do not seem as if they will be resolved in the near future. Census reports a dramatic decrease of population, from 440,321 people in 1989 to 408,400 in 2010.61 The city was mentioned in the Blacksmith Institute's 2006 survey of the world's worst polluted cities, placed in the report's unranked list of the 25 most polluted places outside the top ten.62 The industry used to emit 650,000 tons of industrial wastes, including 68 toxic chemicals, which polluted some 4,000 square miles of Russia. According to a steelworker, none of the filtering devices were in working condition. The highly increased cancer rates in the city are attributed to severe pollution from dioxides and benzopyrene. There are 460,000 potentially affected people and only 1% of all children in Magnitogorsk are in good health.63 Special measures are necessary, particularly cleanup activities. In 2005, the site was visited by the Blacksmith Institute, which intends to fund health studies and plans to work with the plant to further reduce its pollution levels.

After this short overview of the development of New Towns in the past, the state of the art of city development will be presented in more detail.

4.2.4 New Towns today – Project A101 New Town Moscow

As described above, Moscow has to deal with many different problems, especially the exponential population growth and, as a result of, the dramatic traffic chaos. In order to deal with this situation the Russian government supported the Project A101 master plan, which is built close to Moscow, to relieve Moscow’s tensed capacities. Master planning is an integrated approach to area development that covers all issues related to land use. It regulates key town-planning issues: the layout of the main facilities, land use zoning, housing density, transport development strategy, required infrastructural

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units, and general urban and landscape design concept. MAXWAN ARCHITECTS + URBANISTS, a well known architecture company, have completed the master plan for Project A101 in 2007. The idea of Project A101 master plan is to create a high-quality community in the suburbs, a new and harmonious housing environment within which it is convenient to live (for 320,000 people) and to work (a business park for 100,000 employees) where all necessary social, sporting, cultural and recreational facilities are located within walking distance.

The development of metropolitan areas such as Moscow cannot be stopped, but should be managed. A sound growth plan requires development of nearby lands, the construction of self-sustaining suburbs in areas of high natural quality, with well-developed public facilities and good transport infrastructure. In this aspect Russian city development requirements do not differ from European ones. A well-kept, comfortable, livable and environmentally clean suburb is the natural pattern of development for any European city as well, where suburban dwellings are a fact of life. “The planning and development of new towns and large urban formations has taken on a new shape in post-perestroika Russia.” In the Soviet period, the main focus of city development was to create low-cost, functional and standardized in size and quality mass-housing opportunities. The wishes and needs of the inhabitants were not taken into account. In contrast, the current project features close to 120,000 new homes in a wide variety of types and sizes (See appendix, figure 2). It is also important to mention that in project A101 about 320,000 inhabitants are expected and that the majority of houses will be designed for middle class and high-income people.

The A101 territory stretches between 3 and 23 kilometers’ distance from Moscow and covers 13 thousand hectares. The project is the largest European New Town restarts. A nice side effect of project A101 is the comprehensive and coordinated development of rural regions.

Within the project are plans to build new roads, schools (60), preschools (150), hospitals (2), health clinics (20) and also a university and a large business park of 500,000 m². The implementation of the Project should take between 30 to 35 years. Yet the construction process of the first phase will begin in the near future. Finally it is important to underline that implementing A101 involved both Russian and international companies and is accomplished at the governmental but also commercial level.

To summarize, the project’s four principal components are high quality of life, ecology, accessibility and self-sufficiency. Ecology and accessibility are the most important ones and described in more detail below. The ecological strategy used in project A101 contemplates comprehensive greening of the territory, as well as preservation and enlargement of available habitats. In terms of accessibility it is planned that all residents of this new district will have access to the necessary infrastructure at a reasonable distance.

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4.2.5 New Towns tomorrow – Pravgorod, the plan of a new eco-town

The idea of a new eco-town in Russia came from young architects from the Moscow Architecture Institute, who shared their vision of the future of Kaluga, a city on the Oka River not far from Moscow. The creation of a new residential district for 50,000 inhabitants with a brand new living quality is laid down in the development plan, which has already been prepared. The proposed project site is located on the right bank of the Oka River and is well connected with the city itself and to other areas in the region. Total development area is almost 1000 hectares of unoccupied woodland. The development will actually see a new town built on the proposed site, its urban solution representing an optimum combination of various layouts and functional zones: business centre, innovative technologies exhibition complex, hotel and tourist centre, shopping and entertainment complex, recreation and park zone.

Residential communities will be built using the latest, advanced technologies and the focus will be on the integrated design; some of the larger buildings are designed to look like trees in order to blend in with the surrounding landscape. (See appendix figure 3). There are 1,080,580 sq. m. of residential community planned, thereof 858,540 sq. m. of economy class residential, 58,000 sq. m. of cottages and 164,040 sq. m. for townhouses. The initial-permitting documentation is being gathered by the city administration board, but it needs 100% of borrowed resources and there are 833,000,000 Euros which needs to be attracted to the region.

4.3 Conclusions

Although the New Towns in Russia will be built more sustainable and modern, the concern is that the costs will be too high and therefore these towns will not be available for the majority of people. The economic situation and socio-political conditions in the country should be improved dramatically so new quality of life will be available for the consumers.

From this point of view, less attention should be given to the ecological situation as firstly the quality of life standards should be raised. Also, the development of environmental consciousness is a long-term process. It also should be implemented along with educational and social programmes. Another problem in the country is the population decrease (except in Moscow city) – the reason why New Towns should be planned for the people who in fact will be living there. That is another important point why the social-economical programmes should be developed to improve the overall demographic situation.


Russia is a centralized country. For example, the Siberia region is not really developed and people do not want to live there. This tendency is not new, but has been a trend for a long time. That is why it is difficult to attract investors to this area. The important point is to try to put the regions on one level, to develop not only surrounding Moscow and the central part of Russia but also working in other directions to provide a better quality of life and more opportunities there.

Of course it is difficult to manage such a big country like Russia, but at least something should be done. There is a big potential for development. Regarding projects like A 101, is important to underline that the majority of Russians would be unable to profit from them, except the inhabitants of Moscow and others who would be able to afford it. The aforementioned problems must be overcome before such new cities can be successfully implemented and positively impact urban congestion and the environment in Russia. But planning of such modern New Towns could be the first step on the way to modernize the look of towns in twenty-first century Russia, where the focus also should be on the implementation of new sources of energy.

4.4 References

4.5 Appendix

Figure 1: A steel production facility in Magnitogorsk in the 1930s

Figure 2: The Vision of the A 101
(http://www.maxwan.com/section/projects/pro_typ/all/, 11.07.2011)

Figure 3: Idea of Pravgorod by D. Frolova
(http://www.greenhomedesign.co.uk/new-eco-town-in-russia-pravgorod/, 04.06.2011)
5. Transportation in Land-use planning in Lithuania

Dovile Stanaityte

5.1 Introduction

Transport is of fundamental importance to human society, providing mobility and facilitating industry and trade. About 5.4% of the EU labour force work directly for the transport sector including 1.4% who work for vehicle manufacturing. The transport sector contributes about 4.0% to GDP. Another 1.7% is added to GDP by manufacture of transport equipment and 1.6% from sales, maintenance and repairs of vehicles. 13.6% of household spending is on transport. The sector is therefore of considerable economic importance (European Commission 2009).

However, the transport sector is not only beneficial, it contributes highly to environmental and social costs. Transport has negative impacts on climate change, noise, air, water, and soil pollution. The transport sector produced 23% of world energy related CO₂ emissions in 2004, with 74% coming from road transport (IPCC 2007). Additionally, transport causes chronic delays and congestion as well as thousands of lost lives on the roads every year.

Transportation problems are mounting up in Lithuania due to lack of planning, lack of obligations and laws in regard to transport planning, increasing motorisation level, etc. This section discusses transport planning in Lithuania and introduces a relatively new concept of Mobility Management which can be integrated into land use planning and contributes to solving mobility issues by “soft” measures like information and communication.

The section is divided into four parts. First general information about Lithuania is provided in Subsection 5.2. Subsection 5.3 outlines the land use planning in Lithuania. Subsection 5.4 analysis transport planning systems in Lithuania and the obstacles it faces. The following Subsections centre on sustainable transport and mobility and investigate how Mobility Management could be integrated in the land use planning in Lithuania. Finally conclusions as well as strengths and limitations of this work are provided in Subsection 5.5.

5.2 General Information about Lithuania

The total area of the Republic of Lithuania equals 65 300 km². The latest population census was carried out in March – May 2011 and thus preliminary estimated population of Lithuania is 3,054,000 (the final data by Statistics Department will be published till June, 2013). According to the Law of the Republic of Lithuania on the Territorial Administrative Units and Their Boundaries (1994), the territory of the Republic of Lithuania is comprised of 10 counties (apskritis in Lithuanian) and 60 municipalities (savivaldybe in Lithuanian) (figure 1).
Each county covers 5-8 municipalities. In most cases one municipality administrates the territory of one district, except seven biggest cities that are administrated by separated municipalities. Every municipality is divided into up to 23 local authorities (seniunija in Lithuanian).

Figure 1: Counties and municipalities in Lithuania (Statistikos departamentas 2010)

The biggest city in Lithuania is its capital, Vilnius, with the 539,000 inhabitants. In each municipality of the five major cities (Vilnius, Kaunas, Klaipeda, Siauliai and Panevezys) live more than 100,000 people, which make up more than half (59.6%) of the urban population or almost 40% of the national population (Statistikos departamentas 2010).

5.3 Land Use Planning in Lithuania

Territorial planning is a set of procedures in order to develop a given territory with respect to space. The Law of the Republic of Lithuania on the Territorial Planning (1995 Chapter 1, Article 2) defines territorial planning as

the established procedure for setting the overall spatial concept of territorial development, land-use priorities, for establishing environmental, cultural heritage protection and other conditions, for developing land, forest and water areas, residential areas, developing the system of production and infrastructure, regulating the employment of the population, establishing the rights of legal and natural persons to activities in the territory.

After Lithuania regained independence in 1990 the “Temporary Rules of Planning of the Territories” were adopted in 1993. Preparation of Territorial Planning Law started in 1994 and it came into power in 1995. The Law of the Republic of Lithuania on the Territorial Planning (1995: Chapter 1, Article 4) distinguishes three main types of territorial planning (Figure 2):

1. General territorial planning.
2. Special territorial planning.
3. Detailed territorial planning.

The General Plan (GP) covers all areas like land use, landscape, social infrastructure, transport and engineering systems, etc. Special plans (SP) cover only particular areas, for example SP for cycling routes, SP for regional parks or SP for big shopping centres. Detailed Plans (DP) are made only for a specific site, with the aim to receive a building permission.
According to the size of the planned territory and the level of specification of the solutions, the territorial planning has to be implemented at four levels (Figure 2):

1. National level: the entire territory of the State (GP and SP are prepared);
2. Regional level: parts of State territory which differ by administrative (counties), principled functional commonality (GP and SP are prepared);
3. District level: parts of State territory which differ by administrative (counties), specific functional commonality (GP and SP are prepared);
4. Area level: land parcels or their groups (SP and DP are prepared) (The Law of the Republic of Lithuania on the Territorial Planning 1995: Chapter 1, Article 4).

The right to initiate different land use planning documents lies with different ministries, administration of counties and municipalities. For example, general territorial planning has to be organised by the Ministry of the Environment, the county governor and the director of the municipality administration. Depending on the level and type of territorial planning, the Government, the Parliament (Seimas in Lithuanian), institutions authorised by the Government, and county governor to municipal council are obliged to approve the territorial planning documents.

In addition to territorial planning documents, the strategy documents are important for the planning; for example, the Long-term (until 2025) Development Strategy of the Lithuanian Transport System and the Lithuanian Strategy for Sustainable Development. Strategic planning documents can cover particular issues such as sustainable development or can be prepared for particular areas like the Vilnius City Strategic Plan.

The planning documents in Lithuania have to follow the subordination principle. The Law on Territorial Planning and regulative acts are the most important ones. Then national documents and county plans serve as frameworks for planning in municipalities or local levels. The aim of each document is to elaborate the superior document. This implies that

— general plan of Lithuania is prepared following national strategies,
— counties plans have to obey general plan of the country and various strategies and
— plans of municipal level should analyse deeply all documents prepared and to detail or (and) complement its solutions (Project MAX 2007).
5.4 Transport Planning in Lithuania

The situation with regard to transport planning in Lithuania is rather chaotic and has no strict rules. Although, the relationship between planning documents mentioned earlier is clear, this does not apply to transport plans. Transport planning is not statutory and there are no transport plans at any level – national, regional or local. Some feasibility studies might be prepared for the issues related with transport planning but they do not have document status and often are not considered during the planning process.

Because of the strict subordination of documents, ridiculous situations may arise. All planners have to obey the national plan and strategies that were prepared earlier. In the report of the project MAX (2007), in which the integration of sustainable transport and land use planning was analysed, the following example is discussed. If the national programme like “Maintenance of roads network in Lithuania” has taken effect and a planner wants to design a new road in district or town level, in many cases he or she will not be allowed because construction of this road was not indicated in the superior national programme. Even if a need for this road or bicycle path is analysed and proved, the only thing the planner can do is to recommend a new road after the programme has expired.

In the project MAX (2007), another and even bigger problem was identified with the municipality or local level documents. In this case the subordination should again play the main role. However, here time when a document was prepared has the highest power. This means that a document prepared earlier is always better than the one which is done at present. For example, if an institution has implemented a special plan for forest management and now a planner wants to prepare a general plan for the same district, the solutions of previous plans cannot be questioned even though the general plan is a more important document than the special plan. For instance, if the special plan states that there should be forest in some area, it is not allowed to plan a road even if at present this would be the best solution for the district.

The last problem is related with finances. When the government prepares the annual budget, money is provided only for projects planned in national plans. Therefore, when a plan in the municipality level is complemented by, for example, water infrastructure of a new area, the municipality has not been provided with the budget for that. A solution could be private investments but it is not easy to attract them to invest and usually they are interested to provide necessary infrastructure for their own purposes (Project MAX 2007).

It is obvious that changes to institutional and governance frameworks in Lithuania are necessary. The modification in policies and laws is a long process, whereas issues of transport planning require immediate improvements as transportation problems are summing up. For example, the number of passenger cars in Lithuania every year is steadily increasing; it exceeded the average number of personal cars in European Union already in 2006 (Figure 3). In order to improve transport system and decrease the motorisation level, the next subsections focus on sustainable transport and mobility in Lithuania. Consequently, not so-called hard measures (e.g., new roads and new public transport routes) but soft measure (e.g., communication and mobility awareness) are analysed in Section 0.
The EU-27 motorisation level in 2009 was 473 cars per 1000 inhabitants; the highest motorisation level in EU in 2009 was in Luxembourg (660) and the lowest in Romania (198) (European Commission 2009)

5.4.1 Sustainable Urban Transport and Mobility

National Strategy for Sustainable Development in Lithuania was approved by the Government in 2003. In September 2009, the Government adopted a new version of the said strategy. The long-term objectives of the National Sustainable Development Strategy of Lithuania for the transport (2003: para.167) are the following:

*to coordinate development of all types of transport by giving higher priority to the transport with lower negative impact, increase energy efficiency of transport sector and use of alternative and more environment friendly fuels, reduce environmental pollution and input into the global climate change, and increase traffic safety, while establishing economically effective transport system.*

All levels of the government pay attention to sustainable transport policy. However, they understand the policy differently as they are interested only in the issues in their level. The paradox is that even though national strategies and policies declare to provide sustainable transport in the whole country, land use planning documents stop shortly at planning new parking site, wider streets or new public transport stops (Jauneikaite & Burinskiene 2008). Transport system as a general issue is accordingly left without comprehensive attention.

