УДК 332.363

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SUSTAINABLE LAND MANAGEMENT IN URBAN AREAS: THE RUHR AREA AS A ROLE MODEL

Land is by nature limited and fixed. Unlike other goods or assets in the market economy it cannot be moved. Whereas the global economy aims to grow, our planet Earth cannot grow. Land is a resource necessary for different fundamental needs. It is a key factor for economic development, a precondition for social wealth and last but not least it is the main part of our environment. So we have to deal with land responsibly.

The concept of sustainable land management can help creating a balance between the different demands of economy, society and nature. The global trends of urbanization and rural exodus are major challenges but also opportunities for sustainable land management, especially in highly industrialized countries with a very dense population. In Germany, the Ruhr Area as the central industrial metropolis is a showcase of successful sustainable land management through the interplay of legal framework, public institutions and business activities.

Aspects of sustainable land management (SLM)

The origins of the idea of sustainability or rather, its German expression of *Nachhaltigkeit*, lie in the eighteenth century. The German pioneer of forestry Hans Carl von Carlowitz described in his "Sylvicultura oeconomica", which was the first standard work of this scientific discipline, the "continuous and sustainable use" of wood as essential for the development of the land [2]. Wood was the major energy source for mining and metallurgy these days. Because of the intensive use of wood the industry risked a lack of this raw material which could lead to an energy crisis threatening not only production but the fast growing population as well that also needed wood as heating material. By a sustainable forest economy, Carlowitz claimed, cultivation and use of wood could be balanced, so that an enduring supply could be ensured. Sustainability included ecological as well as economic aspects, that is, looking after the protection of the forests as both a natural resource and a commercial product and as the foundation of general well-being.

Sustainability is sometimes shortened to ecological issues, especially in political debates. But it is by no means limited to ecology. Of equal importance are social and economic aspects against the background of the growth in both global population and business. Sustainability is about three basic aims: the share of wealth for as many people as possible (social sustainability), a durable positive economic development (economic sustainability), and the preservation of nature (environmental sustainability) [10].

From this point of view, land can be interpreted in three ways, too: Economically, land is to be seen as real estate, socially it is the place to live, an ecologically it is a natural resource or nature itself.

Sustainable land management (SLM) means actively developing land regarding these three functions. Following management principles (defining goals, creating strategies and plans, undertaking measures) SLM is "the sum or composition of all related/possible/suitable philosophies, visions, ideas, goals, concepts, programmes, plans, measures and actions in order to achieve a sustainable development in urban and rural areas" [13].

Sustainable land management is a "knowledge-based procedure" [18]. It should aim on long term enhancements in the economical, ecological and social capabilities of land and comprise the long term consequences – risks and opportunities of planning and acting today. Technologies and methods to survey, monitor, plan and develop land should be used efficiently and improved. International standards in land law and land policy have to be observed and adopted to the specific situations. Nature must be protected in the best possible way and destructive exploitation of land must be avoided. Land management goes far beyond typical sectors, such as agriculture and forestry, and includes aspects of water use, preservation of the soil, biodiversity, regional pricing, relationship of rural and city settlements, quality of life, division into degrading and prospering regions, etc.

By adapting procedures of quality management an incremental, but steady improvement of current use can be reached, and negative consequences of earlier or current misuse can be mitigated or remediated before they are escalating. Continuous improvements contributing to a SLM strategy in a realistic evolutionary way are much better than following big master plans orientated on utopic images of the far future. Former German Federal Minister for the Environment and Head of the UN Environment Program Klaus Töpfer describes the advantages of a down-to-earth strategy to a visionary one:

Holistic approaches are destined to fail. I´m much more interested in having a clear direction and then going that way. Take small steps, make incremental changes, and you´ll see the world is changing much faster than you expected. All those asking for the "Big Bang" change, they´ve been asking for years, and they forget to act [16].

Stakeholder Approach on SLM

The definition of the European Network for Land Use Management for Sustainable European Cities (LUMASEC) points out the necessity of an integrated

interdisciplinary approach on sustainable land management:

Management is the human activity of working together with the intention of accomplishing desired objectives. Land use management is a process of managing the use and development of land, in which spatial, sector-oriented and temporary aspects of urban policy are coordinated. Land use management covers the debate about norms and visions driving the policy-making and sector-based planning both in the strategic and operative time spans, as well as spatial integration of sectorial issues, decision-making, budgeting, implementation of plans and decisions and the monitoring of results and evaluation of impacts [17].

