

Sustainable urban development

Scientists at the UFZ are investigating urban processes such as transformation, demographic change, expansion and contraction of urban areas, the transport of pollutants and their effects on mankind and the environment. They draw up scenarios and models to help secure a sustainable urban development and quality of life. In doing so, they take into account social, planning, legal and economic components of both urban and natural environment processes, and work closely together with the movers and shakers of urban development – for example, town planners, town administrators, residential property companies and town dwellers.

SPEAKER FOR THE RESEARCH TOPIC "SUSTAINABLE URBAN DEVELOPMENT AND QUALITY OF LIFE":
DR. SIGRUN KABISCH, HEAD OF DEPARTMENT OF URBAN AND ENVIRONMENTAL SOCIOLOGY.

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Sigrun Kabisch, Kristin Schirmer and Marlis Heinz

Farewell to the town?

For many decades towns and cities were synonymous with growth, implying more people, houses, infrastructure and economic power. Towns and cities expanded, swallowing up nearby villages and, in particular, natural areas. While this trend continues in regions with strong economic growth, other areas are concerned about losing inhabitants. Since the 1990s, towns and communities of the former GDR have been slowly bleeding to death. What will be their fate in the 21st century? Social and natural scientists at the UFZ are investigating the causes and effects of urban processes on people and the environment. They are developing scenarios and models for a sustainable form of urban development to secure the quality of life.





Numerous cities are shrinking. Landlords and property owners are attempting to keep the number of empty buildings within limits by resorting to demolition or promptly renovating them to increase their value. However, what is life like in towns that are hollowing out?

It is as if a film of the 1970s was running backwards. The crane lifts up panel after panel from the 16 storeys of the building and lowers them to the ground; the high-rise apartments that had until recently towered over Leipzig-Schoenefeld now dwindle floor by floor. From time to time, one of the sociologists of the UFZ takes out a camera and records the progress of this deconstruction. They could hardly wish for a better illustration for their scientific work than the scenario being played out just in front of their office windows.

However, research on sustainable urban development covers a wide range - everything from an analysis of the individual

microorganisms to a justification of the very latest urban development strategies. Research topics in an urban context are now of such complexity that a single discipline can no longer cover them. Yet you simply cannot toss together the statements from biologists or sociologists or geologists or legal experts to get in-depth statements. Experts from the various disciplines really need to work together and to constantly coordinate their ways of thinking.

The urban-related field of research at the UFZ covers several areas. For example, under the heading of "urban ecology and urban development" the scien-

tists tackle questions related to ecology, management and environmental planning in towns and urban regions. For instance, they examine the biological diversity of urban vegetation so as to be able to make recommendations for the protection of nature. Also, aspects related to health policies play a role in urban development. Large sections of the population, and children in particular, increasingly have to struggle with respiratory problems and allergies. Here it is essential to track down the environmental pollution that causes these complaints and, if possible, to make predictions when decisions have to be made.



Medicaments in the tap water?

Sociologists initially look at the reconstruction of the town from their own perspective. Their starting point: the number of people in our cities is dropping, and it is mostly the young, active and the relatively affluent who are turning their backs on the city. Is this going to upset the functional balance of the big towns and cities? The existing infrastructure is being used – and financed – by an ever smaller number of people.

This puts a question mark over schools and water treatment plants as well as residential areas, local transport systems, libraries and many other components that make up the fabric of a town. And this is not just a financial problem. Does a reduction in water flow through the drinking water supply system entail the possible risk of a more rapid development of bacteria in the pipes? On this point, biologists stand shoulder to shoulder beside the sociologists. If people in the city centres become increasingly older on average, it can then be assumed that the amount of medicaments consumed by each inhabitant will rise. At the same time, is it also to be feared that increasing amounts of these substances will get into the groundwater through the waste water and sewage and from there into the drinking water? In order to be able to answer this,



micro-contamination of the water is one of the topics associated with the research field of sustainable urban development. The goal is to determine what risks there are to human health and the ecological system from micro-contami-