Since this section discusses the integration of Mobility Management approach into land use planning, it is important to mention the issues promoting mobility, mobility awareness and environmental friendly transport declared in the Long-term (until 2025) Development Strategy of the Lithuanian Transport System (2005). The basic goals related to sustainable urban transport are to make passenger communication conditions more ecological to motivate people to choose alternative communication ways, modernise and improve infrastructure for non-motorised transport, create systems of cycle paths and footpaths in towns and other settlements that would increase sustainable transport usage. The main issues with regard to sustainable transport and mobility awareness are presented in the implementation measures of short-term objectives for transport: to prepare programmes for urban public transport modernisation and development of a network of bicycle paths; to prepare and implement public ecological education programmes, which promote broader use of public and biological transport; to implement active regional policy based on sustainable development principles, to strengthen administrative capacities of regional institutions in the field of sustainable development.
Unfortunately, national policy is declarative but not working, i.e. there are no clear mechanisms how to implement and monitor tasks named in national policy. Therefore, a concept of Mobility Management is introduced in the following which helps to raise mobility awareness and use of sustainable transport by integrating Mobility Management into land use planning.

5.4.2 Concept of Mobility Management

Mobility Management (MM) is a concept to promote sustainable transport and manage the demand for car use by changing travellers’ attitudes and behaviour. At the core of Mobility Management are so-called soft measures like information and communication, organising services and coordinating activities of different partners that often enhance the effectiveness of so-called hard measures within urban transport (e.g., new tram lines, new roads and new bike lanes) (Project MAX 2009a).

Mobility Management was introduced by the project MAX (Successful Travel Awareness Campaigns and Mobility Management Strategies), the largest research project on Mobility Management within the EU’s sixth framework programme. The project ran from 2006 till 2009. Now MAX project continues to be pursued by EPOMM-PLUS (European Platform of Mobility Management - Partners Learning Urban Sustainability), a three year project running from 2009–2012. The EPOMM-PLUS is supported by the EU in the frame of the Intelligent Energy for Europe’s (IEE) STEER-Programme. The platform focuses on Mobility Management and assists to integration of MM in national transport policies by transferring good practices and supporting local pioneers by developing national networks (EPOMM-PLUS 2011).

In the Project MAX guidelines for the integration of Mobility Management with land use planning (2009b), the following Mobility Management measures are outlined:

- parking management,
- infrastructure for cycling, walking and public transport,
- new bus services,
- advertising and promotion to encourage site users to take alternative modes.

An important precondition to achieve success with Mobility Management is that early in the planning process, when land use plans are made, local authorities ensure that new development will be sited in locations where a choice of modes is available.

Mobility Management measures often focus on specific sites like a shopping centre, office or stadium. The idea is to implement Mobility Management measures in the building permission since it is commonly required when a site is changed or a new is planned. The building permission involves negotiations between the site developer and public authorities that can be used to secure Mobility Management measures for the site before it opens and when it is in use. This is important as customers have to consider and decide how to get to the site and what mode to take, when they go for the first time. This is the moment when they are most open to try new alternatives. After that, they start to establish a habit and it is much more difficult to change this habit later on (Project MAX 2009b).

In Lithuania information or promotion campaigns are not related to the implementation or reconstruction of an infrastructure. These activities are carried out by non-governmental organisations like cycling clubs or environmental and health departments of municipal planners with the aim usually not related to changing travellers’ attitudes and behaviour (Gauce 2009). The example of Mobility Management carried out in Lithuania are “European Mobility Week” events and campaigns organised in almost every municipality and weekend cycling tours organised in Vilnius.

At the moment there is only one example of Mobility Management implementation in Lithuania. Supermarket chain MAXIMA has built a new shopping centre MAXIMA BAZE in the suburbs of Vilnius in 2000. The shopping centre is still in the boundaries of Vilnius City Municipality, but the distance from MAXIMA BAZE to the nearest resident area is around 5 km and to the city centre
around 10 km. Since it could be reached only by private car, the owners decided to have a free bus from Vilnius centre to the shop. Building of a new site was object for negotiations but more information about agreement between developer and municipality is not available. As far as it is known, there were no special requirements related to MM from the public authorities - the developer took the decision to implement one of the Mobility Management measures in his initiative (Project MAX 2009b).

Unfortunately, by now this is the only available case in Lithuania and as far as it is known it was owners’ decision. At the same time, it would be possible to implement Mobility Management in Lithuania but at first some changes in the laws are necessary. At present there is no obligation to make an additional transport or Mobility Management plan before getting a permission to build. Municipality might give conditions, for example, to provide a bus lane or reconstruct existing parking, but it is not fixed in any law – it is a subject of negotiation between developer and municipality.

5.5 Conclusions

Land use planning in Lithuania is very structured; the Law of the Republic of Lithuania on the Territorial Planning and regulative acts are the most important documents for the territorial planning. Besides them, national policies (e.g., National Strategy for Sustainable Development, the Long-term (until 2025) Development Strategy of the Lithuanian Transport System) supplement the planning process. However, these strategies are more declarative and do not provide with the information for implementation and monitoring tasks named there. Territorial planning has to be implemented at four levels – national, regional, district and local and it is classified into three main types – general, special and detailed territorial planning.

The situation of transport planning in Lithuania is different than of land use planning. Transport planning is not statutory in Lithuania and there are no plans at any level. There is a lack of framework conditions, obligations and laws that impede transport planning. Laws have to be modified and this basically depends on the political willingness.

Since there is an increasing demand for new solutions due to transport problems, in this work a relatively new management tool named Mobility Management was analysed. It seeks to promote sustainable transport and raise traveller’s awareness by implementing Mobility Management measures in the building permission. It is still a very new concept in Lithuania but in general Mobility Management would be possible. For example, Mobility management and sustainable transport issues in Lithuania could be solved in special plans for transport systems in certain territories.

The limitation of this work is that it discusses only one land management tool. The outlined impediments of transport planning in Lithuania rather limit the planning system, and in the first place some changes in laws are necessary. To conclude, at present the transportation planning in Lithuania faces many problems mainly because of the lack of laws that need to be changed. Mobility Management measures have been implemented only presumably even though they are subject of negotiation between developer and municipality at the moment.

5.6 References


6. Does the European Green Capital Initiative give impulses to scale up the 'Green City Approach'?

Carola Bass

Abstract
Today three out of five Europeans live in cities. In the future even more people will be living in cities and will affect urban land use and play therefore a vital role in the development of European regions. Urban areas concentrate most of the environmental challenges facing our society but also bring along commitment and innovation to resolve them. Cities of the future must be created today - and at the same time sharpen the view for change in society and culture. 'Green Cities' are not only focusing on urban greenery, rather it is a holistic approach where the urban area has to be in a balanced harmony with its environment, society and economy.

Hamburg is currently European Green Capital, awarded by the EU Commission and will be presented by a case study. The European Green Capital award is a new annual competition which aims to provide an incentive for cities to inspire each other and share best practices and rewards efforts regarding urban environmental challenges by selecting each year a European city as the European Green Capital of the year.

Keywords:
Green City, sustainable urban landscape management, European Green Capital Initiative

6.1 Introduction
6.2 Green Cities
6.3 The European Green City Index
6.4 The European Green Capital Initiative
6.5 Case Study: Hamburg
  6.5.1 Hamburg is European Green Capital 2011
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  6.5.7 Urban Development and Living
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6.6 Conclusions
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Abbreviations used in this section

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>CO₂</td>
<td>Carbon dioxide</td>
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<tr>
<td>EFILWC</td>
<td>European Foundation for the Improvement of Living and Working Conditions</td>
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<td>EGCA</td>
<td>European Green Capital Award</td>
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<td>EGCI</td>
<td>European Green City Index</td>
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<tr>
<td>EIU</td>
<td>Economist Intelligence Unit</td>
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<td>EU</td>
<td>European Union</td>
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<td>GDP</td>
<td>Gross domestic product</td>
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<tr>
<td>IBA</td>
<td>International Building Exhibition (Internationale Bauausstellung)</td>
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<td>IGS</td>
<td>International Garden Show</td>
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<td>UN</td>
<td>United Nations</td>
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6.1 Introduction

Today three out of five Europeans live in cities and their agglomerations, and cities play a vital role in the development of European regions. By 2020 even more people will be living in cities and will affect urban land use (Engelke et al. 2010). The increase of urban areas in Europe occurred at different levels, the largest urban land expansion in Europe started in the 1950s. During the 1990 and 2000 land consumption by urban areas together with urban infrastructure took place at a higher speed than population increase, resulting in urban sprawl and high environmental costs (Vancutsem 2008).

Since more than two third of the European population live in cities, and cities have a great impact on global warming because of high CO₂ emissions, there exist a high concern about natural resource management and the consumption of land. European cities are confronted with considerable high challenges and risks like demographic and economic change, environmental pollution and urban sprawl. In addition more space will be required for housing, logistics and industrial development. Increasing urbanization can negatively impact everything from the availability of arable land and green spaces to potable water and sanitary waste disposal facilities. These challenges have to be addressed and it is clear, that cities must be part of the solution.

This section provides a short declaration of the 'Green City Approach' and the results of two European City ranking scores: The 'European Green City Index', developed and published in 2009 for the UN Climate Change Conference in Copenhagen, as well as the 'European Green Capital Initiative' introduced in 2010 by the European Commission. It then presents a case study by the city of Hamburg, European Green Capital winner of the current year 2011, to show a successful management approach. Finally, the last subsection presents a conclusion to the research question: Does the European Green Capital initiative give impulses to scale up the 'Green City Approach'?

6.2 Green Cities

Green Cities are often associated with the solely establishment of urban greenery. In fact there exists no official definition of so called Green Cities but an overall conformity that a Green City comprehends more than just the mere increase of green spaces in the city. Firstly ‘urban greenery’ emerges in further occurrences like improved air quality, reduced noise pollution and positive effects on the mental and physical well-being of urban dwellers. And secondly the results of urban greenery indeed act as a carbon sink but without tackling all aspects concerned, like urban mobility, water consumption, water and waste management, resource protection and CO₂ pollution, cities will not ameliorate climate change impacts on the urban environment.

Rather it is a holistic approach where the urban area has to be in a balanced harmony with its environment, society and economy and where the government is accountable and transparent to its people and works with the people through a participatory process. According to the 'Leipzig Charter
on Sustainable European Cities', new approaches like Green Cities should be built on holistic strategies and coordinated action by all persons and institutions involved in the urban development process (European Commission 2008). It is becoming obvious that challenges in urban areas go beyond governmental regulations and need therefore a multi-level coordination where all stakeholders will be involved. Cities need both, a top-down approach defining overall objectives, and a bottom-up approach, that allows sufficient flexibility for local actors to develop strategies according to their needs. Urban land use management needs an integrated action plan with public participation in decision-making processes.

To make cities greener different landscape management, action plans or planning tools can be applied. The European Green Capital initiative e.g. aims to provide an incentive for cities to inspire each other and share best practises, while at the same time engaging in friendly competition. Whether or not this initiative gives impulses to scale up the Green City Approach will be analysed in the following. On the one hand it will be compared to another European city index and on the other hand a case study will provide a closer look on how and if cities contribute as impulse transmitter to scale up the Approach.

6.3 The European Green City Index

The European Green City Index, published by the Economist Intelligence Unit (EIU 2009), measured the current environmental performance of 30 major European cities, as well as their commitment to reduce their future environmental impact by their objectives. The methodology was developed by the Economist Intelligence Unit together with an independent panel of urban sustainability experts. This index differs from other studies in the fact that it is independently researched, rather than being dependant on voluntary submissions from city governments. This index covers either political or business capitals from 30 European countries. The European Green City Index analysed cities using the following eight categories:

- CO₂ emission,
- buildings,
- energy,
- transport,
- water,
- waste and land use,
- air quality,
- environmental governance.

Additionally, thirty individual indicators are applied; sixteen of them have been derived from quantitative data, e.g. the amount of energy it consumes, and fourteen indicators result from qualitative assessments, e.g. their commitment to consuming more renewable energy. The table below shows the top five and the lowest-ranking cities in the European study, out of the total of 30 cities.

<table>
<thead>
<tr>
<th>top-ranking cities</th>
<th>lowest ranking cities</th>
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<tr>
<td>1. Copenhagen, Denmark</td>
<td>26. Zagreb, Croatia</td>
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<td>2. Stockholm, Sweden</td>
<td>27. Belgrade, Serbia</td>
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<tr>
<td>3. Oslo, Norway</td>
<td>28. Bucharest, Romania</td>
</tr>
<tr>
<td>4. Vienna, Austria</td>
<td>29. Sophia, Bulgaria</td>
</tr>
<tr>
<td>5. Amsterdam, The Netherlands</td>
<td>30. Kiev, Ukrain</td>
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Source: European Green City Index 2009

Highlights of the index
Which results of the study can be drawn? Nordic cities dominate the index top tier. All the least ranked cities are located in either the former Soviet Union or in former Soviet-controlled Eastern European countries. The difference between the overall highest ranking city, Copenhagen (87) and the
lowest-scoring city, Kiev (33) is substantial. There is an obvious correlation in overall scores between wealth and a high score rating. The following graphic (see figure 1) shows this correlation. In the appendix you can find the ranking of the European Green City Index including all 30 cities (figure 4) as well as the ranking done by each of the eight categories with the ten best results (figure 5).

Figure 1: Link between wealth and environmental performance (EIU 2009)

Awareness of environmental protection in Scandinavian cities has been strong for years, which is reflected in the cities’ ambitious climate targets. Copenhagen, for instance, aims to be carbon free by 2025. In Scandinavia GDP per capita is above average, and these rich countries have invested enormously in environmental protection. Besides the lower gross domestic product, Eastern European cities also have historic burdens, including the lack of attention paid to environmental protection during the communist era. An additional specific burden is high energy consumption in buildings and outdated infrastructures (Bono et al. 2006).

An independent report from the European Foundation for the Improvement of Living and Working Conditions (EFILWC) yielded a high correlation between voluntary participation and a city’s environmental performance (Figure 2). This study also provides in-depth city portraits which not only explain the challenges, strengths and weaknesses of each city, but also identifies best practise and innovative ideas that others might apply. The index also enables for comparisons across cities clustered by a certain criteria, such as income group or geographic region.
The index was presented at the UN Climate Change Convention 2009 in Copenhagen to enhance the understanding and decision-making abilities of urban environmental development performance, from individual citizens, environmental non-governmental organisations through to leading urban policymakers. This index/study is provided to encourage European Cities to take part of the solution to tackle climate change and other environmental challenges.

6.4 The European Green Capital Initiative

The European Commission has long recognised the important role that local authorities play in improving the environment, and their high level of commitment to substantial progress and launched therefore in 2008 the European Green Capital Initiative. This initiative has conceived to promote and reward efforts regarding urban environmental challenges by selecting each year a European city as the European Green Capital of the year. The European Green Capital award is given to a city that "has a consistent record of achieving high environmental standards, is committed to ongoing and ambitious goals for further environmental improvement and sustainable development, can act as a role model to inspire other cities and promote best practises to all other European cities" (European Commission 2011, p. 1).

The award scheme is open to the 27 EU Member States, candidate countries and European Economic Area countries. All EU cities with more than 200,000 inhabitants can apply for the European Green Capital Award. City applications are assessed by the following ten environmental criteria:
  — local contribution to global climate change,
  — local mobility and passenger transport,
  — availability of green areas open to the public,
  — quality of local ambient air,
  — noise pollution,
  — waste production and management,
  — water consumption,
  — waste water management,
  — sustainable management of the local authority,
  — sustainable land use.
Since 2010, a European jury annually awards a city that is leading the way with environmentally friendly urban living. Some 35 cities applied for the 2010 and 2011 awards. Eight finalists were shortlisted (in order): Hamburg, Stockholm, Münster, Amsterdam, Freiburg, Oslo, Bristol, Copenhagen. Stockholm was announced as the first European Green Capital in 2010, and Hamburg for 2011, even though it had higher scores than Stockholm. In the Appendix you can find the ranking as well as the evaluation of all applied cities.

6.5 Case Study: Hamburg

The city of Hamburg, with a population of about 1.8 million people, and home to 4.3 million inhabitants in the metropolitan region, is a major industrial centre which faces many metropolitan and environmental challenges. It is Germany's second-largest city after Berlin, and the metropolitan area covers 19,801 km². Hamburg has the third largest port in Europe and is the third largest aircraft manufacturer in Europe. It hosts over 500 industrial firms, has a high proportion of foreign residents (13.5%) as well as a high GDP (2010: € 88.3 billion) with a growing population rate (Hamburg Green Capital 2011).

