

Environmental management and planning in urban regions – are there differences between growth and shrinkage?

U. Weiland, M. Richter & H. D. Kasperidus
UFZ Environmental Research Centre Leipzig-Halle, Germany

Abstract

The question is whether the different processes in the development of growing and shrinking urban regions implicate the necessity to adjust and to differentiate between traditional environmental management and planning concepts. It is argued that urban planning in growing and shrinking urban regions does not require completely different planning procedures but locally adjusted solutions with better integration of sustainability issues. This paper briefly presents a conceptual approach that proposes a better integration of sustainability principles in planning processes by the categories *space management*, *resource management*, *spatio-temporal management* and *process management*. These categories will allow for complementing existing formal planning instruments with strategic, economic, and participatory approaches.

Keywords: urban shrinkage, urban growth, environmental management, environmental planning.

1 Introduction

At the beginning of the 21st century more than half of the global population is living in cities and urban regions, many of them in agglomerations. This major trend of global urbanisation is expected to continue during the next decades [1]. Urbanisation is related with multiple other issues of global change like changes in economic structures as well as in social and political structures and of cause with changes in environmental conditions. Facing the structural change from industrialized to service-oriented and information-based society, current urban functions are in continuous process of decline and reorganisation and/or revitalisation. International finance transfers and modified price building



procedures produce modified conditions and expectations in the regional division of labour. From this point of view growth and shrinkage are two sides of one coin. They represent different facets of the dynamic processes in urban development. Therefore, in many cities growth and shrinkage processes appear simultaneously.

Many cities and urban regions spread out due to business cycle expansion and the increase of jobs, commercial zones, inhabitants, and the resulting additional needs for space. Metropolitan areas grow more and faster than small and medium-sized cities and towns outside of metropolitan areas. The new urban structures of growing cities have been described as “inter-cities” [2], “regional cities” [3] or “network-cities” [4] connected with the request to acknowledge the chances they imply. In economic less favoured urban regions, cities loose jobs and inhabitants, gain derelict areas and fallow fields; the result has been discussed as “perforated cities” [5].

Obviously, the management of land use is insufficient – despite sometimes polished urban and landscape planning systems, and thus not only in Europe [6]. Government structures of agglomerations are often dissipated, and especially in fast growing agglomerations often not existent on the regional level. Thus, environmental problems cannot be solved in a regional context [7].

The formal planning forms are loosing importance given the “withdrawal of the state”. As economic processes speed up, the authorities have to act and react faster in planning processes. As more people participate in planning processes with the aim of safeguarding their interests, both the planning processes and the planning culture are changing. The importance of formal plans is being relegating by negotiations and bargaining between the administrations and investors as well as other private actors. Because growth and shrinkage processes occur simultaneously in most of the European urban regions – despite differences in the economic status and priorities in urban development strategies – locally adjusted approaches to urban development are required, that contribute to the guideline of “sustainable urban development”.

2 Environmental consequences of urban growth and shrinkage

Due to changes in production, household-structures and life styles, *suburbanisation* occurs in most urban regions, whether they are economically prospering or not. Suburbanisation is combined with an increase of individual transport and tangential traffic movements; between the growth of urban regions and the increase of traffic and resulting environmental problems exist a vicious circle. Although the average environmental pollution partly decreases in shrinking (parts of) urban regions due to the decline of economic activities and the loss of inhabitants, and although valuable wildlife areas can arise from wastelands [8], environmental loads remain substantial.

From an environmental point of view, suburbanisation, i.e. the *networking* of cities, causes a *fragmentation* of nature and landscapes, the transformation of habitats into different forms of land use and the loss of natural areas. Urban



sprawl and new traffic lines raise surface sealing, the dissection and loss of wildlife habitats as well as air and water pollution, and additional noise. Furthermore, suburbanisation impedes a considerable use of resources as well as resource sparing supply and disposal technologies.

Urban regions are “importers” and “intermediate stores” [9] of large masses and a large variety of resources [10]. The quantitatively most important fluxes are those of energy, water, food, and building materials. Because recycling processes exist barely, warmth, waste water, garbage, and waste air are deposit, pass through the urban environmental systems and cause local, regional, and partly global environmental problems. Urban regions contribute to the increase of greenhouse gases and thus to climatic change at a considerable amount [11].