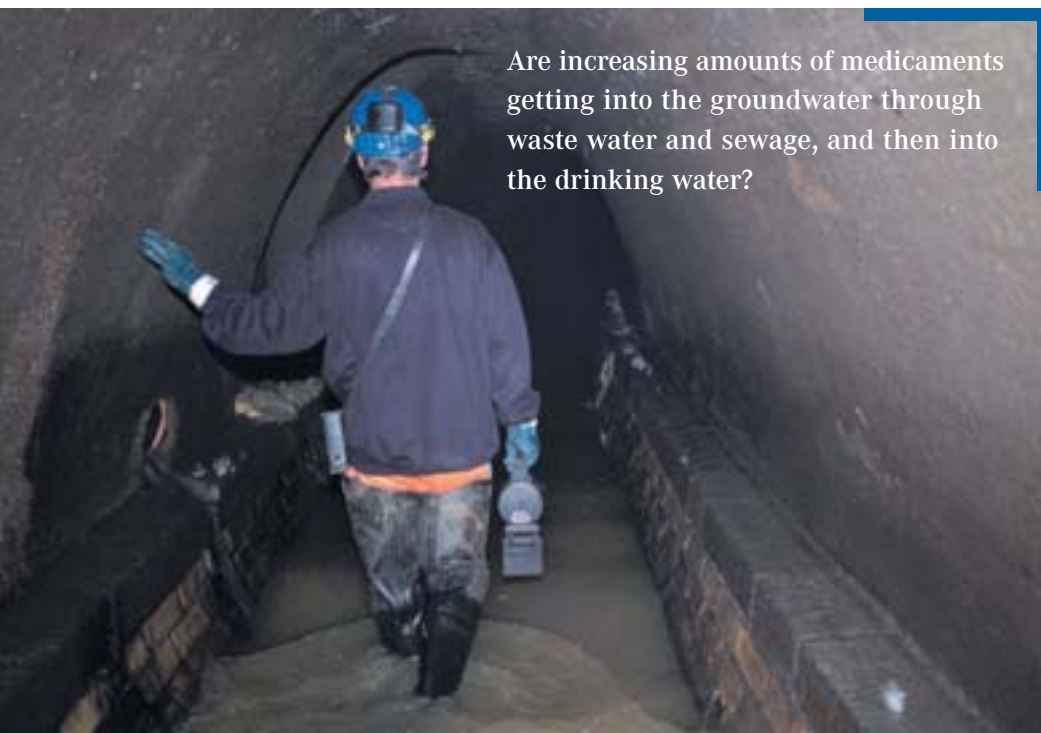
Can our society afford the luxury of maintaining all the existing settlements when the number of inhabitants continues to drop?

nation. Is the person who swallows a glass of supposedly clean water unknowingly ingesting medicaments from previous water cycles? In order to be able to mechanistically understand and better quantify the behaviour of micro-contaminants, primarily at the interfaces



of air, soil and water, the “WASSER Leipzig” concept (Water And Sewershed Study of Environmental Risk in Leipzig) is being developed. Here scientific research questions are brought together with sociological urban analyses.

Are increasing amounts of medicaments getting into the groundwater through waste water and sewage, and then into the drinking water?



Analysing “the prefabs” without emotion

The research results of the UFZ do not, of course, remain in the scientists’ filing drawers but also attract considerable interest from the decision-makers. For example, Wolfgang Tiefensee visited the research centre while he was still mayor of Leipzig. He was given information on the long-term study that had been made of the Gruenau residential area since 1979 and was greatly surprised by some of the outcomes. Results from a number of regularly conducted questionnaires showed a recent increase in the proportion of people who like to live in the Gruenau residential area, built in the 1970s and 1980s. When asked if they would advise a good friend to move into this area, in 1979 around 78% answered “Yes” without any reservations, in 1987 it was 61%, but the absolute low point was reached



USEFUL INFORMATION

in 1995 with a figure of 33%. However, in 2004 the interviewers found that 60% of the people had nice things to say about Gruenau. This change of view came about as a result of renovation work and new infrastructure. The people who live in Gruenau today now want to remain. Analyses of this sort prevent overly emotional and highly partisan debates about “the prefabs”, may put bold plans for demolition in another light and also help in making decisions as to which parts of the areas within Gruenau should be consolidated. If 60% of the inhabitants want to stay, then Gruenau has a future. At any rate we should now give the area a respite and allow the new structures to stabilise, according to the interim summary.