6.5.1 Hamburg is European Green Capital 2011

Hamburg is not yet an eco-paradise but the city is actively finding ways to combine industrial activity with a high standard of living for inhabitants. It brings together many comprehensive approaches, policy commitment and the necessary funding needed to resolve them. On the whole, it has an integrated and participative planning and a strong green vision. The city of Hamburg approaches all aspects of European environmental policy, ranging from climate protection and improving air quality to water management and nature conservation. The EU Commission awarded on 23th February 2009 Hamburg as the Green Capital of Europe 2011.

"Hamburg, the winner 2011, has shown major achievements in the past years and at present, has also achieved excellent environmental standards across the board. The city has set very ambitious future plans which promise additional improvements." (European Green Capital 2009a, p. 12 - the conclusion of the jury to award Hamburg the title of European Green Capital)

For the application of the award, Hamburg selected six topics to show the way towards a Green City with a sustainable future:

- Climate & Energy
- Sustainable Consumption,
- Mobility
- Nature & City Greenery
- Resource Protection & Economy
- Urban Development & Living

Many key projects of these topics were highly valued on the occasion of the award. This chapter shortly mentions Hamburg's effort regarding each of the categories and describes some major pioneer projects. All information is based on Hamburg's application data as well as on their website (www.hamburggreencapital.eu).

6.5.2 Climate & Energy

As an industrial centre with a growing population, Hamburg has set itself ambitious climate protection goals such as reducing its CO₂ emissions by 40% by 2020 and 80% by the year 2050. Wise use of natural resources, coupled with an innovative policy for ‘Responsible Growth’, has helped to make the city an example of environmental best practise. CO₂ emissions per person have already been reduced by about 15% compared to 1990.
Hamburg has almost tripled its use of renewable sources in the last 12 years, and the metropolitan region has been a pioneer in wind energy since the early 1990s. Hamburg’s Climate Protection Programme helps the city to reduce its carbon footprint by 0.7 million tons of carbon per year and the city invests up to €22.5 million a year in these measures.

6.5.3 Sustainable Consumption

True to the motto ‘From the Region for the Region’ started Hamburg a pilot project with restaurants, schools and retail stores to encourage the use of regional products. The city has also begun to build a network of business partners and prospects committed to the regional initiative.

6.5.4 Mobility

Hamburg has achieved good environmental standards and high performance in terms of cycling and public transportation. Nearly 100% of citizens have access to public transport within 300 meters.

The city’s StadtRAD metro bikes

Since 1984 Hamburg increases its bicycle traffic (see figure 3), and the city has now 1,800 km of cycle paths. In July 2009, a new initiative, the ‘StadtRAD’ bicycle scheme was introduced. A network of 71 stations around the city, with 1000 bikes and 53,000 registered users. The city’s StadtRAD metro bikes are free for the first half hour. This initiative due to its success will expand by the end of the year, this will mean 500 more bikes and 40 more stations. (Note: base year 1984 = 100%).

Further projects are: new suburban and underground train lines to HafenCity and airport, introducing environmental zones.

Figure 3: Development of Bicycle Traffic at Hamburg’s Cycle Count Locations 1960 – 2010 (Hamburg’s application data 2009)

6.5.5 Nature & City Greenery

Hamburg is impressively green in comparison to other European cities of similar size, with over 16.7% of the urban area given over to forests, parks and green spaces. Water covers a further 8%, contributing significantly to the city’s recreational opportunities. 89% of the city’s inhabitants live within 300m of a park. The basis of Hamburg’s urban planning is to extend the City’s greenery and prevent utilisation of existing woods, agricultural land and green spaces.
Hamburg's pioneer project 'Greening the motorway'
A combination of green area and noise reduction is Hamburg's pioneer project, the so-called 'Hamburger Deckel'. This pioneering scheme is about 'Greening the motorway'. The impressive covering forms part of the extension of the A7, a motorway which goes through Hamburg West. A 25 hectare green area will cover the motorway and will so add more parks and green spaces as well as city gardens. This project does not only reconnect fragmented natural environments and districts, it also cuts noise pollution for nearby residents. The construction of the project will last until 2017.

6.5.6 Resource Protection & Economy

Industrial companies invest some € 45.8 million a year in measures to care for the environment. Of this, € 24.1 million goes towards water protection. In total, the enterprises currently save 134 000 tonnes of CO2 emissions every year. The business community is an important stakeholder towards becoming a green city and has considerable contributions to make. Hamburg addresses this challenge and has already founded different initiatives. Hamburg’s first eco-partnership scheme dates back to 2003. This partnership, a joint venture between local government and the commercial sector, encourages companies to take additional eco-friendly actions. It also serves as a platform for information and networking, the local government also offers free consultancy for firms based in Hamburg. A significant partnership programme, called ‘Enterprise for Resource Protection’ encourages voluntary investment in increasing energy and resource efficiency. Already about 1000 projects are completed. In 2010, Hamburg launched a further initiative: the Environment Partnership Project 2011. Companies are taking part in additional voluntary environmental efforts, with support from the city. This initiative has already over 80 partners.

Urban Development and Living

Over the last 30 years, Hamburg has switched its extension policy away from greenfield development, which creates urban sprawl, more infrastructure, roads and traffic, and destroys landscapes and natural habitats, to regenerating brownfield urban areas. Hamburg's urban planning drives for an inner city consolidation by the development of vacant sites and by adding floors.

A green network for the city

Hamburg’s landscape planning policy is to link residential allotment, parks, leisure and sports areas, playgrounds and even cemeteries, to allow people to travel on foot or by bicycle, without coming into contact with traffic. Therefore the city structure is based on a 'Green Network'. The green network covers the whole city, forming a link between urban parks and playing fields from the outskirts to the city centre.

The HafenCity

The Hafencity, Europe's largest urban development project, promotes inward growth by brownfield recycling. The former port and industrial area is transformed into a lively inner-city district (area of 155 ha), with a mix of residential units, offices, retail businesses and recreational and cultural facilities. The Hafencity will extend the present city centre of Hamburg by 40% within a time period of about 20 years. The plan envisages around 5,500 residential units for up to 12,000 inhabitants, more than 45,000 jobs and thousands of daily visitors. In spring 2011, the Hafencity had already become home to 1,500 people, with around 7,200 working in the district (Hafencity Hamburg 2011). The projects stands for a high degree of urbanity combined with the highest standards in sustainability. For instance, underground parking in flood-proof building basements thus saving on ground surface, outstanding and special accomplishments in construction of green buildings have been certified with the Ecolabel. The mix of different uses, including housing, work, commerce, gastronomy, culture and leisure space, leads to high efficiency and low-carbon spatial interaction.

Besides the Hafencity project, Hamburg has further projects regarding inward urban development: the ‘Leap across the Elbe’ and the ‘IBA’ International Building Exhibition 2013 that will be held in conjunction with the igs International Garden Show. Both events will take place mainly or completely in Wilhelmsburg. Hamburg is putting a lot of efforts in the socially disadvantaged district
Wilhelmsburg. With the project 'Development Plan for the Centre of Wilhelmsburg' Hamburg plans to upgrade the district and provide an identity for the geographical centre of the district. The International Garden Show, which will take place in 2013, creates a 100 hectare park in the centre of Wilhelmsburg.

6.5.8 Public Participation
Involving citizens, local businesses and other stakeholders is an important part in Hamburg’s efforts becoming a greener city. The city of Hamburg has several initiatives to address people participation. Hamburg also offers a participation platform for individual events put on by citizens. The city also tries to reach the younger generation and organises this year in September the first Environmental Youth Summit and invites local youth throughout Hamburg and Europe.

6.5.9 Spread the 'Green City Approach'
Throughout the year of 2011, Hamburg offers special events like regular changing exhibitions, discussion rounds, excursions and environmental tours which offer visitors the opportunity to see more of the city’s green practises. Furthermore it launched numerous awareness-raising campaigns to help people get to know their ‘green capital’. Info Pavilion are spread all over the city and wider regions. The city of Hamburg also developed a “train of ideas”, which travels around Europe to carry green thinking to other European cities. Seven wagons of the train are used as an interactive exhibition and lead visitors on an educational journey, from urban dwellers, experts and politicians to students and other visitors. The exhibition shows Hamburg’s best practises as well as environmental solutions from other cities.

6.6 Conclusions
This section aimed to give a comprehensive understanding of the Green City Approach as an urban landscape planning concept. Furthermore the section tried to analyse if the European Green Capital Initiative give impulses to scale up the Green City Approach. The European Green City Index (EGCI) was presented to compare the European Green Capital Award Initiative with another competition/ranking concept. Differences can be already drawn from the results of these two rankings. According to the EGCI Copenhagen is the greenest major city in Europe, but the city occupies only the 7th position in the European Green Capital Initiative. Hamburg is not even included in the EGCI due to other city data application regulations. The EGCI only covers 30 main cities - either political or business capitals - from 30 European countries, whereas the European Green Capital Initiative is open to all European cities with a population above 200,000 inhabitants. The index also differs from the Initiative in the fact that it is independently researched, rather than being reliant on voluntary submissions from city governments. Furthermore the indicators of the both ranking systems as well as the evaluation process are not conform.

Besides the differences, there exists also some congruency among the results of the cities' performances of the both ranking systems. They have in common that Nordic cities predominate the indices top tier. Both rankings indicated a strong correlation between wealth and a high performance in the index. All cities on the first ten positions have a GDP per head above the average. This result is however not surprisingly because wealthier cities can afford environmental expert manager and can for instance invest more money in energy-efficient infrastructure. The correlation between citizen engagement and environmental performance was identified in the EGCI analysis as well as by the European Commission. People participation is already being considered in the selection process of the European Green Capital Award (EGCA).

The European Green Capital Initiative shows a strong long-term vision, since the award is be given each year to a different city whereas the EGCI was developed for the UN Climate Conference in Copenhagen and has not been repeated until today. The annual competition for the EGCA is open to all European cities with a population above 200,000 inhabitants. Both characteristics contribute as a impulse transmitter to scale up the Green City concept in Europe. Especially the initiative attaches
high importance to provide an incentive for cities to inspire each other and share best practices, while at the same time engaging in friendly competition and increases innovation in this field.

However a critical acclaim has to be mentioned. On the one hand the EGCA indeed enables the possibility that all big European cities can participate and not only the capital of each country, which enables to spread the approach on a larger scale. On the other hand the application procedure is dependent on the submissions from committed city governments, plus it can also result as a high burden due to time, efforts and costs cities have to spend. Overall the comparison of the two indices infers that, even though both rankings where published on a high attention level, the EGCA gives higher impulses to scale up the Green City Approach due to a wider time horizon, its application procedure and its considerable contribution to share best practises to all other European cities.

The case study presented in in subsection 6.5 has shown how the City of Hamburg approached the Green City Concept and got awarded as the European Green Capital of 2011. Hamburg, as the current European Green Capital, illustrates that the Green City approach is not just building more parks in cities or helping companies making solar panels but rather a series of small steps regarding the city's environment, economy and society and requires co-operation at all levels – citizens, industry and science. The exchange of ideas and solutions is very necessary to increase the Green City Concept on a larger scale. Hamburg has shown that communication is a key to raise awareness among citizens and visitors and for being an effective role model.

Hamburg’s 'train of ideas' brings the green capital message even to other European cities and shares its innovations and best practises with other urban dwellers. The train plays a large part in securing to spread the message and to scale up the 'Green City Approach' and is therefore a big impulse transmitter.

The European Green Capital Initiative is a way of encouraging more cities in Europe to participate in establishing best practices and finding solutions (downstream effect). Thereby, the winning cities like Stockholm and Hamburg serve as role models and motivate other cities to follow (cross boarder influence). And the competition with a voluntary submission process enables a bottom-up approach that allows flexibility for local actors and city governments to develop and implement strategies according to their needs (upstream effects) as well as an healthy race to create greener living conditions.

However there are also some negative aspects which have to be mentioned. The index (see annex fig. 5) shows along the 35 applicants mostly only Western European Cities. One problem has been a lack of funding. Furthermore, cities in Eastern Europe have a tougher challenge to overcome, in terms of their relatively aged and inefficient infrastructure as well as their lower GDP. In conclusion the European Green Capital Award act as an inspiration and source of ideas for its own citizens, and for other cities and contributes to further progress in transit-oriented urban development. There is however a need to work on new financial perspectives and a better access to structural funds that all European cities can drive towards a Green City Approach. To turn the Green City Approach into a wider European reality will be a challenge for the future.

"Working together and exchanging good practice is the only way that vision will become a living reality." (Janez Potocnik, European Commissioner for the Environment)

6.7 References


Economist Intelligence Unit (EIU), 2009, European Green City Index - Assessing the environmental impact of Europe’s major cities, London.
Hamburg Green Capital, 2009, Hamburg’s application data.

### 6.8 Appendix

#### Figure 1: Ranking of the European Green City Index (EIU 2009)

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Figure 2: Overview of evaluation of 35 applications for the European Green Capital Award of 2010 & 2011 (European Green Capital 2009b)
7. Sustainability in French Land Management through the EcoDistrict Concept

Inès Joubert-Boitat

7.1 Introduction

7.2 The French town planning and its evolution
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Abbreviations used in this section

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<td>EHPAD</td>
<td>Centre for Housing Elder and Dependent people (<em>Etablissement d’Hébergement pour Personnes Agées et Dépendantes</em>)</td>
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<td>DATAR</td>
<td>Inter ministries delegation for territorial planning and regional attractiveness (<em>Délégation Interministérielle à l’Aménagement du Territoire et à l’Attractivité Régionale</em>)</td>
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<td>PDU</td>
<td>Plan for Urban Mobility (<em>Plan de Déplacement Urbain</em>)</td>
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<td>SEA</td>
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<td>ZAC</td>
<td>Concerted Planning Area (<em>Zone d’Aménagement Concertée</em>)</td>
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7.1 Introduction

In the traditional way of thinking, density is opposed to environment conservation and sustainability. From this point of view, sustainable development could only be found in the countryside, far from concentration and pollution sources. Density and sustainability are thus likely to appear as antithetical and can yet be associated (Riley, 2010). Density refers to high concentration and urban sprawl as an evolution. To sustain itself, a city has to integrate this unavoidable trend in its planning. Thus the construction themselves and the organization of cities have to be thought in a long-term perspective. Regarding resources management as well, dense areas have a high potential. Energy management for instance shows it greatly: heating and air conditioning in buildings circulate through the other apartments before getting away through the roof, as opposed to individual housing. Consequently, buildings help to regulate the temperature of neighbouring apartments, reducing overall energy use (Owen, 2008).

Density and sustainability are rather combined than opposed. The necessary step further is to see density has an opportunity to develop sustainable projects since the potential in dense areas is high. On the other hand, the awareness on environmental degradation is growing as well as the role of urban areas in it. The incentives from the public and private spheres are growing which have helped the development of the “Ecological District” (EcoDistrict) concept. It refers to a specific district planning responding to precise requirements, in the perspective of sustainability. To what extent EcoDistricts can serve as keys for future sustainable urban planning, and how the concept can be applied and extended? France lately showed great willingness to develop this concept through original initiatives.

After presenting the French approach regarding land management and town planning, the recent procedures and initiatives which are more and more related to sustainability will be identified. One of them is the encouragement for EcoDistrict development. In a second part this concept will be theoretically explained. The notions related and the several implications will be presented before a more concrete illustration will be given. This will be done in the last part through the presentation of the case study “ZAC de Bonne” in France. This content will help to emphasize the relevance of the concept and thus its relevance for sustainable urban planning.

7.2 The French town planning and its evolution

7.2.1 French town planning background

Compared to other European countries, France has a long history of territorial planning. A ministry called Eugène Claudius-Petit emphasized the importance of this notion in 1950 with the following quotation: “the territorial planning’s goal is a better repartition of human settlements according to the natural resources and economic activities” (Claudius-Petit E., 1950). After the Second World War, socioeconomic progress and spatial specialization were driving terms which were expected to bring economic growth and social well-being. However, little attention was given to the environment and the resources management. It is only during the 1990s that the physical aspect of the territories has been more seriously considered. Since the “Voynet law” implemented in 1999, the policies for territorial planning integrate indeed a sustainable approach. From now on, the environmental issues should be considered in territorial plans for socioeconomic development. The creation of an environmental comity in 2007 called “Grenelle de l’environnement” is the last step symbolizing the integration of the environment into territorial planning. By formulating standards and laws against environmental degradation, France is progressively appearing as an ecofriendly planning country.