The process of land use involves many different agents – or stakeholders – with various interests. Focussing on sustainability as the combination of social, economic and ecologic aims land management has to take in mind this complex network of people and purposes and should follow a stakeholder approach. Without sustainability, there will probably be no long-lasting acceptance of land management activities in the communities.

Stakeholders are all parties with interests in the development of land, and they make up the network of stakeholders. A stakeholder in land management is any relevant person or interest group who makes a claim on the development of land in a certain area and who has sufficient power and influence to enforce that claim. When defining goals and targets in land management, the stakeholders´ claims must be taken into consideration and integrated as much as possible [5].

The diagram (Fig. 1) shows examples of individuals, groups or institutions that are affected by land management activities and therefore have an interest in the direction and regulation of those activities. They can exercise a stakeholder role [11].

The control of stakeholders and their networks works particularly well when all participants see the advantage in cooperation.

SLM based on the interests and the goals of the stakeholders in land using and developing is the result of a bargaining process between the different institutions by creating benefits (win-win-situations) or adequate conflict solutions to reach a consensus (risk and opportunity management).

The challenges: Growth and Urban transition

Growth is the major trend in global development. Especially global population has grown as never before in history. This trend is going to continue. The United Nations assume that more than 7 billion people are living on earth at the moment. The forecast until 2050 sees a further rise to more than 9.2 billion people. Likewise, global economy continues to grow as well. The International Monetary Fund (IMF) estimates that the global GDP will increase by 3.5 % in 2013 and 4.1% in 2014. The largest proportion will be contributed by the emerging countries headed by China. Altogether, economic growth of 5.5% in 2013 and 5.9% in 2014 is expected in these countries. The economy of the developed industrial countries will also continue to grow, yet at a more moderate level [6].

Both phenomena, the growth in population and the growth in economy, have an impact on the global demand for resources, including land. This impact can be illustrated best by looking at the global development in the 20th century, when global population

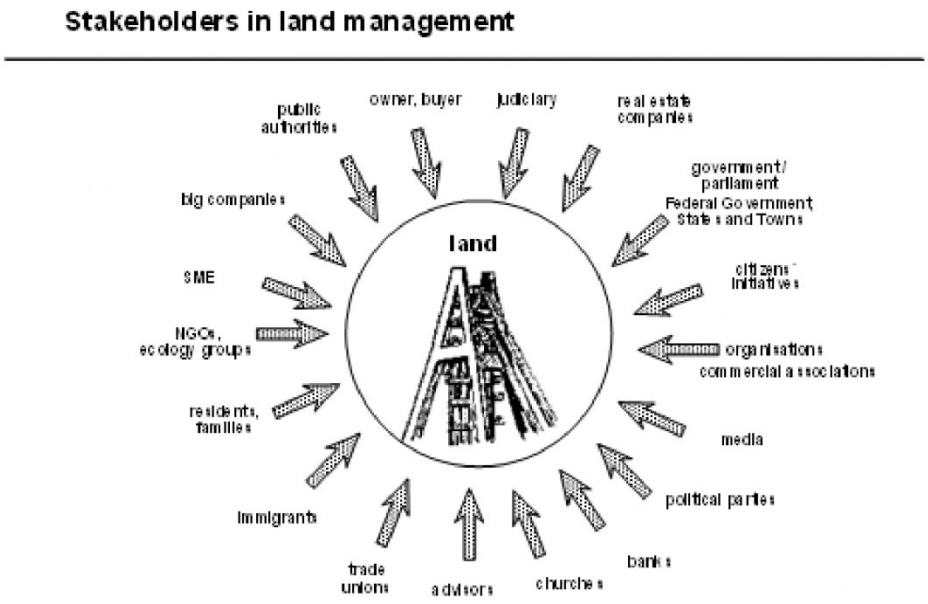

Fig. 1. Stakeholders in land management

grew by a factor of 4, and global economy grew by a factor of 18. In the 65 years since the end of World War II alone, this growth has led to a consumption of resources that is higher than that of the entire history of humankind before.