Anyone who is expecting a potpourri of simple recipes for sustainable urban development is on the wrong track. The task of the UFZ scientists is to explain the status quo and how it arose, and to make statements on further development. In doing so, they highlight the opportunities and limits of re-urbanisation and pass on this know-

What risks are involved with a **megacity** as a place to live in is currently impossible to tell. For that reason, researchers from five (as of now) Helmholtz centres have combined forces for a new research initiative under the overall guidance of the UFZ. In Latin America they will work on strategies for sustainable development in megacities and conurbations on the basis of Santiago in Chile. Scientists will research land usage conflicts, risks posed by nature, social polarisation within the various areas, air pollution and hazards to health, deficiencies in the supply of energy and water and the disposal of waste. The Helmholtz initiative is linked with the programme initiated by the Federal Ministry of Education and Research [BMBF] “Sustainable development of the megacities of tomorrow” and the main programme “The informal dynamics of global change” of the German Research Foundation [DFG] as part of a “national research initiative on megacities”.

ledge to partners involved with the practical side.

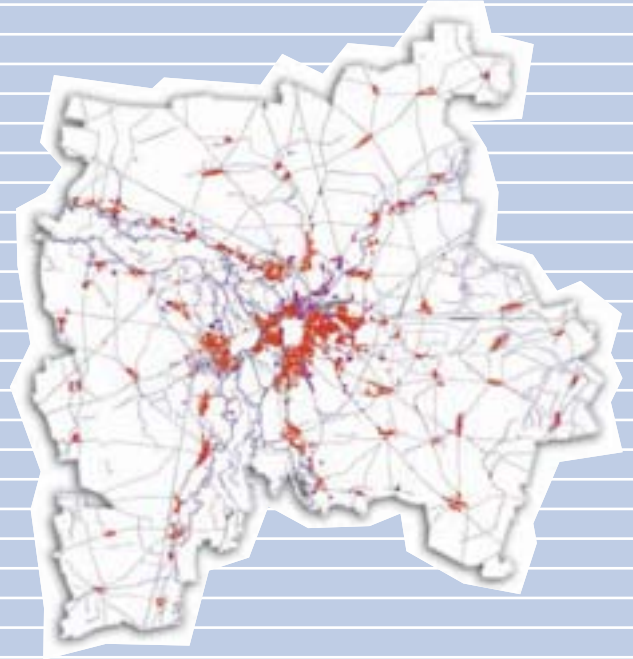
Furthermore, the researchers add a new twist to the problems posed and tackle topics previously tabooed, pushing hard for a fundamental rethinking on the future of the urban communities: can our society afford the luxury of maintaining all the settlements that currently exist when the number of inhabitants continues to drop? And, for example, what will happen over there in Schoenefeld when the 16 storeys disappear bit by bit? How do the inhabitants of the buildings that are still standing feel about the demolition? Are they relieved, or do they also move away? However, the sociologists have to hurry up with the photography, because in a few days the relatively short life of that apartment block, which only stood for three decades, will finally be over. ■

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LEIPZIG IN 1870

Dagmar Haase and Marlis Heinz

A red fleck on the landscape



The small red fleck on the screen represents Leipzig in 1870, surrounded by farmland and woodland. Industrialisation gets into gear at the touch of a button, the red spreads out and gobbles up the open areas, it changes the course of rivers, swallows the woodland ... now they are all history. All urban development until the present day can be recorded and tracked with relatively little difficulty in a sort of time-lapse film. However, when we come to today, we are faced with the question as to what will happen with towns and cities in the future? How much further will the red spread out? Will it break up at the centre? And what will fill the empty spaces then? Or will the fleck shrink again one day?