78 Eugène Claudius-Petit was minister for the reconstruction and town planning in 1950. His book called “For a National Territorial Planning” has been a founding text for the French planning policies during the following decades.
79 Page number unknown
Parallel to this evolution, two opposed trends regarding land management occurred and even had been reinforced lately. On the one hand, the French planning can be characterized by a strong “top-down” approach. The main directives are formulated by the State and applied by the municipalities through laws, regulations and budget. The other element which reinforces the top-down approach is the growing role of the European Union. The European “regional policy”\textsuperscript{80} consists in common directives which are applied to the members, promoting a harmonized development.

However, the local level represented by the municipalities follows these directives while adapting to local particularities. The decentralization occurs thus on a power perspective with more responsibilities given to the small scale. Furthermore, this trend appears also through a territorial decentralization. France is well known for its extremely centralized system turning around Paris. In 1963 already, an inter-ministries delegation for territorial planning called DATAR\textsuperscript{81} was created putting the basis for a progressive decentralized planning. Since then, attempts have been made in order to empower the other French cities and hence harmonized the country. Even though municipalities have to respect the European and French directives, they can nowadays elaborate their own planning directives. Besides, they integrate progressively a sustainable approach.

### 7.2.2 The current procedures for land use towards a sustainable urban development

Nowadays, every plan which is likely to change the land use at any scale has to respect the norms established by the SCoT (Scheme for territorial cohesion)\textsuperscript{82} and the PLU (Local plan for town planning)\textsuperscript{83}. A sustainable approach is included within these two tools through numerous considerations concerning territorial development (PUCA, 2008). Established at an inter-municipalities scale in 2001, the SCoTs are master planning plans assuring the coherence between the numerous municipalities’ plans. This cohesion must appear in the domains such as transportation or water management.

Municipalities elaborate development plans called PLU which have to fit with the SCoT of the region. This document establishes a project of planning that fixes the general rules of land use on the territory considered. It is composed of a report on the past situation, past changes, the current situation and the present land uses (e.g. urban areas, areas that should become urban, agricultural areas and forest areas). When it is judged necessary, the PLU can be modified in order to improve on a sustainable perspective. It occurs through different types of modification procedures taking more or less time. Considering that a PLU is likely to have direct and/or indirect effects on the environment, the plan is subject to an environmental assessment.

In both SCoT and PLU relies a PADD (Planning and sustainable development)\textsuperscript{84} which gives the main directives for the sustainable public policies. In each domain presented in the following points relies specific plans which have to fit the PADD:

- Housing where the main directives are formulated in the PLH (Local housing plan)\textsuperscript{85};
- Water management with the SAGE (Plan for planning and water management)\textsuperscript{86}, and SDAGE (Master plan for planning and water management)\textsuperscript{87};
- Environmental directives (scheme related to the sea, scheme related to natural regional park and national park) (MEDDTL [1], 2010): general directives are formulated aiming at a good balance between the inevitable urban development and the necessary environmental protection (MEDDTL [2], 2010).

\textsuperscript{80}Also called “policy for economic, social and territorial cohesion”, this policy is a sub-section of the Single European Act (SEA) signed in 1986.

\textsuperscript{81}Délégation interministérielle à l’Aménagement du Territoire et à l’Attractivité Régionale

\textsuperscript{82}Schémas de Cohérence Territoriale

\textsuperscript{83}Plan local d’Urbanisme

\textsuperscript{84}Projet d’Aménagement et de Développement Durable

\textsuperscript{85}Programme Local d’Habitat

\textsuperscript{86}Schémas d’Aménagement et de Gestion des Eaux

\textsuperscript{87}Schémas Directeurs d’Aménagement et de Gestion des Eaux
Energy management: regarding CO₂ emissions, the PADD through the SCoT and the PLU imposes strict rules regarding energy efficiency (MEDDTL [1], 2010).

Transportation and traffic with the PDU (Plan for Urban Mobility) which is a jurisdiction coordinating town planning and transport planning, giving more rooms to alternatives to avoid car use. However acting on the means of transportation is not sufficient: a re-thinking of the town and its organization are also crucial which is supposed to be added by the PADD.

Urban development: a good balance should be found between restrained urban development, urban renewal and conservation of natural spaces (MEDDTL [1], 2010).

Economic development,

Recreation spaces,

Eventually, further developments are made on specific projects taking place within the town such as a ZAC (see subsection 7.4).

Other deepenings towards sustainability are constantly formulated, encouraging seriously densification and presenting new major considerations for the future (i.e. the Scheme for Ecological Coherence and the Territorial Plans for the Climate). Outside the strict procedures, there exist also original incentives organized by the government which are presented in the following part.

7.2.3 The governmental incentives for ecological projects

With the numerous and increasing environmental degradations, the awareness regarding the climate change and environmental emergencies is growing. The recent incitation made by the French president Nicolas Sarkozy proves it: a new committee dealing with environmental issues was formed in 2007 called “le Grenelle de l’environnement”. The main actors for sustainable development are gathered together so as to establish several directive frameworks within each domain related to sustainability. Representatives of the government, associations of professionals and/or NGOs focus thus on policies and laws formulation, and initiatives inducement, all linked with sustainable development. After discussions, public consultation, propositions, laws and commitments are adopted. The outcomes of this comity are laws formulation. Grenelle I was framed in 2009 and one year later, an update was already formulated: Grenelle II which deepens the commitments of the first version. Among those established in 2008, one deals with the development of “EcoDistricts” (Ecological districts) which is a new approach relying on local sustainability planning. Since the government wants to encourage local initiatives, each French city should develop at least one district classified as an “EcoDistrict”.

Although the aims of such project are numerous, it was initially introduced to struggle against any kind of environmental degradations. This does not only imply the development of green spaces within the urban frame but also efficient resources management to guarantee the quality of life of the inhabitants as well as the quality of the environment. Since it was recognized as well that urban development has numerous implications in the social and economic spheres, the implications of the EcoDistrict concept deal consequently with social equity and economic dynamism. In 2008, the comity Grenelle concretized the incitation for sustainable urban development by the organization of a competition: cities voluntary to participate should present a specific and elaborated EcoDistrict project. This first competition has met a major success since 160 projects were presented when only 50 were expected. Consequently it has been re-initiated for the year 2012. For this new version, the government wants to enhance the organization by promoting the exchange of knowledge and experiences on one hand, with reunions among the participants of the first competition and the ones of the second. Another innovation is the creation of certification which guarantees the quality of an EcoDistrict.

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88 Plan de déplacement Urbain
89 “Ecoquartiers”
The label will not be a strict list of norms which could fix a standard model for EcoDistrict. Rather, it is supposed to emphasis the driving lines of the national objectives regarding sustainable planning. By doing so, the government aims at spreading the incentives of development of such project through the country. To clarify this incentive, the concept of EcoDistrict is in the following part presented.

7.3 The EcoDistrict Concept

7.3.1 The particular scales of the EcoDistricts

An EcoDistrict is constituted of several buildings built ecologically according to specific types of construction and management. The first step in the development of EcoDistrict project is thus the elaboration of green buildings pattern with the necessary technologies, local – if possible -, natural and/or recycled materials, and sustainable management plans. However, “ensuring that one building is ecofriendly is not enough, focus and improvements have now to be done on a neighborhood scale”; the next step is thus to “[think] outside the buildings” (Fulton & al., 2011, :1). The innovations should then be expanded to the district-scale to constitute an EcoDistrict and finally to a city-scale to build a sustainable city. The sprawl is necessary to scale up and move toward high-performance neighborhoods and city.

Looking closer to the constituents of an EcoDistrict reveals the same approach of scaling up. A sustainable water management for instance requires a strategic cooperation between - at least - the regional and the local levels. Infrastructures for water treatment or for retention basins cannot be developed solely at the EcoDistrict scale. From this perspective, the development of an EcoDistrict project can participate as well to the enhancement of the city’s and the region’s infrastructures and have therefore a broader impact. The waste management has the same implications: an efficient system of sorting will not be applied only to the EcoDistrict but rather expanded to the entire city. The development of infrastructures such as collections of sorted wastes is indeed not financially viable if only applied at a district level. On a long term period, such a project is thereby extremely likely to have broad repercussions on its surroundings and a virtuous circle can thus take place encouraging investment in the rest of the territory. The combination of scales participates indeed to the enhancement of the level of equipment and the type of management. However such a phenomenon would appear solely in the case of a great integration of the EcoDistrict within its space. Complementarity is here a key notion that town planners have to keep in mind (PUCA, 2008). An EcoDistrict should not be self-sufficient; otherwise its development will takes place within a bubble. An EcoDistrict is indeed not a notion referring to a unique district scale. Its efficiency depends on the buildings scale for its components and the city one for its dynamic and integration. Then, the combination and deep imbrication of these scales into system thinking are key elements for success and sustainability.

7.3.2 EcoDistrict in a system thinking

Due to the multiple dynamism, interactions and actors that constitute an EcoDistrict, its representative model would be a complex system. There is a “need to understand the relationships between disparate elements of the larger social system” and it appears that “the connections and relationships are more important than the elements themselves” (Hallsmith, 2003, p. 1). It is thus important to understand the city as a system and investigating the subsystems which constitute it. This understanding influences directly the successfullness of the EcoDistrict integration. A system is constituted of nodes and links between these nodes. The 3 main components in an EcoDistrict system are the buildings, the infrastructures and the people – meaning choices and behaviors -. The linkages are various and all aim at sustainability. And because of these considerations in the planning, the EcoDistricts need a multifaceted approach for its design. The three components of an EcoDistrict are all crucial and interdependent⁹⁰ (Fulton & al., 2011).

⁹⁰A study from the Oregon Sustainability Centre on Portland State University’s Campus has showed a great example to illustrate the interdependence between these components: a goal of net zero energy could be reach through about 70 percent efficiency - of buildings systems, façade… -, but the 30 last percent remains in occupant behavior.
A great particularity of EcoDistrict is that the system developed is often a renewal. The project can indeed be developed and implemented in already existing neighborhoods. A typology concerning the potential land for EcoDistrict encompasses lands already urbanized, brownfield lands, urban renovation areas, fragmented areas with low density or urban spread areas (Bobroff, 2011). Strategies are therefore very different when it takes place with already existing infrastructures, buildings and sometimes with people who have already a dynamic of living and working in a community.

Numerous stakeholders take therefore part in this system and constitute the governance of an EcoDistrict. Building in an ecological way requires adequate governance, that is to say a true consideration of the various stakeholders already during the conceptualization of the project (Bobroff, 2011). The awareness of the necessity of such district development should be shared by all. The largest participation as possible is crucial in order to maximize the efficiency and the sustainability of the project, when the construction will be finished as well.

Then, the long term approach in system thinking is a key for success, true integration and sustainability (PUCA, 2008). However this approach is not always considered in town planning. In reality the first stage of planning composed of the elaboration of a plan and its realization is often the solely one treated. Whenever the construction is finished, the programme has therefore succeeded according to the town planners. However the cycle is far from being finished. Indeed it is rather the second stage which matters: how this construction will evolve? That asks concretely about the evolution of the inside dynamics into an EcoDistrict system and about the integration into the larger urban system. The major part of such planning begins actually when the construction is finished (Bobroff, 2011).

7.3.3 Implications of the EcoDistrict concept

The idea of EcoDistrict is that green technologies and a combination of architecture and planning can create socially, economically and culturally sustainable neighborhoods. The goal is to enhance the quality of life while preventing any kind of environmental degradation directly and indirectly (Riley, 2010). The several domains considered in planning are hence: natural environment and resources management (water, energy and waste management), economic activities, social environment, urban development, transportation, and finally infrastructures and recreation.

1. Implications regarding the environment

The urban development has always appeared as made in detriment of the nature. Urban sprawl takes place on initially natural land and has always been opposed to the conservation of nature. Yet the presence of humankind is not the problem in itself: nature and civilization are not opposed concepts anymore and could be conciliated (PUCA, 2008). Planners have understood the importance of the environment within the city. On one hand this green aspect is considered in EcoDistrict planning by the integration of green spaces, i.e. parks, vegetation on the walls, etc. While ecosystems often lake in urban spaces, they can here develop. Another major issue in urban areas is the absence of water infiltration caused by floor impermeability. According to urban ecology, the floor waterproofing accentuates the risk for flood and drought. That’s the reason why construction of roads and pavements should be done in certain way that infiltration is possible. Finally environmental planning is a success when monitoring is then guaranteed (e.g. reports on environmental impacts of the various activities, pollution measures and limitation, etc.) (PUCA, 2008).

The other task of urban ecology concerns the resources management. Firstly, it exists several ways to influence the environmental impacts of buildings construction. The goal is to minimize its footprint and that takes places within several domains: an efficient energy management, water management and waste management. The most important change regarding energy and resources consumption is to reduce the demand of energy flow and resource flow. For that green buildings are crucial as well as change in inhabitant’s behavior toward an ecological one (Fulton & al., 2011).

Even though EcoDistrict are firstly based on urban ecology thinking, “objectives are broader than just preserving physical resources. It attends human well-being as well” (Fulton&al., 2011, p. 2).
2. **Economic dynamism**
EcoDistrict development is the creation of a lively and diversify place boosting new economic and commercial dynamism. Since the area is not meant to be restricted to housing, town planners have to stimulate investments and create the opportunities for added value generation. Job creation can be helped by the construction of offices, shops and services within the district. The next step is to generate networks (PUCA, 2008) and in order to enlarge these networks, the district should not be complete and obligating the inhabitants and workers to go in the surrounding districts. Consequently, the economic integration would be successful.

3. **EcoDistricts as a social change**
Enhancing the quality of life is made by the creation of a social environment. That takes place by deepening the neighborhood mixed-up and socially diverse (Riley, 2010). The creation of an EcoDistrict is, among other tasks, the response to demographic growth and here relies the opportunity to create social and inter-generational mixes (PUCA, 2008). Since individual dwellings do not participate and even hinder these mixes, EcoDistrict aims at developing this aspect by offering housing with both high and low rents, for students, families and elderly people.

4. **Struggle against urban sprawl**
Despite the large array of negative impacts leaded by individual housing – e.g. urban sprawl, space fragmentation, etc. (PUCA, 2008) -, EcoDistrict’s goal is not always to hinder any kind of individual dwellings since satisfying the largest part of the demand is a key tool to reach sustainability. However EcoDistrict goes mostly along the concept of urban concentration and struggles against the fragmentation of the build area. Renovation of districts and rehabilitation of already existing buildings are made in the perspective of an internal urban growth as opposed to an external one. Incentives have thus to be made in the renovation of vacant buildings instead of new construction. However the growth of dwellings outside the urban centre is not the unique source of urban sprawl since infrastructures sprawl incite it as well. Therefore urban development has to be carefully structured (PUCA, 2008).

5. **Transportation**
Since transportation is also a mean for enhancing quality of life, the challenge relies in reconciling quality of life, environmental protection and accessibility. Here again EcoDistrict have great potential since the individual dwellings increase the dependency on cars, which goes along the increase in fuel consumption (PUCA, 2008). “The other major reason density leads to sustainability is that it is necessary to support a public transportation infrastructure” (Riley, 2010, p. 2). With high population density, car’s congestions are highly likely to appear. Therefore the ridership for alternative means of transportation is sufficient so as to develop a public transportation system. Density is indeed a great opportunity for sustainable transportation system development. On the other side, the concept of “soft transport” is also developed since it promotes any non-motorized transport. It refers therefore to pedestrian, bicycle, roller skate and skateboards which are all alternative to car use. This sustainable mobility optimizes urban livability by keeping the individual right to move (La Rocca, 2010). And while assuring the right to mobility, planning should be done in the view of reducing the need to move by the functional mix in the district. This approach is developed through the concept of “small distances”: housing, offices, shops and services should be developed in a restricted area (Riley, 2010). Alternatives to car use ask also for efficient public transport system with bus, trams and/or subways.