Recent societal changes are connected with an acceleration of economic and societal processes. Between spatial and temporal structures exist dense but to date hardly recognized linkages; the changes with regard to time (speeding-up, just-in-time-production etc.) have a major influence on spatial structures

3 Environmentally sustainable development as basic principle of environmental urban management and planning

Despite environmental loads and structural problems, the urban style of dwelling with a high density of buildings is more environmentally sound than rural settlements or suburbs with respect to the average land and resource use per person. As there is no alternative to cities and urban regions, conceptual frameworks and approaches are required to make their *environmentally sustainable development* possible.

Environmentally sustainable development is a subset of sustainable development [12] that concentrates on the environmental issues with their related procedures and institutional structures. Environmentally sustainable development also comprises an ethical imperative: justice in the shared use of the environment; e.g. balancing the environmental quality against resource use is one of its basic elements. Moreover, environmentally sustainable development has to consider following basic principles [13]:

- *consistency* that balances societal and economic use of resources against the carrying capacity of the environment,
- an increase in the *efficiency* of resource use, and
- *sufficiency*, i.e. change of lifestyles as well as resource wasting consumption and production patterns.
- Institutional aspects comprise organisational and procedural aspects including the actors, who promote and materialise an environmentally sustainable development.

4 Research and action fields of environmental urban development

Transferring the general concept of environmentally sustainable development to environmental urban development requires a conceptual framework for relevant



research and action fields [14]. They can be classified by the dimensions they address:

- *Space management* in a two-dimensional or spatial view,
- *Resource management* in a three-dimensional or “functional” view,
- *Spatio-temporal management* in a four-dimensional view, and
- *Process management* in a “five-dimensional” or procedural view.

Consistency, Efficiency and Sufficiency are relevant objectives of space, resource and spatio-temporal management; institutional aspects are relevant for the process management. They all are relevant for both, growing and shrinking urban regions, though with different priorities, that have to be defined by the local communities.

4.1 Space management

In order to reduce environmental pressures and maintain the environmental carrying capacity, an effective steering of land use requires space management. Space management is the data-based activity to monitor and align the patterns of land use and land(scape) functions to the desired goals. Criteria that should be considered in *quantitative space management* include aspects like:

- density of buildings and mixture of uses,
- re-use and recycling of building areas as well as commercial and industrial wastelands, and
- compensation of the land utilization for housing, industrial, commercial, and traffic zones.

In many European regions new settlements like family houses, commercial zones and shopping centres are destroying natural and semi-natural landscapes; a process that should be controlled by legislative orders. In old industrial areas which are now abandoned, another problem predominates: Due to a high density of buildings with high percentages of soil-sealing there is a lack of greenspaces for the inhabitants in their surroundings. Within a city quarter a good balance between open space (especially urban green areas) for recreation and urban density has to be found [15].

A *qualitative space management* aims at the careful and environmentally sound use of surface and soil. Not only has the land use itself to be taken into account, but also its functionality and the drivers of its use intensity.

Several *approaches* to space management in regional and urban planning already exist. Spatial and environmental plans classify areas and place constraints on land use. Regional plans control land use e.g. by defining priority, provisory, and suitability areas. Large cities attempt space management in their surroundings, which includes open spaces in “Regional Parks”. However, this list is by far not complete. In the summary, these instruments cover only parts of a space management; research needs still remain. The existing approaches to space management have to be extended at regional and local scales in the following aspects:

- *Co-operative development of guidelines for sustainable land use*: Land use guidelines allow for steering towards sustainable development; they should serve as base for land use decisions. They should meet and make more