Perpetual growth?

Scientists around the world have been attempting for decades to model such processes. This means they are attempting to generalise all data on the development of towns and cities to date in such a way that they can use past trends to derive a sort of equation for the future.

Also, scientists of the UFZ are working on the modelling of urban landscapes. They get the necessary facts either from the UFZ itself or from outside. These range from the state of the stock of buildings to the situation of the people living there as obtained from empirical questionnaires; from the proportion of green spaces to the density of traffic;

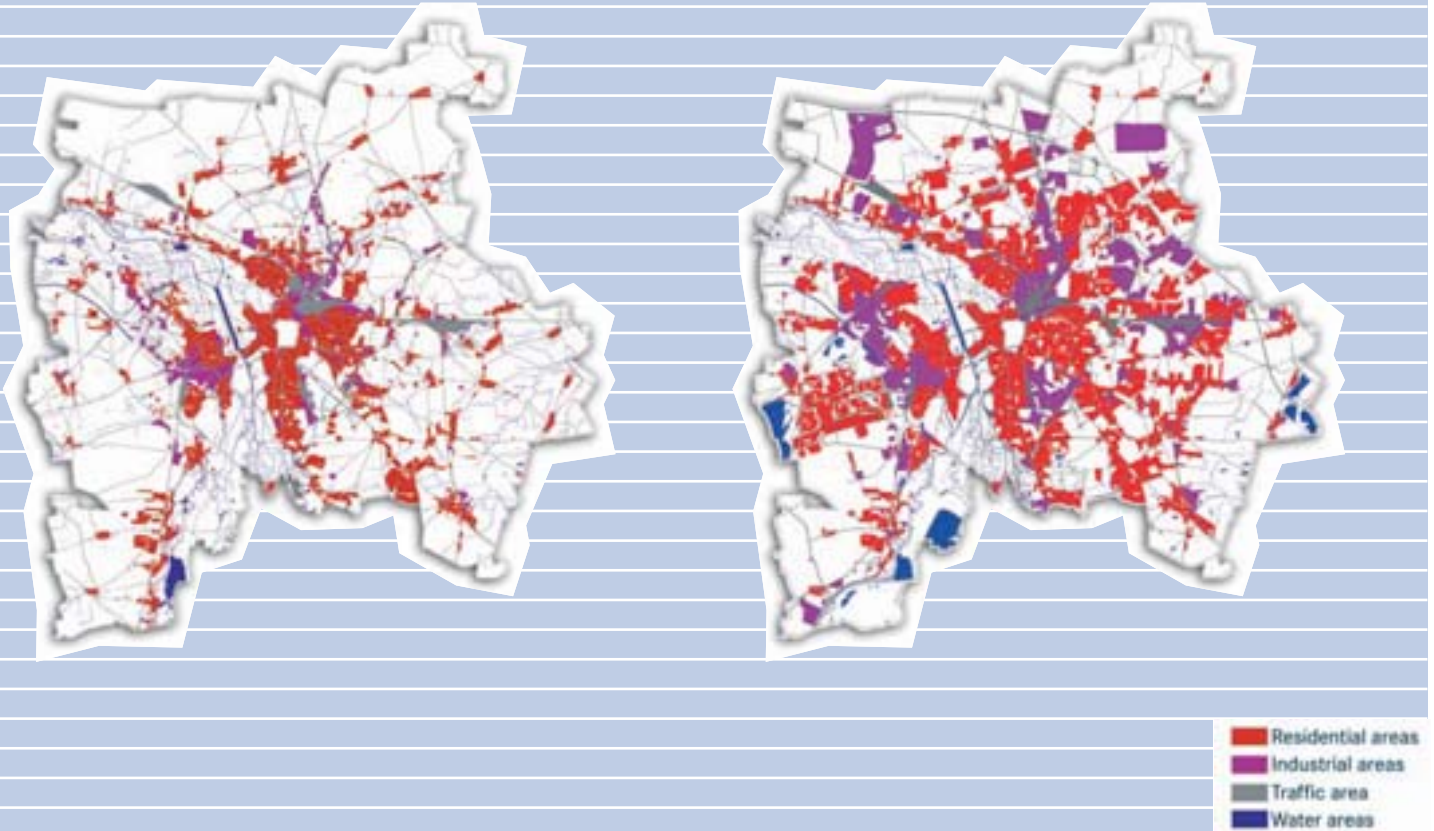
from the presence of individual types of animals to climatic peculiarities. As the insatiable hunger for data by a model, such as that at the UFZ, can be satisfied from all directions, we can also talk of interdisciplinary modelling. In this way it is possible to combine social scientific findings and knowledge that is difficult to quantify with exact spatial information. Nebulous concepts such as “feeling good” are thus fed into this system along with exact measurements. Each grid point within the urban landscape, such as the line of a street, to take an example, is then assigned a certain development potential during the next step in the modelling. Then the changes start to show themselves.