6. **Infrastructures and recreation**
A crucial point in the planning of an EcoDistrict is the capacity of the inhabitants to appropriate the space. Thereby they are not only spectators of the programme but take part of the system and become actors (PUCA, 2008). Infrastructures and recreation (such as playground for children or cinema for students) can help for that. Besides the children evolving in this area will later decide for the future of the space including the reversibility of the infrastructures and services according to the new needs. Knowing the main characteristics of an EcoDistrict, a case study is now presented making this concept more concrete.
7.4 Case study: ZAC de Bonne in Grenoble, France

7.4.1 Overview of planning in Grenoble

Grenoble is a French town located in the south east of the country close to the Alpes. The three massifs in the surrounding have several impacts and make the particularity of the city. On one hand it places the city in a bowl; an important characteristic which has to be considered especially when planning has to deal with pollution. The thermal amplitude during the day and the year are relatively high which makes the energy efficiency crucial. Finally seismic risk does exist in this region and have to be considered in the construction. On the other hand the localisation makes low the land availability. Grenoble is indeed the 3rd most dense city in France with 160 000 inhabitants living on 1 800 hectares. While urban development faces many constraints and challenges, town planning appears thereby as crucial (Bobroff, 2011). After the Second World War, Grenoble faced a major demographic and economic growth. While at that period physique expansion appeared as inevitable and needed, the approach today used is the opposite one: concentration and functional maximization of the space are nowadays driving notions (Bobroff, 2011).

7.4.2 Background on the elaboration of the project “ZAC de Bonne”

Initially owned and used by the French army until the 1990s, the city had at its disposal a new vacant area located in the city centre (see fig. 1). The potential of this land was massive and the need for its planning thus crucial. Moreover due to its central location showed by the map above, the land was by this time connected to 3 different tramways lines (SEM SAGES, 2009). Its accessibility was already high which would help the future integration of a new planning. In 2000 Grenoble started to have a closer look at this area, developed opening projects and decided to put it under the appellation of a ZAC (Concerted planning area)\(^\text{91}\). This planning procedure is initiated by a public initiative and later transferred to public and private users. The purpose is to plan or to provide public and/or private equipment (housing, shops, industries or services) to an area build or not. The elaboration of a ZAC must be made in collaboration during the entire process with all the stakeholders involved - authorities, inhabitants …- . This procedure is especially useful for large scale and complex project (CCI, 2005).

![Figure 1: Localisation of ZAC de Bonne in Grenoble (DeBonne, Grenoble)](image)

Then, the European tender initiated by Concerto in 2003 has accelerated the process of project elaboration since the possible contribution of money in case of success would be considerable. The positive response later on from this commission has thus helped to finance a large part of the scheme.

\(^{91}\text{Zone d’Aménagement Concertée}\)
5 years later, while the renovation and construction were already advanced, Grenoble has won the competition organized by the French comity “Grenelle de l’Environnement” (cf. I.3) which has helped to bring other funds. The construction ended at that period and rapidly new workers and inhabitants investigated the spaces. Nowadays, ZAC de Bonne is both dynamic and an ecofriendly district that one could get inspired by for innovative projects (see fig. 2).

![Figure 2: Land use plan for the EcoDistrict ZAC de Bonne, Grenoble (PUCA, 2008)](image)

### 7.4.3 Objectives

The first driven target of this project was to use the area potential while responding to growing needs. On one side because of the inexistent economic dynamism money was lost. And one the other side, the city has to face constantly demographic growth which goes hand by hand with the growth of infrastructures, services, transport and recreation demands. It has then appear as a great opportunity to develop an original plan which would reconcile urban density, social mix, accessibility, environmental protection and thereby quality of life (SEM SAGES, 2009). The aim was accordingly to maximize diversity and efficiency within the new district. It should not reach yet self-sufficiency which would hinder the necessary integration for sustainability.

Through this project, an intention relied also in governance renewal. The project has indeed been elaborated and is maintained today thanks to a large participation of all the stakeholders. Therefore partnerships with the several builders and the architects (housing planners, energy ingeniers …etc) as well as public participation were intended to be promoted. Thanks to this approach, all the interests were likely to be considered during the planning process (PUCA, 2008). By experiencing a new approach of “sustainable urban development”, Grenoble attempted to become an exemplary planner regarding environmental, economic and social strategies.

### 7.4.4 The planning process

The EcoDistrict has been elaborated through 3 main tracks: environmental issues, quality of life and accessibility.

#### 1. Reconciling density and the environment

Resources management is considered as a pillar of an environmentally friendly approach. It deals mainly with energy, water and waste management and aims at minimizing the environmental impacts. Regarding the energy plan, the efficiency was planned to be reached through:

- Energy efficiency itself, with the cogeneration of both heat and electricity with gas (when heat and electricity are generated separately, the losses are higher); the spread of renewable energy and especially the solar one with photovoltaic panels (1m² per dwelling; 1000m² on the
shopping building’s roof; 430m² on the roof of the “positive energy office”) (SEM SAGES, 2009).

— Buildings’ energetic efficiency developed thanks to an adaptation of the construction to the seasons (SEM SAGES, 2009):
  
  • During winter, with a new generation of isolation\(^{92}\) for both the walls and the windows and efficient heat system;
  • Specific architecture such as longer roof and covers, greenhouses and efficient air circulation, for summer - air conditioning has not been installed -;
  • Differentiation of the size and position of the windows according to the sun orientation.

The city acts also in the public spaces by saving electricity in the public lighting. Thanks to these innovations, Grenoble can respect the consumption’s standards established by the comity “Grenelle de l’environnement” (50kWh/m²habitable/year for heat; 20kWh/m²habitable/year for hot water; 10kWh/m²habitable/year for electricity). Since water treatment was already implemented in the region, focus regarding the water management has been made mainly on salvaging rain water.

The efficiency of the waste management appeared firstly through the recycling of old materials for some part of the new constructions and renovations. During the renovation, 90% of the materials coming from the destroyed buildings were re-used within the EcoDistrict itself. It is estimated that approximately 10 000 truck travels have been avoided (PUCA, 2008). On the other hand, waste generated every day is sorted. However the efficiency of the waste treatment as well as the water treatment depends rather on the municipality’s and region’s systems than the district’s one. Then the change in behavior toward less wasteful ones, were and are still encouraged by sensitization conferences (SEM SAGES, 2009).

For the environmental protection the stakeholders have secondly decided to introduce a green landscape architecture through the following points:

— 40% of the district are green spaces through parks for instance as showed in figure 3;
— vegetation on the roof and the walls;
— struggle again impermeability of the urban ground and acting for more infiltration of the water.

Figure 3: Green spaces within the EcoDistrict ZAC de Bonne, Grenoble (PUCA, 2008)

2. Reconciling density, social mix and quality of life

The second task of EcoDistrict deals with social environment. While providing sufficient housing and services, planners should ensure a great diversity within the district as well. As Figure 2 shows, the

\(^{92}\) The more spread isolation type is implemented inside the construction. Yet, it does not prevent efficiently the loss of heat (process called “thermic bridge”). To counter that, isolation has to be developed on the façade and through specific windows (with several layers with metallic oxide so as to reflect heat loss).
land use of this area is highly heterogeneous. This diversity appears through several aspects: social mix, inter-generational mix and adequate services and recreation infrastructures for each subgroup of the population.

Housing is the first and main driver for diversity within a space. It has been proved in ZAC de Bonne through the following points (SEM SAGES, 2009):

- Among the 900 dwellings built, 40% are so-called “social-dwellings” (with a rent adapted to lower-income);
- An EHPAD (centre for housing old and dependent people)\(^93\) for 80 people;
- 2 student buildings hosting 200 students
  The other infrastructures built respond also to the population’s needs and enhance additionally their well-being:
- A school - with 15 grades -
- A cinema
- A swimming-pool
- 20 shops and 7 restaurants
- A large parking under the shops
  This functional diversity was even broadened with the creation of an economic centre constituted of 5000 m² intended for offices, various stores and 2 hotels (SEM SAGES, 2009).

3. **Reconciling density and accessibility**

Since ZAC de Bonne is located in the city centre of Grenoble, the integration in its urban surrounding was possible but also crucial. As explained above, it depends on the district’s functions; what interests can be found by the other districts in the new one, and vice versa. In addition to that, incorporation is largely determined by the accessibility. The challenge relies in the combination of this necessary accessibility with the crucial environmental protection. As the EcoDistrict was already surrounded by 3 lines of tramway, the planners did not have to develop an entire public transportation system but just to improve it. The other focus was rather made on avoiding the car circulation within the district. The challenge was hence tackled by an extreme limitation of the use of the car: circulation roads are narrow - as Figure 2 shows it-, few spaces are designated to car circulation and speed is limited to 30km/h (zone 30). The promotion of “soft transportation” in parallel induced the construction of bicycles lines, large pavements and entire pedestrian streets.

Nevertheless accessibility concerns also the convenience inside the infrastructures especially for the people with limited mobility and handicap people. That’s why no steps in the public spaces and within the different infrastructures were constructed as Figure 4 shows it (SEM SAGES, 2009).

\(^93\)French meaning: Établissement d’hébergement pour personnes âgées dépendantes
7.4.5 Today's results and dynamism

The balance sheet of the project highlights the necessary improvements that should be done regarding especially the buildings’ isolation (SEM SAGES, 2009). Nonetheless this project is a great success vis-à-vis the construction itself and the inside dynamism. The national price won in 2008 and the impacts on larger time and space scales prove it:

— The development of green spaces within the urban areas
— The integration of solar panels in the new constructions
— The integration of extern isolation in the new constructions.

Figure 5: Proportion of solar panels in the new construction, in Grenoble between 2005 and 2008 (SEM SAGES, 2009)

Figure 6: Proportion of new generation of isolation taking into account in the new constructions in Grenoble between 2005 and 2008 (SEM SAGES, 2009)

The figure below proves the large influence observed the last years on the rest of the city. The spread of the technologies and ecological landscape architecture has been successful.
7.5 Conclusions

Urban areas have always been nests of environmental degradations and socio-economic problems. The actual awareness on these issues emphasizes the need for improvements. That can only take place though innovation concerning ecofriendly buildings and changes in behaviors, both organized by a sustainable town planning. The future of urban development relies in the concept of EcoDistrict and should therefore be seriously considered as key for current urban planning. Since it is at its infancy, cities such as Grenoble are still considered today as experimental places. However this new approach is expanding rapidly.

So what should be done to encourage EcoDistrict development? Since the technology needed exists already, the incentives rely mainly in the willingness of the population. It comes into view through project elaboration, governmental financial aids and policies. The quintessential component for EcoDistrict spread is thereby the institutionalization of the concept. However the implementation of such projects faces numerous impediments including principally conflict of interests and financial issues. Since large governance is crucial, the number and types of interests are numerous and make the project tricky to realize and sustain (Fulton & al., 2011). The project elaboration can also be highly time-consuming when compromises have to be found. But this stage is fundamental since the satisfaction of all stakeholders’ interests is the key for sustainability. A second barrier could be a financial one since the elaboration of such project with the technology involved is likely to be costly. Here relies though a great opportunity for public-private partnerships so as to gather significant amount of money to finance and maintain large infrastructure systems (Fulton & al., 2011).

Despite these constraints, large EcoDistrict developments are surely possible. The French government has shown his willingness as well as private actors who can find financial interests. From this point of view it is realistic to expect multiplication of EcoDistricts on the French territory in the coming years.
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III. Landscape Management

1. The Potential of Permaculture for European Land-Use Planning

Jannis Lambert

1.1 Introduction

Sustainability is one of the key aspects that are to be considered in today’s land use management. Planners and developers in both industrialised and developing countries face manifold challenges with respect to environmental problems such as pollution, soil degradation, and biodiversity loss. In an equal manner, ill-conceived or over-exploitative land use practices often also entail negative social consequences. Over the last decade, the necessity to prevent such harmful impacts on the environment and society has been increasingly recognised by planning authorities and was implemented into many programmes. Various tools, such as environmental impact assessments, vulnerability analyses, or the zoning of nature reserves have been developed to integrate environmental and social considerations into land use and landscape management. While these measures certainly contribute to bring about more sustainable planning results they do not represent a comprehensive answer to current problems.

The attempt of the European Union to build an overarching framework of sustainable land use management is still in its fledging stage. Various strategy papers are directed at a sustainable management of land use, amongst which the ‘Territorial Agenda’ and the ‘Leipzig Charter’ are arguably the most relevant. Both documents identify a number of aims and general directions and show that the European Union is aware of the problems. However, this section will argue, that in spite of aiming at a fundamental reorientation of land use management, the current EU approach remains within the lines of conventional planning procedures. This is problematic, as the conventional planning approach can be seen as a factor contributing to or even causing current environmental problems. To quote Albert Einstein: “We can’t solve problems by the same way of thinking we used when we created these problems” (Calaprice 2005).
For this reason, it is worthwhile to have a look at alternative approaches and guidelines that may complement or enhance the current land use management approach of the EU. One of such alternative approaches is the concept of permaculture, which originates from the field of agriculture but has been recently transferred to land use issues. This section seeks to analyse the potentials of integrating permaculture in European land use management systems. For this purpose, it will be pointed out what the current problems related to land use management are and why the current legal framework of the European Union is not sufficient to address them. Then, the theory of permaculture is explored and potentials for land use management are illustrated. Two example cases are studied to discuss to what extent the application of permaculture in this field appears to be a realistic and practical option. It must be noted that the limited scope does not allow for a comprehensive analysis of all benefits and drawbacks deriving from the application of permaculture in land use planning. This paper is rather of an explorative nature.

1.2 Research question

The discussion of permaculture in the realm of geography and planning is still relatively young. There are a few studies that draw a connection between permaculture and land use management (Holmgren 2002; Copeman 2006; McManus 2010). However, in most cases only some references are made and not further elaborated upon. The aim of this section is therefore to explore the potentials of permaculture in this field. The respective research question is: Can the concept of permaculture enhance sustainable land use planning? In addition, and to come back to the above mentioned misguidance in planning, it can be asked more explicitly whether the concept can provide a practical framework for land use planning that is better suited to avoid current problems of land use management?

1.3 Problems related to land-use management and its legal framework to address them

As in any other part of the world, people in Europe have strongly influenced their environment over the last millennia. In order to serve current and future needs it will be indispensable to continue to actively interfere with our surrounding ecosystems. This threatens to put even more pressure on already overstrained natural resources, which in consequence results in severe environmental problems. It is important to break with this vicious cycle. Fifteen years ago, the European Environmental Agency listed an inventory of 56 environmental issues that still gives reason for concern. It comprises specific problems as well as general threats. Among the most significant are air, soil and water pollution, biodiversity loss, climate change and the degradation of natural ecosystems (EEA 1995). Most, if not all, of these problems are related to human land use practices. The ongoing development of greenfields, for example, deprives natural ecosystems of living space, particularly forests and meadows. Pollution and industrial agriculture puts pressure on soils and landscapes. An overexploitation of resources threatens the resilience of ecosystems. The utilisation of waters for transport, energy generation and waste dump endangers biodiversity. All in all, we can observe an overtraining of ecological capacities.

This triggers questions about the current legal and political framework for European land use management. As mentioned above, the European Union reacted by adopting the ‘Territorial Agenda’ and the ‘Leipzig Charter’, to set out a guiding framework that should lead land use management onto a more sustainable path. Both documents give impulses for a better land use management and provide member states with a general orientation. However, they represent not more than informal strategy papers comprising rather general policy recommendations (Naylon et al. 2007) and fail to provide explicit guidelines for daily planning practices of municipal agencies. For concrete projects, the implementation often appears problematic (Wokoun et al. 2010).

Moreover, it must be asked whether the proposed recommendations go far enough. The EU strategy papers suggest gradual improvements, but no essential changes in land use management (Gualini 2008). The approach remains within the lines of conventional planning procedures, which can be seen as the cause for the mismanagement of natural resources. Thus, the paper at hand argues that the problems we are facing are not only of an environmental but also of an institutional nature. Or, in
other words, the roots of current ecological challenges (at least partly) result from a wrong guiding framework of land use planning and decision-making.