- explicit the basic principles consistency, efficiency, and sufficiency. Finding them in co-operative processes by the discussion of all relevant societal groups enhances their acceptability.
- *Consideration of environmental, health and nature protection aspects by environmental planning:* a space management towards an environmentally sustainable development requires also an integrative handling of environmental, health and nature protection aspects and their consideration in spatial planning. A process of segregation according to income and ethnical groups can be observed in many cities [16]. The result is that the people with higher income are living in areas with better environmentally quality whereas the poorer people are living in environmentally less favoured areas e.g. in houses along the main roads. Due to this effect on health controlled by the household income, there is the need to consider and define minimum standards for the environmental conditions in urban regions as a social aspect of spatial planning.
 - *Open space networks and habitat systems* are useful for both nature protection and human recreation purposes in all cities and urban regions.
 - *Use of economic instruments:* an effective control of land use requires supplements to spatial planning and a change in the general conditions of planning. The *general* steering of land use can be managed efficiently by economic instruments, e.g. financial incentives, taxes and contracts with private investors or actors. The spatial plans then serve as framework for the *detailed, spatial development*.
 - *Development of a land use register:* To date, the real land use and its intensity often cannot be stated exactly, because an adequate procedure, allowing for a periodical gathering of recent information on land use changes, is missing. Detailed information on the density and distribution of building structures, open spaces and technical infrastructure are a basic prerequisite for a land use management towards environmentally sustainable development. In the complex research area of monitoring land use changes, there was a good progress during the last twenty years so that we can hope to have good monitoring procedures on a high spatial resolution within the near future.

The measures presented above are challenges for spatial and environmental planning, because they partly require new organisational structures and instruments, and a close co-operation of spatial and environmental planning administrations.

4.2 Resource management

Subject to resource management conceptions are not only the resource uses in cities and urban regions, but also the exchange processes of resources between (urban) regions partly on global scale [17].

Main objective of a *quantitative resource management* is the reduction of use, fluxes, and emission of materials, energy and waste (materials, air, water). Beyond that, the potential risks of materials and energy should be taken into account by a *qualitative resource management*.



Aspects of resource management have been realized e.g. by pilot projects, by industrial re-use of resources and recycling products. Also sale and sales promotion of regional products are part of a resource management. But until yet, the perspectives and constraints of a resource management in cities and urban regions have not yet been investigated systematically. Details of an urban-regional resource management are still unclear, but the general need for development can be characterised as follows:

- *Co-operative identification of guidelines for sustainable resource management*: the carrying capacity, the efficiency of resource use and the sufficiency in lifestyles can serve as basic principles for the use of resources by production, housing, and consumption.
- Elaboration of *material and energy flux analyses* [18] that allow for accounting and assessing the resource uses and setting priorities to actions.
- *Development of an equivalent data base*: To date, information on material and energy fluxes in and between urban regions is barely available. In order to construct a resource management system at affordable costs, the most important material and energy fluxes have to be identified and monitored.
- *Involvement of the resource user*: Because the producer and the consumer use resources, a resource management system should integrate both groups, and both should be involved in the development of a resource management system. Here, the gap between the people's knowledge about environmental problems and their behavioural consequences have to be taken into account.

The development and implementation of a resource management system will be difficult, because the expansion of functional networks, the European integration and globalisation processes cause international and global transfers of goods and economical pressure on companies and households. Material and energy fluxes are linked to an extent that it is necessary to identify which products and materials can be subject to an urban-regional resource management in an effective way.

4.3 Spatio-temporal management

The time span of several generations, which is relevant to environmental precautions and long-term stability, and which is a basic part of the sustainable development concept, is not adequately grasped by standard policy-making as well as in business planning and urban and regional planning; they realise mostly short-term up to mid-term time horizons. However: trying to take into consideration the long-term perspective causes considerable epistemological, conceptual and methodological problems because the future development of urban systems is unpredictable and therefore planning activities often fail to anticipate unexpected events, trends and developments. To deal with such problems and with long-term perspectives in complex systems is a domain of future research which supplies a set of methods designed to support the process of thinking about the future, of forecasting and of analysing global change [19]. The analysis of related spatial and temporal structures should take into account the relationships between societal time and spatial use in order to optimise both mutually in all development and planning tasks.



A mapping of the spatio-temporal uses of land and infrastructure can document uses and their intensity dependent on where and when they happen, so that both, “under-use” and “over-use” can be identified. The analysis and documentation of use intensities will deliver the necessary, basic information to steer towards a balance or compensation of use intensities.