Modelling the use of land in the area of present-day Leipzig in 1870, 1940 and 2003

Graphic source: Dagmar Haase, UFZ

LEIPZIG IN 1940

LEIPZIG IN 2003



Each cell does what it has been programmed to do. This resembles a biological process that can, like the growth and death of a tree, be calculated for the future.

Shrinking according to a model

Urban modellers at the UFZ are not alone in doing this work, combining inputs from multidisciplinary groups. However, their intention is to fill a gap in the international “model market” that is dominated by simulation of growth. They want to model shrinking cities. These models are intended to show how to maintain the quality of life in a sustainable way despite falling numbers of inhabitants. Shrinkage

models of this type could illustrate the new social, economic and ecological qualities of a perforated town, whose face no longer corresponds to our centuries-old impression of European dense and compact towns.

A great deal of what the town modellers at the UFZ calculate is done on the basis of the city of Leipzig. For example, on a mosaic-like map of the recently built-up area of Gruenau they have calculated just how long the average route to the nearest school is. On another map they have shown the proportion of green areas in the immediate vicinity. This assigns various qualities to the residential area and can thus form the basis for planning decisions. Where

should the high-rise apartments be pulled down? Where could single-family houses be put up? And where would it be fatuous to destroy existing structures?

Nevertheless, even if Leipzig often serves as the object of the research, the actual goal of the modellers is an ever-improving model with widespread applicability. After all, the designation of “shrinkage patient” that is applied to towns in eastern Germany will no longer be a special case in the not-too-distant future. ■

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Wolfgang Köck and Marlis Heinz

Legislation for more green

There is so much that man can do, almost as he thinks best; he can rebuild or restructure ever more areas, he can create extreme temperatures or achieve speeds greater than sound. However, other than in coastal areas, it is impossible to create virgin land. Only when it lies undamaged at our feet does the water cycle function, and flora and fauna flourish. Our food grows in the soil, the air that we breathe depends on it.

And yet mankind treats land as if it will keep on growing. Towns sprawl across adjacent areas and bury living nature under shopping centres, industrial plants, industrial and commercial areas, residential areas, roads and railways. Around 120 hectares of land in Germany are currently sacrificed every day for buildings and roads. And this against the background of a population that is

The current requirement for around 120 hectares of new land each day for housing and transport is to be reduced to 30 hectares a day by 2020 and to zero in the long term.