There are different explanations for where this misguidance comes from. For example, one can identify a prevailing ‘techno-scientific’ mindset among decision-makers and planning authorities. Natural processes are altered, resources are exploited, and areas are cleared for development. The conventional planning approach builds up on the idea of domination and mastery of nature (Pattberg 2007). From this perspective, environmental problems appear as the consequence of the hubris to control and interfere with nature without being aware of one’s own limited abilities to do so.

In a similar vein, one can criticise the domination of an economic paradigm in the political and societal discourse. The cause of the problem can be diagnosed as an economisation of planning, i.e. the growing influence of economic constraints and reasoning on governmental planning tasks. This can lead to a misguidance of planning, which is subjected to profit-orientated thinking. It often ends up in favouring economic development over ecological preservation in respective decision situations. Moreover, the prevailing concept of sustainable development can be criticised for being too vague and too flexible towards business interests to provide an adequate guiding framework that ensures safeguarding the environment (Kahl 2008; Stephan 2002).

As mentioned above, this paper does not aim at discussing the adequacy of these explanations of misguided planning. Instead, the assumptions are taken as a starting base to examine permaculture as an alternative planning approach that might be able to circumvent these issues.

1.4 Permaculture as a land use approach

1.4.1. Permaculture Theory

1.4.1.1 What is Permaculture?

The concept of permaculture is inspired by natural cycles and ecological patterns. Originally developed in the 1970s as an alternative to industrial agriculture, it was later transferred by some scholars to architecture and land use planning. Gradually, the concept evolved into a “design system for creating sustainable human environments” (Holmgren 2007, p. 3). As such, it aims at providing an alternative framework for land use planning and management that is more in line with the requirements of sustainability.

Permaculture adopts a system perspective. Unlike in so-called black box models however, the inner functions of a system, i.e. the relations of its elements with each other, are taken into consideration. To understand how a system works, each element is analysed to identify its needs (inputs), its characteristics (processes), and its outputs. A chicken, for example, requires food, water, shelter, space, air, and other chickens. Its characteristics comprise breed specific behaviour and a certain climate tolerance. Among its many outputs are eggs, meat, feathers, manure, methane, carbon dioxide, heat, scratching, picking, foraging, and so on (Holmgren 2002).

The aim is to form cyclical metabolisms between the elements of a system, making use of the specific inputs, characteristics and outputs. This basic idea stems from the observation of natural processes, where outputs are recycled instead of being ‘wasted’. Leaves, for instance, that fall from a tree, rot, turn into humus, and eventually fertilise the soil that nourishes the tree. All natural processes work in this way and thus form highly efficient systems, which do not know any material waste. The concept of permaculture suggests imitating these efficient cycles. In anthropogenic systems, too, outputs should be treated and made use of as new inputs. In this sense, permaculture can be also described as “the conscious design of ‘cultivated’ ecosystems” (Diver 1998, p. 2). Furthermore, man-made systems should not only imitate, but also be smartly integrated into existing natural processes and forces that are at work. This can help to reduce the input of labour and energy a system requires and thereby further increase efficiency. In the chicken example mentioned above, a farmer could make use of the chicken’s outputs in a number of ways, instead of considering most of them as wastes. Their manure
can fertilise soils, their scratching and foraging can work land, their heat and carbon dioxide can be utilised in green houses, etc. In this simple example only one element (chicken) is regarded. Ideally, the inputs and outputs of many elements interplay. The more diverse a system becomes, the more synergies can be created.

1.4.1.2 Theoretical Framework

After years of experimenting with permaculture for agricultural processes, Bill Mollison and David Holmgren deduced their observations into a comprehensive theory, comprised of general ethics and more concrete principles (1978). In his recent book (2002), Holmgren further developed this theoretical framework. His elaborations will be taken as a baseline in this paper to explain the overall concept of permaculture and look for potential links to land use planning.

As shown in figure 1, the framework comprises three ethics and twelve principles. The ethics form up a general orientation that has much overlap with the triple-P bottom line of sustainable development. Similar to ‘planet, people, profit’, permaculture speaks of ‘care for the earth’, ‘care for people’ and ‘fair share’. The congruence of the two terms can already be found on a semantic level. Permaculture indicates something that is permanent, lasting, and thus sustainable. However as for the notion of sustainable development, projects should meet all of the three ethics at the same time and in a mutually reinforcing manner (Holmgren 2002). The economic perspective of permaculture theory takes, however, a more radical stance. While sustainable development emphasises the prospect of sustainable growth, the fair share ethic asks for limits to consumption, reproduction and a distribution of surplus (Holmgren 2007). Holmgren’s elaborations on this issue do not go into much detail, but his advances are oriented at the ‘Limits to Growth’ discourse and the ideas of degrowth or steady state economy (see: Dryzek 2005; Kerschner 2010).

Figure 1: Overview of permaculture ethics and principles (Holmgren 2007)

The twelve principles are more explicit and supposed to give orientation in the practical application of permaculture. Holmgren describes them as a “checklist when considering the inevitably complex
options for design and evolution of sustainable systems” (2007, p. 7). These principles are especially noteworthy, as they encompass the added value of the concept of permaculture compared to the generally accepted notion of sustainable development. The limited scope of this paper does not allow for a detailed discussion of each principle. Instead, only a selection of five principles will be explained on the basis of Holmgren’s elaborations (2002; 2007) and examined for their applicability to land use planning. The selection is based on the potential of a certain principle to add new perspectives to land use planning. As indicated in figure 1, the remaining principles relate to the ones that are discussed.

Beneficial relationships can only be created when there is sufficient knowledge about a system. Thus, the Observe and Interact principle requires that each intervention should be preceded by a phase of thorough and detailed observation of the project site. Existing processes at work should be known and taken into consideration before an intervention is undertaken. This can be understood as a contrast to conventional planning approaches that usually depart from desk-bound research and statistical studies. In most cases, first a project plan is conceived and afterwards a suitable location is searched. This means that a pre-defined plan is imposed on a certain area. Permaculture suggests proceeding the other way round and devoting more attention to specific location characteristics. To a certain extent, environmental impact assessments (EIA) and strategic environmental assessments (SEA) go in this direction.

Yet, these measures are often carried out by external personnel and their influence on decisions is limited. Here it becomes clear that the permaculture approach is not subject to the dominating economic paradigm criticised above. On the other side, observing periods of 12 months or more, as envisaged by some permaculture proponents (Diver 1998), do not seem realistic given nevertheless prevailing economic and time pressures that constrain most public and private projects.

The principle to Produce No Waste is directed against the linear production model that characterises the existing industrial economy (resource, production, consumer use, waste) and leads to a thriftless handling of resources. The problem applies not only to industrial processes, but also to cities and communes, which depend on a steady input of products and resources and often dump the outputs at municipal disposal sites. Hence, it is also up to planners to improve existing designs to reduce resource use. There are various concepts to tackle this issue. For instance, the Z-squared community set-up by BioRegional and WWF in Great Britain presents a comprehensive approach to encourage re-use and recycling and minimise waste (Hersey 2007). Similar schemes are also conceivable on an EU-wide scale. Furthermore, the Produce No Waste principle goes hand in hand with the ‘cradle to cradle’ approach which is discussed earlier in this report.

Permaculture suggests to Design from Patterns to Details. For land use management this means considering local patterns first and adjusting the project details accordingly. Building up on the Observe and Interact principle, specific local characteristics such as climate, energy flows, landscape, and vegetation should be examined and made use of to minimise the need for further energetic and material inputs. To harvest beneficial energy flows in an optimal way, each project has to be tailored to its specific location.

This goes along with the Integrate rather than Segregate principle, which prescribes to adjust to existing environments instead of changing them. This philosophy forms a counter piece to the technical-scientific mindset criticised above.

The last principle discussed here is to Use and Value Diversity. This insight reveals the agricultural origins of permaculture. Widely applied monocultures harm soils and are highly vulnerable, since a single pathogen can affect a very large share of planted crops. Permaculture, in contrast, claims that a diverse system, where many elements interact, produce better and more efficient results. These systems are also more resilient against external threats. This principle can also be applied to land use management. Uniform suburbs and commercial areas are susceptible to social and economic deprivation. Artificially planted coniferous forests do not provide viable habitats for other species and are hardly resistant to storms and floods. Moreover, this principle calls for a stronger integration of natural elements into human designs and. Cities should provide as much space as possible for green
spaces, urban gardens and municipal forests. This promises benefits for the whole system entity, in terms of local climate, well-being, recreation, pollution control, etc. (Copeman 2006).

This discussion of five selected principles shows the point of contacts between permaculture and land use management. As far as conclusions can be drawn from this brief examination, it appears that permaculture may provide a more coherent, more explicit and more committed guiding framework for planning that is able to circumvent problems that can be related to the conventional approach, such as economisation and technical-scientific hubris.

1.4.2 Application in practice: Lessons from pilot projects

Although the transfer of permaculture to land use management is not very elaborated yet, there are some pilot projects adopting permaculture principles in their implementation. To better assess whether permaculture can serve as a guiding framework in praxis, we will have a closer look at two of these examples.

1.4.2.1 Lammas, Wales

The first example is the Lammas project in Wales. It envisages the construction of a village for about 40 residents on an area of eight hectares until the year 2013 (Pickerill 2010). Following the idea of a low impact development, a minimal burden shall be placed on the environment. For this purpose, permaculture principles have been implemented in the planning process. The site has been studied for many years (observe and interact). The design started by considering patterns and functions and adjusted details accordingly. In this way, housing and agricultural zones could be allocated to the most suitable locations, where they can make optimal use of solar radiation, wind patterns, and soil conditions. Different innovate technologies are pioneered to harvest beneficial flows, including politunnels, passive solar-heating systems, and willow-fuelled domestic appliances. There are strategies to minimise waste and create closed material cycles. Lammas aims to be self-sufficient in food and energy production. To that goal, permacultural agriculture and renewable energy production will be undertaken. Overall, the project aims at integrating into the existing landscape (Lammas 2008). Furthermore, also other principles than the ones discussed here are considered. Participative community living structures comply with the principle to ‘Apply Local Self-Regulation and Accept Feedback’ and the remote village character stands for a ‘Small and Slow Solution’.

All in all, the Lammas project takes permaculture principles strongly into account. Yet, it becomes clear that some of the principles (Apply Local Self- Regulation and Use Small Solutions) also limit the general applicability of permaculture when they are realised strictly. Community living plays a significant role in the Lammas project. This small and cohesive ideal of community contradicts many people’s urban way of life and can thus not serve as a general solution (Philby 2010).

1.4.2.2 Masdar City, Abu Dhabi

The second example case is Masdar City in Abu Dhabi. Unlike Lammas, Masdar City is a large scale project designed for 50,000 inhabitants within the city itself and an additional 50,000 in the suburbs. The development takes place on a site of six square kilometres and is scheduled to be completed in 2020 (Schuler 2010). Masdar is not a true permaculture project. Its sheer size already contradicts some of the permaculture principles. Furthermore, the project is almost completely a top-down matter and hardly foresees any self-regulation from bottom-up. However, as other principles are taken into account, the project provides an interesting example case. The design of the whole project was planned from patterns to details. Insulation and wind flows strongly influence the arrangement of houses, streets, and green spaces. A reinvention of traditional wind cones ensures a comfortable climate within the city. It makes use of wind patterns and directs hot daytime air upwards and cool evening breezes into the streets. Buildings and large umbrellas are arranged in such a way that they permit a well-balanced mix of light and shade in public places. Furthermore, the Masdar City project embodies the permaculture principles ‘Use Renewables’, ‘Catch and Store Energy’, and ‘Produce no Waste’.
According to its planners, the city shall become the world’s first carbon free city and a centre for renewable energies. Amongst other organisations, it will headquarter the International Renewable Energy Agency (IRENA). The plans also foresee to become a zero-waste city, i.e. to re-use all materials and to allow only a minimal amount of material inputs. (Schuler 2010)

Despite recent claims of financial problems, the Masdar project shows that permaculture can also go beyond the village scale. The progressive, technology afine, and urban character is the project is likely to find a greater general approval than the close to nature approach of the Lammas concept. However, it becomes also clear that this can lead to a certain degradation of the permaculture concept. The conscious violation of some principles undermines the clear and comprehensive approach that marks the appeal of permaculture as a guiding framework.

1.5 Conclusions and Outlook

This section sought to examine the potential of permaculture for land use management. Permaculture appeals through its intuitive logic and the conceptual clarity of its principles. The first and more general research question, whether the concept can enhance sustainable land use planning, can thus be answered in the affirmative. Permaculture forms a conceptual framework that addresses sustainability in a holistic manner. Being more explicit and more committed than the concept of sustainable development, permaculture is able to circumvent problems that can be related to nowadays planning procedures, such as economisation and technical-scientific hubris. The concept could be integrated into EU sustainability strategies and form a new guiding framework for land use planning.

However, the second research question, which asks about the practicality of the concept, cannot be confirmed in all respects. The example cases show how difficult it is to implement all of the principles in practice, especially on a larger scale.

The Lammas project shows a comprehensive realisation of permaculture principles, but seems not attractive as a general solution given its small community character. Masdar City is more in line with modern images of urban living, but does not take all permaculture principles into account and even consciously violates some.

At the end of the day, permaculture can offer inspiration and might be formed into a general orientation that complements and improves the current EU approach. However, like the vision of sustainable development, the concept has to adapt to the course of things. The concept may enhance the existing guiding framework, but practical implementation always requires compromises.
1.7 References


2. Vulnerability Assessment

Henrik Beermann

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Abstract

Tackling anthropogenic climate change is one of the biggest challenges of the current generation. The fact that Climate Change is already in progress leads to not only focus on mitigation measures, but to complement them with ‘climate smart’ adaption strategies. A prerequisite for implementing these adaption strategies is scientific knowledge about the capacity of regions to be wounded by climate change – the vulnerability of the considered regions. The following report provides an introduction to this very recent scientific field. The study reveals a certain compliance of the researchers regarding the usefulness of a vulnerability definition proposed by the IPCC. Nevertheless, the case study of a vulnerability assessment currently undertaken in Western Saxony unfolds some obstacles being associated with this approach. Altogether, assessing vulnerability is vital for backing decisions regarding climate change with scientific knowledge. Furthermore, the IPCC’s definition serves as an appropriate starting-point for undertaking vulnerability studies.

Key words: Vulnerability, Climate Change, IPCC
2.1 Introduction

The world is in progress from time immemorial. But for some time past, the scope of changes expanded and the velocity of changes increased dramatically. The term Global Change subsumes changes on a planetary-scale, like an increasing population, international integration or climate change. Scientists increasingly recognize the need to address the consequences of the changes taking place. Vulnerability is an emerging concept for analyzing the consequences of certain changes and identifying the capacities to be wounded. Questions like: “Who is vulnerable?” or “Where are vulnerable regions?” are tackled by means of vulnerability assessments. Since the impacts of Climate Change differ from region to region, vulnerability assessment in this regard means analyzing alternative future perspectives. This paper gives a basic overview of the basic concept of vulnerability assessment towards Climate Change. Since the term vulnerability nowadays is widely used, a lot of confusion appears of what this term actually means. Many different definitions are in use, which are accompanied by even more methods to measure the magnitude of vulnerability. The Intergovernmental Panel on Climate Change (IPCC) defined vulnerability as a function of sensitivity, exposure and adaptive capacity. This definition has become broadly accepted among researchers in this field. The following deliberations will use the IPCC definition (IPCC 2007) as a starting point and will show how this approach can be operationalised to assess vulnerability towards climate change. The theoretical considerations will be backed by a case study of a vulnerability assessment. Hence, the underlying question of this section is: How can the vulnerability definition provided by the IPCC be operationalised to undertake a vulnerability assessment?