In the next 30 years, global demand for resources is expected to double when compared with today; one reason for that is that more people are now directly involved in this demand.

The challenge of sustainable land management in general facing this growth – based on the dynamic development of the population, the societies and the countries on Planet Earth – is

- to continuously create (more) value from real estate
- to continuously increase the use of necessary natural resources while saving nature
- to continuously enhance the quality of life for an increasing population.

For the first time in history the majority of the human population is living in urban settlements. "Mankind has entered the urban age" [7, 8]. The prosperity (or poverty) of the world goes along with the prosperity of the cities. "Urban transition" is a crucial challenge for a better (urban) future; evolution becomes urban. To realize "mass dreams of the modern metropolis" [15] it is necessary to conceptualize the 21the century metropolis as sustainable as possible.

This urban transition of global living conditions brings along several challenges concerning the use of land. The growing urban population needs decent affordable housing, sufficient and secure energy supply, efficient mass transportations systems, the spatial and social integration of different ethnical groups, safety from crime or terrorism, protection against dangerous weather conditions or natural catastrophes like earth-quakes etc. That is why land as a non-renewable resource has to be used efficiently and sustainably as well, especially in and around urban areas. "Cities occupy only 2 per cent of the Earth's surface, but they consume the majority of the planet's resources" [4].

Because of the diversity of challenges and the diversity of stakeholders involved it is obvious that land management cannot act unidimensionally. On the contrary, diversity – of people, of businesses, of landscapes, of neighbourhoods, of fauna and flora species etc. – can be seen as an opportunity. History shows that cities which are tied for instance to one single industrial branch, like the "motor-city" Detroit in the U.S., are stagnating or even diminishing, whereas highly diverse cities like Mumbai, Rio de Janeiro or Moscow are on the rise.

In the European Union more than two thirds of the population is living in cities [17]. The Ruhr Area, Germany's biggest metropolitan area, is an example how cities can avoid the risk to decline together with their economic past. Sustainable land management plays an important role in this success story.

Sustainable Land Management in the Ruhr Area

The Ruhr Area is located in the centre of Western Europe in the west of Germany. 53 cities occupying 2,435 square kilometer with more than 5 million inhabitants form one of the biggest and most important urban agglomerations in Europe. During the industrial revolution in Germany – since about 1850 – the Ruhr-Metropolis became the industrial heart of Germany, because of the large hard coal deposits. The energy intensive steel production industry settled next to the many collieries that gave the Ruhr Area the telling name "Kohlenpott" (Coal Pot). The heavy industry shaped the cities in the Ruhr Area and had also a strong impact on the environment and living conditions of millions of people.

But the mining industry is transitory by nature. Every deposit will be exhausted some day. Additionally, competition on global markets forces companies to change their strategies. For more than hundred years hard coal from domestic production was the basis for industrial success in Germany, even after World War II, when Germany started its "economic miracle", becoming one of the leading economies in the world. But since the 1960ies – 50 years ago – hard coal mining in Germany is in the state of continuous diminution. Because of relatively high production costs hard coal mining in Germany seems not to be capable of competing on the world market any more. Back in 2007, the German government has decided to stop financial support for the coal mining industry in 2018, because the European Union does not allow this kind of subsidies anymore. This led to a final mining closure program. The era of post-mining will begin [12].

The decline of the heavy industry had very severe consequences for business and the people in the Ruhr Area. But it still gave place for new opportunities. 50 years ago the later chancellor of Germany Willy Brandt developed the vision of a „Blue sky over the Ruhr", which included the idea of future oriented activities in business and society. 50 years later, compared to other European and non-European regions with a similar past, the Ruhr Area is a role model when it comes to sustainable development.

Land management regarding economic, social and environmental issues has a long tradition in the Ruhr Area. As a polycentric conurbation without dominating centre, there was a need for cooperation between municipalities. Cities grew around the production sites, a complex transportation network had to secure the shipping of goods and the mobility requirements of the population, energy and water infrastructure had to be built and maintained. Last but not least there was the need for recreational areas [14].