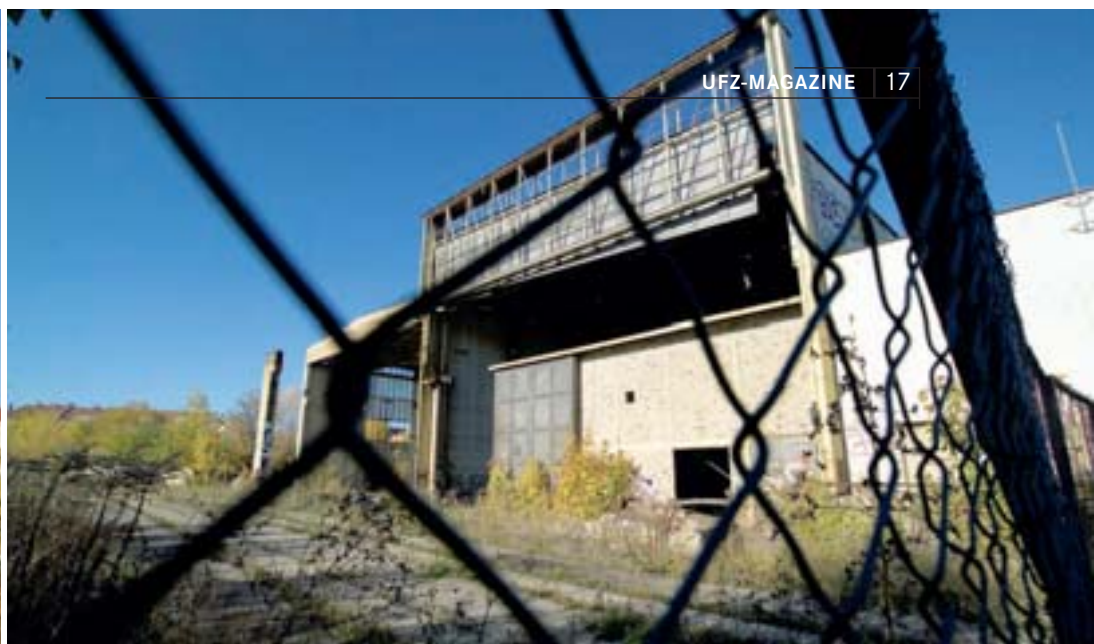
stagnating, or even declining in some regions. In theory, this would mean a reduced need to pave the living earth – but that is merely in theory.

Who is going to apply the emergency brake?

Experts observe this trend with great concern because it has significant negative effects on the natural function of the soil. The strategic goal is the increase in the growth of areas taken for housing and

traffic to be reduced to a maximum of 30 hectares a day by the year 2020. Per day – that means that the expansion will not come to an end, merely that its advance is to be slowed down. However, from a long-term point of view no further new land at all should be used for buildings and roads according to the recommendations of the expert advisory council for environmental matters, an advisory committee of the German Ministry of the Environment. The demand for land to use for building and the construction of roads should be secured by a form of recycling of used land areas, such as brownfield redevelopments.

However, how can a land recycling system of this kind be set up? Legal experts in environmental matters at the UFZ in Leipzig-Halle have set themselves the task of converting the general requirement of land use reduction from an



areas

If not, then how can they be applied in a way that restricts the freedom of local decision-making as little as possible? What consequences would there be from a policy of enforced conservation of land, and what effects would it have on the distribution of land? Could synergies be created? Is conservation of land viable, not only from an ecological point of view, for example as a result of reducing transport pollution, but also socially – and as a result of a reduction in infrastructure costs – economically as well? What can we learn from other countries?

Thus legal experts are deliberating together with their scientific partners both within and outside the UFZ on, among other things, whether completely new economic instruments such as

negotiable rights to develop land, for example, in much the same way as the trade in emission rights would be useful. A municipality would have available a legally specified number of land use permits for construction purposes. If it does not use this right, it could then be sold to another municipality. In theory this sounds highly attractive, but how would it actually work in practice? Based on various planning models set up with partners from towns and communities it shall now be determined how such an instrument would affect local decisions so as to be able to come up with realistic recommendations. ■

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ecological point of view into an instrument that can be applied from a political and a legal point of view. They cooperate with political scientists, geographers, planners, biologists and sociologists, which is a good precondition for searching for the right questions and finding the answers to them.

Tradeable land use permits?

There are numerous examples of questions that scientists are working on at the moment. Can it be expected that the problem of increasing land usage will resolve itself through demographic trends? What trends in the land usage can be predicted? What are the land use impacts of the existing governance structures for making local and regional land use planning decisions? What steering mechanisms does the state have at its disposal? Are its instruments effective?