Especially in shrinking urban regions we find new, temporarily limited categories of land use (e.g. beach volleyball or sheep grazing on fallow land within the city) [20]. This new land use concepts emerge out of the needs of cities inhabitants together with special opportunities (unused land in shrinking cities). A new approach of spatial-temporal management therefore has to take into account that these new land use concepts often are organized from the inhabitants living nearby in a bottom-up approach.

A “*policy of time*” could help to find long-term perspectives for cities or urban regions that allow for steering the urban development towards an environmentally sustainable development.

4.4 Process management

The shift in importance from formal state-planning to informal project-planning and public-private partnerships requires an adjustment of the organizational structures and instruments of spatial and environmental planning – and especially the introduction of a *management procedure* including the setting of objectives, monitoring, and controlling. In order to develop projects within the framework of environmentally sustainable development, a management approach to planning and supplementing instruments is required (Fig. 1):

- *Strategic orientation of planning*: a planning, that is realised by many actors, is a political and especially a communication process. In order to facilitate a democratic control of negotiations and results, planning processes need a strategic orientation of planning at all political levels. A national strategy for (environmentally) sustainable development can supplement regional and local strategies, containing guidelines, principles, aims, and targets of environmentally sustainable development.
- *Vertical co-operation*: a vertical co-operation and co-ordination between the different political levels - the international, national, Land, regional and local level - is necessary. This vertical co-operation is well known in formal spatial planning as “feedback-principle”; it should be transferred to and used by informal planning, regional development initiatives and agenda initiatives, too.
- *Horizontal co-operation and co-ordination*: formal planning, informal planning and development as well as the activities of regional and local agenda 21-initiatives should be co-ordinated in order to avoid divergences between political and planning activities as well as inefficacy and inefficiency in planning.
- *Evaluation and control*: the „de-formalisation“ of planning requires monitoring and assessment of spatial development results with sustainability indicators. This evaluation shall allow for control, whether the economic,



social, environmental and cultural development meets the requirements of environmentally sustainable development.

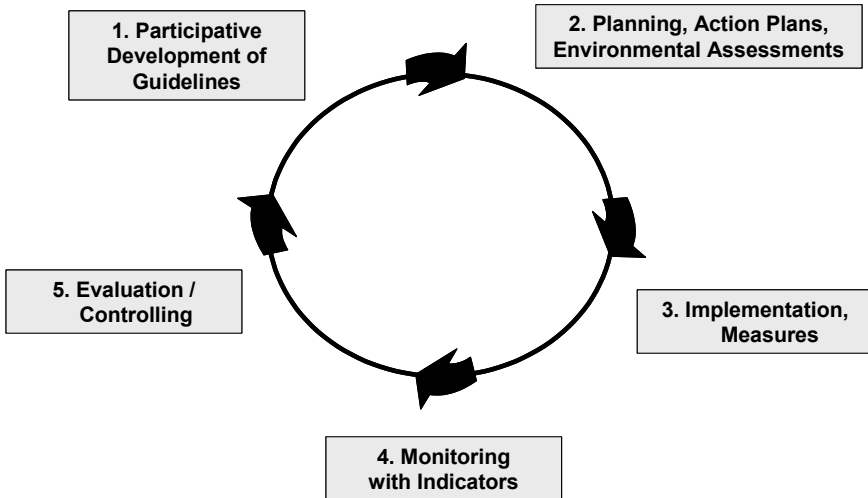


Figure 1: Management cycle as central element of process management.

5 Conclusions

Despite the differences between growing and shrinking cities and urban regions, environmental problems remain severe in many areas of both. The mixture of growth and shrinkage in the same city and urban region does not require completely different approaches, but locally adjusted solutions. Temporarily limited new land use categories in shrinking cities are organized preferably in a bottom-up approach by the inhabitants and therefore are *not planned* in a traditionally sense of the word *planning*. Developing space, resource and spatio-temporal management and a new process-oriented and co-operative planning culture requires interdisciplinary and trans-disciplinary work and research. We are at the beginning of this process where the formal instruments have to be complemented by new participatory approaches using strategic as well as economic approaches. A strategic orientation of planning, that encompasses a strategy for sustainability, with aims and target concepts at all political levels can provide guidelines to decisions and help to legitimise the results of negotiations. The application in practice will show if this approach is successful.