It will be clarified what this vulnerability approach actually means for practice research. Furthermore, strengths and weaknesses are discussed. For this purpose, subsection two introduces the topic by presenting an overview of the purpose of most vulnerability studies. Furthermore, the problem of defining ‘vulnerability’ is discussed and the famous definition developed by the IPCC explained. The main components of the IPCCs vulnerability approach, namely sensitivity, exposure and adaption capacity, are clarified in subsection three. How this knowledge can actually be applied is shown by means of a case study. As part of the model project ‘Spatial Development Strategies for Climate Change’ (KlimaMoro) a vulnerability assessment was undertaken in the planning region ‘Western Saxony’. Supported by the German Federal Ministry of Transport, Building and Urban Affairs, the survey aims at preventing uncertainties that arise through climate change. The study shows an example how this definition can be operationalised. In the conclusive part, strength and weaknesses of the IPCC approach and the realization of this approach in Western Saxony will be discussed. Furthermore, some general comments on vulnerability assessment will top the paper off.

2.2 Purpose and definition of Vulnerability Assessment

2.2.1 Why to undertake a Vulnerability Assessment?

Many aspects in the earth system are rapidly changing at the moment. Nowadays, the system does not only consist of natural components like the hydrosphere or the atmosphere, but the human society has to be considered as an integrated part of it. Planetary-scale changes like rising atmospheric carbon dioxide, declining forest areas in the tropics or an increase of the global population are commonly recognized as ‘Global Change’. Many current research projects address these concerns (Metzger et al. 2006). Vulnerability assessments often analyse the risk of disasters due to events that are somehow belonging to ‘global change’. But the purpose to undertake such a study is in many cases different to other research projects: At the most general level, the purpose for undertaking a vulnerability assessment is to inform decision makers. Usually, vulnerability assessments are not undertaken to generate advanced knowledge just for its intrinsic value (Hinkel 2011). Benson et al. (2007) provide an overview of the purposes of a vulnerability analysis.
According to them, the main purpose is to:

— identify vulnerable groups,
— analyze and identify the why and how they are vulnerable,
— identify their needs and capacities,
— make sure that this needs are addressed by policies of projects through targeted intervention or prevention.

In the case of Climate Change, which is probably the biggest challenge of Global Change, vulnerability assessments are key tools for developing climate change adaption strategies. The fact that Climate Change is already in progress, leads to the obligatory to not only focus on mitigation measures, but to complement them with “climate smart” adaption strategies. In this regard, Glick et al. (2010) highlight three key motivations for undertaking a vulnerability assessment:

— helping the setting management priorities,
— assisting in informing and crafting adaption strategies, and
— enabling more efficient allocation of scarce resources.

### 2.2 Defining vulnerability

The linguistic origin of the term vulnerability is the Latin term ‘vulnerare’, which means ‘to wound’ (Kasperson et al. 2005). This fits to the ordinary use of the word vulnerability, which basically means the degree to which a system is likely to be wounded due to its exposure to a hazard (Füssel 2006). For scientific purposes, the term is conceptualized in many different ways. Originally rooted in geography and natural hazard research, it appears nowadays that scholars from numerous scientific disciplines like ecology, public health poverty and development or sustainability sciences intrumentised the term for their specific purposes. As a result, numerous definitions are applied, often accompanied by different methodologies for assessing vulnerability.

The definition of vulnerability developed by the Intergovernmental Panel on Climate Change (IPCC) is currently the most authoritative and most quoted definition for vulnerability in the context of climate change. Furthermore, it is the applied definition in the presented case study of the vulnerability assessment undertaken in Western Saxony. Hence, it seems to be an appropriate working definition for this report. According to the IPCC, vulnerability is

“The degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity” (IPCC 2007).

How the components of the vulnerability term are related to each other is outlined in figure 1: vulnerability is a function of sensibility, exposure and adaptive capacity. Considering a certain change that a system has to deal with, in combination with its susceptibility towards this change defines the potential impact the system will experience. Understanding the consequence of this potential impact requires knowledge abound the ability of the system to adjust to these changes. Metzger et al. (2006) go one step further, “describing the vulnerability of a sector relying on a particular ecosystem service at a particular location (e.g. grid cell) under a certain scenario at a certain point of time” (2006, p. 71).
2.3 Components of vulnerability

Since the terms sensitivity, exposure and adaptive capacity are the core components of IPCCs vulnerability approach, a detailed explanation of these terms will be provided in the following.

2.3.1 Sensitivity

According to the Potsdam Institute for Climate Change Research (PIK), sensitivity regarding climate change is the susceptibility of a system towards the degree of a negative or positive stimulation through direct or indirect climatic effects (PIK 2009). It can be determined by nature (sensibility of an arid region toward droughts) and it can be exacerbated by anthropogenic influence (risk of water scarcity through wasteful consumption of water). Furthermore, it can be defined from a socio-economic point of view (sensitivity of sick people towards heat).

2.3.2 Exposure

At the most general level, exposure is the contact between a system and a perturbation or stress (Kasperson et al. 2005, p. 253). According to the IPCC, exposure is the nature and degree of the climatic variations a exposure unit (activity, group, region or resource) is exposed to (IPCC 2007). Climate variations are changes of the mean temperature value or of the margin of fluctuation of the temperature, which last for several decades. The causes for this climatic variations can either be natural (fluctuations of the climate system, volcanic activity) or be caused by anthropogenic perturbations (e.g. emission of greenhouse gases, land use changes).

2.3.3 Adaptive Capacity

Adaption basically refers to a systems response to perturbations or stress. The stress does not fundamentally change the system itself, but might shift it into a new state. Adaption capacity hence is the combination of all strength and weaknesses within a system, which can reduce the level of perturbation (Levina et al. 2006). When it comes to Climate Change, the adaption capacity is the ability of a system to adjust to climate change (including climate variability and extremes), to moderate the potential damages, to take advantage of opportunities, or to cope with the consequences.
Adaption capacity therefore is the sum of all abilities, resources and institutions of a system for implementing effective climate adaptation methods.

It is obvious that the presented elements of vulnerability are only the core of a system of features. A framework which aims at depicting the whole of different elements identified and demonstrated in risk, hazard and vulnerability studies, was provided by Kasperson et al. (2005). The framework recognizes two basic parts to the problem and assessment: One is that vulnerability basically emerges from the categories exposure, sensitivity and resilience\(^{94}\) and the attributes of the coupled system (see fig. 2).

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\(^{94}\) Resilience refers to the capability of a system to rebound, recoup or recover from a certain stimulus. In this report, resilience is considered to be an element of adaptive capacity.
2.4 From vulnerability to vulnerability assessment

How human communities adapt to global changes, especially climate change, is described by Smit & Wandel (2006). They focus on identifying preferred adaptation at the community scale via undertaking vulnerability assessments. The described approach is participatory: The researcher does not presume to have information about the exposure, sensitivity or adaptive capacity of the community. This knowledge is generated by active involvement of the stakeholders (see fig. 3).

![Conceptual framework for vulnerability assessment and mainstreaming](image)

This approach has several advantages, like securing legitimacy of outcomes, including information from multiple sources or engaging decision-makers. The first step of this approach is to generate knowledge about exposure, sensibility and adaptive capacity. This is done through participatory methods like interviews of observation of focus groups, perceptions of local decision-makers, resource managers, scientists, data bases, published or other sources of information. The goal of this analysis is “to identify and document the conditions of risk (current and past exposures and sensitivities) that people have to deal with, and how they deal with these, including the factors and progresses that constrain their choices (current and past adaptive capacity)” (Smit & Wandel 2006, p. 289).
Once this status quo is identified, future vulnerability has to be assessed. This is done through integrating information of other scientists, policy analysts and decision-makers to identify the potential future exposure, sensibility and adaptive capacity. This conditions shape the future that the community may be facing. Once the most important ‘adjustment screws’ for the current and future vulnerability are identified, opportunities for reducing future vulnerability have to be sought. Decision-makers and authorities should participate in this step, since they are the one that have to implement adaption measures like changing existing resource management strategies, disaster preparedness plans or sustainable development programmes.

The goal of this approach to vulnerability assessment is not to generate ratings of future vulnerability. It is rather to identify ways to increase the adaptive capacity and decrease the exposure and the sensitivity. In this way, the vulnerability assessment can provide answers to the following questions:

— Who is vulnerable?
— To what are they vulnerable?
— What are the special reasons for their vulnerability?
— Where are the vulnerable?
— Under what circumstances will they become vulnerable?

2.5 Vulnerability Assessment in Western-Saxony

Since Climate Change is happening at the moment and all over the world, assessing vulnerability to climate change is really on the pulse of time. Sadly, there seems to be a ‘growing market’ for vulnerability assessments. Hence, a number of climate change vulnerability studies are currently undertaken. Many of these can be more or less be characterized as ‘pilot’ projects. The following case study is one of the pilot projects currently undertaken in Germany. Since the project is not finished yet, the presented results are based on an interim report. The main purpose of presenting this study is to show how the vulnerability concept based on the IPCCs definition is implemented in an actual research project.

2.5.1 Background and purpose of the study

Since the nineties, the paradigm in spatial planning in Germany shifts from programmes and planning to more campaigns. The action programme “Demonstration Projects of Spatial Planning” (MORO) displays this paradigmatic change. Supported by the Federal Ministry of Transport, Building and Urban Affairs, the development of innovative action approaches for spatial planning is promoted. This is basically done via model projects, studies or initiatives. A key feature of this approach is the integration of science and practice. Promising new action approaches are accompanied to generate best-practice solutions for actual problems.

The model project Spatial Development Strategies for Climate Change (KlimaMoro) aims at generating innovative spatial planning approaches in regard to Climate Change. Its main aim is to encourage regions to invent regional adaptation and mitigation strategies. In eight regions, regional strategies are currently invented and first projects are implemented. One of this regions is the planning region Western Saxony. Here, possibilities are invented to prevent the uncertainties that arise through Climate Change. In this regard, one basic field of attention is to develop a vulnerability assessment toward climatic changes. The main purpose of this study is to reveal peculiar endangered areas and activities. Furthermore, planning-instruments and spatial development perspective are developed to prevent the revealed dangers. The vulnerability assessment in the region ‘Western Saxony’ emphasizes the following thematic priorities:

— Issue 1: Summer heat waves and human health,
— Issue 2: Flooding and heavy rain and its impacts on infrastructure, agriculture and space utilization,
— Issue 3: Decreasing water yield and its impact on post-mining-landscapes, landscape in general and spatial utilization,
— Issue 4: Decreasing water yield and its influence on water supply and effluent disposal,
— Issue 5: Climate Change and its impact on recovery and cultural landscapes.

In the following subsections, the assessment approach and the results will be presented using the example of vulnerability towards flooding-events.

2.5.2 Assessment approach of the case of Vulnerability towards flooding

In Western Saxony, the risk of flooding is quite severe, since three big rivers cross the region: the Elbe, the Mulde and the Weiße Elster. Hence, the region has to deal with the risk of flooding all the while. The question is how Climate Change will alter this risk and where the peculiar endangered areas, activities or infrastructures are located, and whether existing plans have to be updated or not.

2.5.2.1 Methodology

The working definition of vulnerability is the already explained definition of the IPCC. Vulnerability is seen as a function of sensibility, exposure and adaptive capacity. Nevertheless, the operationalisation of the definition is slightly different (see fig. 4).

In subsection 2.2 it was mentioned that the potential impact is a function of exposure and sensitivity. Hence, vulnerability is a function of the potential impact and the adaptive capacity. In the approach of Western Saxony, the adaptive capacity is a function of the sensitivity. The exposure is directly influencing the vulnerability. Hence, vulnerability is a function of the exposition and adaptive capacity (see figure 4), what simplified the approach compared to figure 1.

2.5.2.2 Socio-economic Sensitivity

Sensitivity towards Climate Change is the susceptibility of a system towards the degree of a negative or positive stimulation through direct or indirect climatic effects (PIK 2009). In the case of vulnerability towards flooding, the regarded systems are emoluments and infrastructures. These are likely to experience serious harm due to flooding events and therefore bear a high socio-economic sensitivity. Critical infrastructures are those with a trans-regional significance whose loss would cause
negative effects for the whole region. Examples are important traffic connections or water supply infrastructure. Critical emoluments are living- and mixed areas.

2.5.2.3 Exposure towards Climate Change

Exposure is the nature and degree of climatic variations an exposure unit (activity, group, region or resource) is exposed to (IPCC 2007). To identify the future exposition towards climate change, the assessment in Western Saxony used the climate model WEREX IV, which is a model especially elaborated for Saxony. Unfortunately, this model does not make any projections of future flooding events. Hence, the assessment came up with own projections: Since the amount of days with ‘Vb weather conditions’ is increasing since several decades, the likelihood of summer-flooding-events will increase. The situation in winter is projected quite similar: the risk of flooding-events will stay on the same level or will also increase. The exposition towards flooding-events was subdivided with by means of potential flood plains. The flood plains where the probability of occurrence is very high have a very high exposition and the flood plains with a high probability of occurrence have a high exposition.

2.5.2.4 Adaptive capacity

Adaption basically refers to a system response to perturbations or stress. The stress does not fundamentally the system itself, but might shift it into a new state. Adaption capacity hence is the combination of all strengths and weaknesses within a system, which can reduce the level of perturbation. Adaptive capacity in the present study is the potential reduction of the damage a flooding-event towards critical infrastructures and critical emoluments. Adaptive capacity of critical infrastructures and emoluments might be the potential to relocate certain objects or to implement preventive measures when relocation is not possible.

2.5.2.5 Vulnerability Assessment

The vulnerability assessment is subdivided into two parts. In a first step, the socio-economic vulnerability is detected. In a second step, the conflict potential is detected. The socio-economic vulnerability is an overlay of the socio-economic vulnerability and the natural exposition due to flooding plains. The conflict potential is an overlay of critical objects and infrastructures with the exposure.
As a result of the socio-economic vulnerability assessment, nearly all bigger localities in this region are affected by a high socio-economic vulnerability towards flooding events. The affected living areas and infrastructures are mostly located in flooding plains of the big rivers. Most of them have been affected by the flooding events in 2002 (see map 1). The results of the conflict potential analysis shows a concentration of endangered areas is located in Bad Düben, Wurzen, Grimma, and in the alluvial forest of Leipzig. The areas with high conflict potential are characterized by a high concentration of flex space or supply networks.

2.5.3 Outcome and recommendations for action

Several recommendations for action have been derived from the results of the vulnerability assessment. In the case of vulnerability towards flooding-events, the recommendations can be summarized as follows:

— to establish a new objective for regional planning, namely “Special protection of critical infrastructure”;
— to establish a new planning category, namely “Regional focus area for elimination of danger capabilities due to flooding events”.

In two identified focus areas, namely the alluvial forest in Leipzig and the water meadow between Wurzen and Eilenburg, further research will be undertaken through elimination of existing danger capabilities and improvement of retention-potential in agricultural areas.

2.6 Conclusions

The definition of vulnerability developed by the IPCC Working Group II is broadly accepted among researchers in the field of vulnerability assessment. In many studies currently undertaken, it serves as starting point for operationalising the term ‘vulnerability’. Nevertheless, this approach bears a lack of clarity, which is illustrated by the second sentence of the definition:

“Vulnerability is a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity” (IPCC 2007).

This sentence has been essential for designing the methodology of vulnerability assessments. But this definition lacks clarity since it does not specify the form of the function. If we define a university as a function of books, people and buildings, misinterpretations are unavoidable. The difference between the nexus of exposition, sensibility and adaptive capacity proposed in subsection 2.2 and implemented in the vulnerability assessment undertaken in Western Saxony illustrates this appropriately: In one case the term potential impact is implemented as a function of exposure and sensitivity, in the other case this term is immaterial (comparing figure 1 and figure 4 illustrates this issue). This has to be taken into consideration, in order to make vulnerability assessments comparable.