Back in 1920 a public institution devoted to land management was founded in the city of Essen, the "Ruhr Coal Settlement Association" (*Siedlungsverband Ruhrkohlenbezirk* SVR). Legally authorized by the state of Prussia, the SVR was installed as an umbrella body for the regional and local town planning

in order to "to limit the damage caused by the meteoric and reckless seizure of land for industrial purposes and to improve living conditions by easing transport problems and environmental pollution" [1]. The land management program of the SVR aimed at three targets: "putting forward proposals for allocating specific uses to areas throughout the region, setting up an efficient traffic network, and interlinking green spaces" (ibid.).

The successors of the SVR, the "Association of Local Authorities in the Ruhr Area" (Kommunalverband Ruhrgebiet, KVR, 1979-2004) and the Ruhr Regional Association (Regionalverband Ruhrgebiet RVR, since 2004) took over these major targets. The RVR is a public institution regulated by elected organs formed by representatives of the municipal council and district assemblies. Important stakeholder groups such as employers' organizations, trade unions, sporting, cultural and nature protection associations have an advisory function. Financial support comes from the municipalities, the federal state of North-Rhine Westphalia, the German Federal Government and the European Union.

One of the most important tasks of the RVR is the preservation of space – in other words: sustainable land management. The most successful strategic approach to fulfil this task is the transfer of open space into the ownership of the public sector. Since the 1960ies, the RVR and its predecessor KVR have acquired available open space to a total amount of now 18,000 hectares. The RVR is one of the biggest municipal owners of land and wood in Germany. Especially wasteland and conversion areas are acquired by the RVR supposed for ecological restorations [3].

The German Federal Nature Conservation Act from 1976 was a very powerful legal basis for the work of the RVR. The core of the act is the polluter pays principle: The polluter intervening in natural environment is responsible for the planning and implementation of the appropriate measures of compensation. This rule of intervention was integrated into the German Town and Country Planning Code (*Baugesetzbuch*) in 1998. In 2005 the law was amended substantially: Impact and compensation were temporally and spatially decoupled, so that compensation does not necessarily take place at the site of the intervention in the natural landscape. Compensation measures can now be implemented spatially separate from the site of impact. They can even be realized in advance in so-called ecological compensation accounts: a future polluter can allocate ecological credit points to compensate future measures [1].

The RVR offers Ecological Land Management as a service to companies or institution being bound to compensate ecological impacts. It carries out compensation and maintenance work within the property of the RVR. Of its 18,000 hectares land, around 5,200 hectares land are suitable for this kind of paid service. This delegated form of compensation creates a win-win-situation: the private or public polluter is not forced to engage in land management himself, the RVR gets a financial support for the preservation and development of open spaces and the safeguarding of natural resources. Compensation measures undertaken by the RVR comprise reforestations, conversion of existing forest stands to near-natural conditions, layout of orchards, extension of farmland, unsealing of surfaces, layout or restoring of waters, sustainable improvement of biotopes, species protection etc. Overall, the ecology-concerned activities of the RVR are part of a general open space concept for the Ruhr Metropolis.

The aim is to crate a continuous, graduated green system with regional green belts and local green connections, resulting in a network of landscape-related open spaces at the edge of estates through into the residential areas. A continuous system of footpaths then makes this network of open spaces accessible to the region's residents and visitors [3].

Carow and Lethmate give a hint that ecological and social aspects of sustainable land management are deeply linked in urban areas. Open green spaces do not only claim back natural resources from former industrial sites ore wastelands, they also enhance quality of life for the inhabitants.

An outstanding lighthouse project fostered the realisation of sustainable land management in the Ruhr Area: The International Building Exhibition Emscher Park (*Internationale Bauausstellung Emscher Park*, IBA) out of which arose the Emscher Landscape Park (*Emscher Landschaftspark*, ELP). Former industrial brown-field sites, mining waste tips and abandoned industrial buildings were transformed into parks and leisure facilities, cultural venues, bureaus and commercial zones. The UNESCO World Heritage Zollverein colliery (Zeche Zollverein) in Essen (Fig. 2) – the "Eiffel Tower" of the Ruhr Area – and many other sites of the industrial culture establish a positive identity for the Ruhr Metropolis inhabitants [14].