References

- [1] United Nations, World Urbanization Prospects – The 1999 Revision. Population Division, Department of Economic and Social Affairs, United Nations Secretariat, 2001.
- [2] Sieverts, T., Zwischenstadt. Bauwelt Fundamente 118. Braunschweig/Wiesbaden, 1996.
- [3] Sieverts, T., Die Stadt in der Zweiten Moderne, eine europäische Perspektive. In: Informationen zur Raumentwicklung nr. 7/8, pp. 455-473, 1998
- [4] Baccini, P. & Oswald, F. (eds.), Netzstadt. Transdisziplinäre Methoden zum Umbau urbaner Systeme. ORL + EAWAG, ETH Zürich. Zürich, 1998.
- [5] Lütke Daldrup, E., Die perforierte Stadt – Eine Versuchsanordnung. In: Keim, K.-D. (ed.): Regenerierung schrumpfender Städte – zur Umbaudebatte in Ostdeutschland. REGIOtransfer 1. Erkner, pp. 193-203, p. 198, 2001.
- [6] Bengston, D.N., Fletcher, J.O., Nelson, K.C., Public Policies for Managing Urban Growth and Protecting Open Space: Policy Instruments and Lessons learned in the United States. In: Landscape and Urban Planning 69, pp. 271 – 286, 2004.
- [7] Atkinson, A., Dávila, J.D., Fernandes, E., Mattingly, M. (eds.), The Challenge of Environmental Management in Urban Areas. Ashgate. Aldershot, p. 5., 1999.
- [8] Herbst, H., The Importance of Wastelands as Urban Wildlife Areas - with Particular Reference to the Cities Leipzig and Birmingham. UFZ-Bericht nr. 2. Leipzig, 2003.
- [9] Baccini, P. & Bader, H.P., Regionaler Stoffhaushalt. Spektrum Akademischer Verlag. Heidelberg, 1996.
- [10] Chambers, N., Simmons, C., Wackernagel, M., Sharing Nature's Interest, Ecological Footprints as an Indicator of Sustainability. Earthscan, London and Sterling, 2001.
- [11] Dávila; J.D. & Atkinson, A., Organisation and Politics in Urban Environmental Management. In: Atkinson et al., The Challenge of Environmental Management in Urban Areas. Ashgate. Aldershot, pp. 193-202, 1999.
- [12] WCED (World Commission on Environment and Development), Our Common Future. Oxford University Press, New York, 1987.
- [13] Weiland, U., Environmentally Sustainable Development of Cities and Urban Regions - Challenges for Spatial and Environmental Planning. In: Bastian, O. und Steinhardt, U. (eds.): Development and Perspectives in Landscape Ecology - Conceptions, Methods, Application. Kluwer Academic Publishers. Dordrecht/Boston/London, pp. 397-189.
- [14] Tjallingii, S.P., Ecopolis: Strategies for Ecologically Sound Urban Development. Backhuys Publishers, Leiden, 1995.



- [15] URGE-Team, Making Greener Cities – A Practical Guide, UFZ-Bericht Nr. 8, Städtökologische Forschungen Nr. 37, UFZ Leipzig-Halle GmbH (Leipzig), 2004.
- [16] Tönnies, G., Demographischer Wandel in Großstadregionen. In: ARL Nachrichten 3, pp. 47 – 48, 2004.
- [17] Atkinson, A., Dávila, J.D., Fernandes, E., Mattingly, M. (eds.), The Challenge of Environmental Management in Urban Areas. Ashgate. Aldershot, p. 3., 1999.
- [18] Haberl, H., Fischer-Kowalski, M., Krausmann, F., Weisz, H., Winiwarter, V., Progress Towards Sustainability? What the Conceptual Framework of Material and Energy Flow Accounting (MEFA) can offer. In: Land Use Policy 21, pp. 199 – 213, 2004.
- [19] Glenn, J.C. & Gordron, T.J., Futures Research Methodology – Version 2.0. American Council for the United Nations University, Washington, DC. The Millennium Project, CD-ROM, 2003.
- [20] Bundesamt für Bauwesen und Raumordnung (ed.), Zwischennutzung und neue Freiflächen. Städtische Lebensräume der Zukunft. Berlin, 2004.