For future research, it is essential to make vulnerability assessments comparable. Since the outcome of the studies are often summaries presented in maps (see map 1) or in index systems, a comparison of vulnerability seems appropriate and without problems. The fact that these outcomes hide complex methodologies which differ from study to study makes a comparison inadequate. Since the purpose of vulnerability assessments is to inform decision makers, not taking this into consideration can lead to wrong decisions regarding adaption and mitigation of climate change.
2.7 References


3. Environment-friendly Land-Use Concepts including Environmental Assessment Procedures

Rita Brandt

3.1 Introduction
3.2 Environment-friendly Land-Use Concepts

3.2.1 Land-Use Planning
3.2.2 Sustainable Land-Use Planning
3.2.3 Environment-friendly Land-Use Concepts

3.3 Environmental Impact Assessment
3.3.1 Structure
3.3.2 History
3.3.3 Aims and Purposes
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Abbreviations used in this section
AUMA Alberta Urban Municipalities Association
EG European Commission
EIA Environmental Impact Assessment
EU European Union
NEPA National Environmental Policy Act

3.1 Introduction
Humans use land to built cities where their live and work. They use the land for growing crops and raising livestock for food. They use the land in order to promote oil and other raw materials to produce energy. These facts show the complex interplay of environmental parameters, economic needs and often politics which are involved in land use. All these human activities such as live, work, leisure, personal development etc. need a place to be realized. But at the present time the demand for land increases while the supply is fixed (GIZ 2011, p. 10). That is why land, therefore, becomes increasingly scarce. In result one can observe that the number of land-use conflicts and the level of violence in these conflicts increase.

Today, persistent population growth, climate change, erosion and desertification as well as urbanization increase the pressure on fertile land and other natural resources and promote those conflicts mentioned above. That is one reason wherefore land-use planning is essential. It is the key component of urban management and all land planning. During the last decades land-use planning has become a central prerequisite for any (spatial) development that aims on social, ecological and economic sustainability. But therefore high transparency is an important base for all further planning and responsible decision-making on the use of land.
The present paper is primarily about land-use planning in general. It describes sustainable land-use planning and shows differences to the “normal” land-use planning. Furthermore environment-friendly land-use concepts will give a short overview about the ways and possibilities in which such concepts can be put into practice. And finally the Environmental Impact Assessment is part of this paper as an example for sustainable and also environment-friendly land-use planning. This final section is about the general structure of the assessment. That includes the history, the aims and purposes and the procedure of an Environmental Impact Assessment.

3.2 Environment-friendly Land-Use concepts

3.2.1 Land-Use Planning

Before describing environment-friendly land-use concepts, I want to clear some other important “parts” of land-use planning in general. First of all, land-use planning is the term used for a branch of public policy. Within using different disciplines land use should be regulated in an efficient and ethical way, thus preventing land use conflicts. Land use planning is necessary because of the utilization of land by humans. Therefore it is a permanent process and it happens in different speeds. For example the industrialization or the global shortage of water or land, shows the necessity of land use planning. During the last decades almost all countries in the world have changed their land use to meet the new challenges such as ageing populations, stagnant population growth and changing patterns of urbanization (Schmidt 2009, p. 1907). Inevitably the multiple use-interests, in which economic, social and environmental goals collide, compete with each other, use conflicts arise again (GTZ 2010, p. 1). So it is clear that national, regional and local authorities are actors involved in the process to find best solutions (Weiland 2011, p. 3).

An essential task in land-use planning is anticipating the different land-use conflicts and excluding them from the outset. Land-use planning is therefore responsible for an optimal and sustainable utilization of scarce land and resources. Based on this foundation, plans are compiled in order to meet the goals mentioned above. Therefore, land-use planning has to be more effective, efficient and complex. However, a higher data base is needed, which is a new basic challenge.

In Germany various problems existed after the Second World War. Responding to those, the German government implemented the following principles: first of all, an “equitable distribution of public services and infrastructure with a balanced distribution of land uses. [Secondly, a] legally grounded framework emphasizing consensus and mediation. [Third], a system plan compliance through an extensive approval process. And last a careful balancing of powers and federal division of government predicated on the Basic Law” (Schmidt 2009, p. 1908; translation: R. Brandt). From this time on, there were different levels / tools of land-use planning in Germany. The overall instrument of land-use planning is the regional development plan adopted by a land. It includes the regional plan and regulates the spatial land planning at the Federal state level. Then there is the informal urban development plan. The Urban development plan is a long-term development concept of a municipality that formulates as a steering instrument development priorities and guidelines for the medium- to long-term planning of a town. Urban development planning serves as basis for the preparatory land-use plan. The master plan is stated on the local level and acts as an intermediary between the preparatory- and the legally binding land-use plan (Streich 2005, p. 437-439). The legally binding land-use plan is a local instrument for the municipalities and regulates the different possible manners of the development. The following figure I illustrates these facts.
Planning in general is “organized as a process of reciprocal influence by federal, state and municipal authorities on each other’s proposals, commonly referred to as the ‘counter-current-principle’” (Schmidt 2009, p. 1912). Therefore the federal government is only responsible for the outlining of the framework. States and municipalities however are actual planning bodies and the manner in which planning is organized differs from state to state. Decisions and also the implementation of environment-friendly land-use concepts are a local affair in Germany with two important constraints: the local decision-making process operates within a highly structured legal framework, so the local plans have to be consistent with the plans above them. The second point is that the format and procedures, which are involved in the Federal Building Code, ensure a degree of transparency and consistency (Schmidt 2009, p. 1912).

Land-use planning has the aim to ensure that (urban) activities are organized and developed in physical space with due consideration for the protection of the public interests which include health, safety, convenience, efficiency, energy conservation, environmental quality, social equity, social choice, and amenity. These are also features of sustainable development and that is the reason why sustainable land-use planning has to be involved in this paper.

### 3.2.2 Sustainable Land-Use planning

First of all it is important to describe the differences between the normal land-use planning and the sustainable land-use planning and to explain the term of sustainability. In the literature they say that the concept of sustainability describes the use of a regenerative system in a way that the system remains in its essential characteristics and its holdings can be regenerated naturally (Klauer 1999). To come over to sustainable land-use planning we can see that the way we plan the physical layout, or land use, of our communities is fundamental to sustainability.

Sustainable land-use planning includes the social, cultural and economic utilization within the natural limitations at an appropriate rate. (Alberta Urban Municipalities Association (AUMA) 2007, p. 3). AUMA believes that land-use planning is fundamentally related to sustainability planning and they defined planning as it integrates five dimensions of sustainability: social, cultural, environmental, economic and governance. Furthermore they say that the difference between “development” and “growth” is central to the concept of sustainable land-use planning. The term sustainable land-use planning embraces several aspects shown in the following figure 2. The Figure illustrates the two dimensions of both land use planning (physical planning and improvement plans) and sustainability (environmental and socio/economic sustainability) (Jaarsma 2000, p. 2).
A part of the sustainable land-use planning is the environment-friendly land-use concept described in the following.

3.2.3 Environment-friendly Land-Use Concepts

A standardized definition for environment-friendly land-use planning / concepts is still not existing. But the concept is often used synonymously with the understanding of sustainability. Environment-friendly land-use Concepts in practice are implemented in different ways and differ from country to country. In the following only a few German examples will be mentioned briefly. At first there is the mixed land use as one of the most important instruments which is commonly used. It is stated on the federal, state and local municipality level. The process of spatial separation took different forms before and after utilization in Germany. “There is a general consensus in the policy and the academic debate that mixed structures should be aimed at Greenfield sites and on derelict land. To understand the changes for reaching this general objective, the legal framework and the organization of urban development have to be considered” (Wiegandt 2004, p. 3; translation: R. Brandt). Through implementing mixed land-use various types are enabled including for example residential, commercial and industrial uses. Often, mixed land-use is seen as a chance to develop the economic vitality and perceived security of an area “by increasing the number of people on the street and public spaces” (Healthy Spaces and Places 2009, p. 1). This could be realized by planting trees, flowerbeds, plant tubs or the installation of green open spaces. Another opportunity is to identify traffic-calmed areas (Weiland 2011, p. 27). But also the planting of roofs or walls can make a contribution to implement environmentally friendly land-use concepts. Environment-friendly land-use Concepts try to ensure a better live quality while changing the infrastructure.

One more environment-friendly land-use concept is about the climate aspect to adapt or mitigate negative influences. Considering the present global climate change, it is necessary to keep in mind that floods and / or cold air as well as heat waves in summer will occur more often in the future. Therefore ideas for an efficient and also preventing construction method considering building houses have to be developed. But also the efficient use of energy through the use of renewable energies can contribute to environmentally friendly living for example by using solar energy etc. Furthermore the position of houses also to prevent wind or the construction of passive houses is one important instrument of this concept.

Then there are a lot of possibilities considering the point of soil protection and water balance. That means that through a limitation of surface sealing, a permeable land cover or a groundwater saving way of construction already helps to protect the most crucial and essential thing we have, the earth (European Commission 2006, p. 9). Water balance as one more aspect to describe the different ways to realize environment-friendly land-use concepts means, that it can be used to characterize the flow of water in and out of a system. It helps to provide plants or other creatures with water.
One easy understandable objective of environment-friendly land-use concepts is the protection against traffic related air pollution, noise and bad smells (Weiland 2011, p. 33). In Germany there are different ways to convert these instruments. For example, on roads with a high traffic rate, the noise depicts an enormous burden for all the residents. Therefore walls near the streets were built and so the noise can be reduced. Furthermore plants or forests can reduce or compensate those negative impacts. In reality, there are still a countless number of other ideas to implement or realize environment-friendly land-use concepts. However, it is not discussed further in the following.

3.3 Environmental Impact Assessment

3.3.1 Structure of environmental impact assessment

Treated to the given facts it is clear, that one of the most important instruments to preserve spatial and regional planning requirements is the regional planning process. By realizing the requirements it is quite common, that projects which are objectives of the process are reviewed on their environmental performance regularly. As environmental protection and nature conservation among are key principles and objectives of regional planning, it is quite clear, that the Environmental Impact Assessment (EIA) has an important position (Barsch et al. 2003, p. 35).

3.3.2 History

In 1970 the National Environmental Policy Act (NEPA) was implemented in the USA, which constitutes the foundation for the Environmental Impact Assessment developed within the following years. This development was strongly influenced by the environmental movements in the 1960s. Important features of these movements were the human-nature-integration into the environment-term, the critique of technology and the integration of the public (Köppel et al. 2004, p. 171). From 1971 to 1973 first eco-political discussions started in Germany. These were heavily influenced by citizens’- movements (Bechmann 2003, p. 1). Fundamental principles of the first activities were, however, the precautionary-, polluter pays- and cooperation principle. Finally in 1973 a first draft law was written, but it was not pursued. “Already the preliminary environment in the Cabinet had indicated that an Environmental Impact Assessment Act in Germany in just because of the development process located medial - sectoral environmental laws viewed as superfluous and therefore would not be politically feasible” (Bechmann 2003, p. 1). On 22.08.1975 a first internal administrative directive for a review of the EIA was implemented by a cabinet decision. Unfortunately it had no wide influence. Decisive impetus for an Environmental Impact Assessment in Germany was eventually the European Community (EG). The EG published in 1972 its general principles. Those principles included that all technical planning and decision-making processes having an impact on the environment, should be taken into account as early as possible (Köppel et al. 2004, p. 172). Again in 1978 the European Commission introduced a first law of the EG-EIA-Directive, which was hindered by the resistance of the Member States. After another test, the directive was finally approved unanimously by a decision of the German Bundestag. But only if an optimal implementation of the EG-Directive was ensured, it could go into effect. On 27.06.1985, the Directive was ultimately about the effects of certain public and private projects to come into force. The eventual implementation of the EIA-EG-Directive into German law was performed with great delay and somewhat adhesive fracture. This highlights the resistance that the EIA apparently at the Federal Environment Ministry and especially to an even greater extent in the various federal departments aroused (Köppel et al. 2004, p. 1974). It was not until 1990, when the content of the Directive with the EIA Act in German law has been adopted. In the course of this development, there were also many voluntary activities by EIA by municipalities, which are still relevant today. However, these are mostly related to land use planning. Further, there were problems in the wake of Reunification, as the EIA was not very prestigious in this period (Bechmann 2003, p. 2). In the last years the EIA-Directive has changed several times (1997, 2001, 2003) and the European Union implemented a further Directive especially for plans and programs, called Strategic Environmental Assessment which is not a subject of this paper.
3.3.3 Aims and purposes

The Environmental Impact Assessment is a tool that follows the environmental welfare principle (Köppel et al. 2004, p. 173). The aim is to estimate environmental impacts early and structured, systematized and integrated with concrete measures in the process of decision making (Hübler 1995, p. 1000). It should be demonstrated to the public and the media that the EIA is an integrative and effective instrument (Umweltbundesamt 2011). It is important to take into consideration that the Environmental Impact Assessment is not an agent for preventing projects, but rather a means to prevent / reduce its environmental impact. That means it only takes place to optimize the project (Köppel et al. 2004, p. 174). Furthermore it is said in the literature that the support is invoked by the introduction of an EIA to environmental self-regulation and this ultimately encourages acceptance. By the EIA a higher motivation has to be promoted for finding alternative solutions with a reduced environmental impact. Furthermore it is important not to forget the interactions between the different areas. Another feature of the Environmental Impact Assessment is to obtain the participation of potential stakeholders and the public and give them the opportunity of commenting and hearing. Based on this consideration, the decision will be prepared (Umweltbundesamt 2011). Approval of projects has to be designed more public, transparent and accountable.

3.3.4 Procedure

Before describing the exact procedure of an Environmental Impact Assessment, it is necessary to explain the legal foundation of it in the European Union and also in Germany and Austria. In the European Union, the EIA has been implemented under the EIA Directive on certain public and private projects with the aim of protecting the environment and the quality of life. The EU is trying to harmonize the different EIA systems in the Member States to promote a consistent implementation. Relevant test projects are individually listed in the appropriate guidelines. In Germany the Environmental Impact Assessment Act governs all project-related matters. In addition, the EIA legislation is compounding in various sectoral laws, state laws and statutory regulations such as the Water Resources Act or the Federal Pollution Control Act (Köppel et al. 2004, p. 175).

The procedure needs to be regulated exactly in order to take these guidelines into practice. The EIA-Act in Germany specifies which regulations have to be included in the Environmental Impact Assessment. That means that you have to figure out whether EIA is required, which documents are needed and when the authorities or the public will be involved. Furthermore, the precise environmental impacts are identified, described and summarized. Afterwards they are evaluated by the same authorities (Köppel et al. 2004, p. 186).

The Environmental Impact Assessment is embedded in a consolidated approval process. “This means, that for a project only one permit application shall be the competent EIA authority (Current government) uses all of the relevant projects applicable laws governing in a concentrated procedure and then decides in a decision on the eligibility of the project” (Umweltbundesamt 2011; translation: R. Brandt). The EIA process and the national legislation in Austria are almost the same as in Germany (Mandl 2010). The following figure illustrates the whole EIA-procedure in Austria.
Another interesting point is the distribution structure of implemented projects. Until 1988, an estimated 400 procedures performed (usually on a voluntary basis). In contrast to that, from 1990 to 1998 more than 4800 Environmental Impact Assessments were recorded (Köppel 2004, p. 196). This shows the growing appreciation after reunification. But also the compositions of the relevant EIA procedures in the various sectors of the economy are interesting.

3.4 Conclusions

Reflecting the paper, the huge importance and necessity of land-use planning activities should become clear. We also found out that land-use planning is happening in a lot of different ways. The possibilities as listed in this paper give some suggestions to take it into practice. Land-use planning should be based on some basic principles, thus, land-use planning aims at sustainability, that means at balanced social, economic and environmental needs. It should be integrated into state institutions, as it leads to a dialogue between different interest groups. Land-use planning must be realistic and oriented to local conditions, requires transparency and depicts an iterative process. These facts also relate to sustainable and environment-friendly land-use planning which is described in this paper. All planning activities should be designed according to the needs, demands, capacities as well as the rules and institutional structures in place. Furthermore it shows how important it is to development suitable opportunities. One of these options is characterized by the Environmental Impact Assessment. The EIA shows that this is just a small part of the considerations which have to be made to interact in the common regulatory framework. It is not limited to protect goods, but it also integrates social and cultural aspects of environmental protection. The Environmental Impact Assessments in Germany should be represented in separate components of processes for planning permissions or the approval of a project plan through the implementation of certain projects.
3.5 References