Fig. 2. Zollverein Colliery, UNESCO World Heritage

In addition to ecological and social issues, the conversion of former industrial sites makes a contribution to an economical sustainable development, too. The project of Ewald Colliery serves as an excellent example to illustrate this as figures 3 and 4 are showing. Until 1999, the colliery produced an output of approximately 2.5m metric tons per year. Its premises included around 0.44 sq.km of surface area, 2 shafts and more than 90 buildings. In 2002 a team consisting of architects, urban planners, technical authorities, municipalities and individual citizens developed a concept of how to utilize the surface areas. After that, the area was redeveloped, i.e. some buildings were demolished, other buildings have been restored and marketed. By now, a number of companies have found a new home at this location, including industries such as logistics, technology, services, crafts, commerce, leisure time and real estate, as well as catering and even a theatre [11].

At the same time, mine gas is extracted from the old shafts and sold. At the mine dump nearby, a wind wheel is being built to generate energy; in the medium term, a hydrogen competence centre is to be established at Ewald Colliery to promote the energy gen-

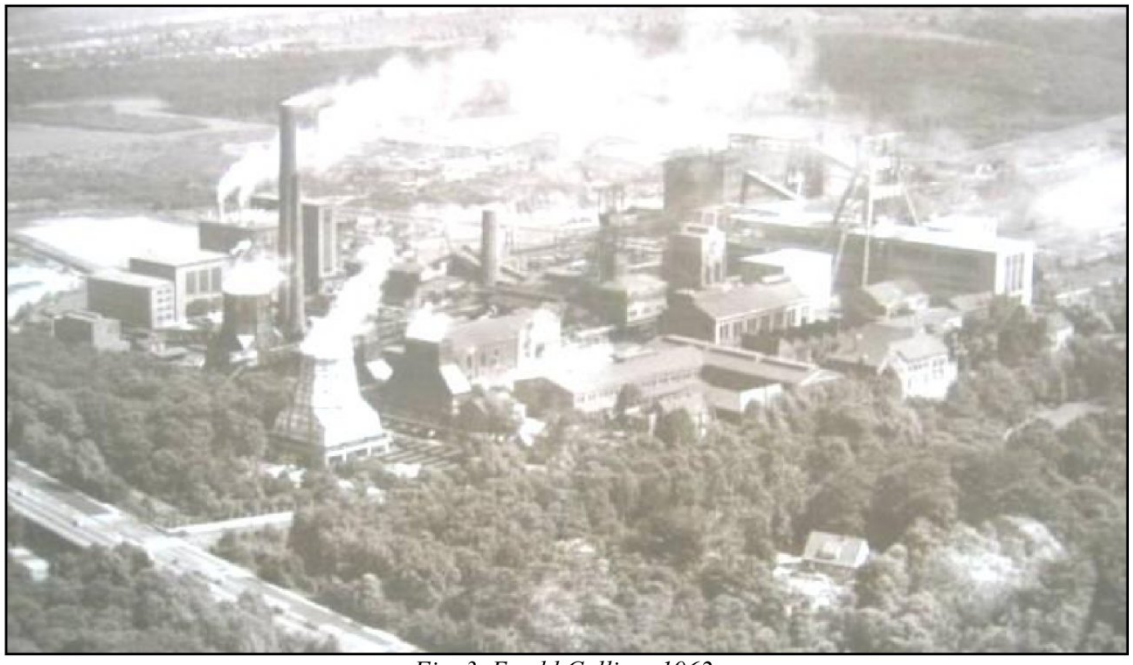

Fig. 3. Ewald Colliery 1962.

Fig. 4. Ewald Colliery 2015.

eration from hydrogen as a fuel. All of these developments show that the former colliery is being revamped as a world-class location which fulfils all criteria of sustainable development: new values, new jobs, and ecological recovery.

Conclusion

The RVR is playing a leading role in the stakeholder network of the Ruhr Area as the regional authority for integrated, future-oriented regional development [14]. It tries to combine the different interests of the stakeholders in this area to create win-win situations in a sustainable context. The ecological, social and economical change of the former heavy industrial region can serve as a role model for sustainable land management in urban areas. Beside of this, the experiences in the Ruhr Area are showing that the past is not necessarily a burden but can be a precious heritage to enhance towards the future – even in a region where industry has occupied the greater part of the land [11].

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