

Statement of the SURE President

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Global ecological challenges on the way to Green Cities

New books are available, good ideas need to be implemented!

Breuste, J. (2022): *The Green City. Urban Nature as an Ideal, Provider of Services and Conceptual Urban Design Approach*. Springer Spektrum, Berlin Heidelberg

Breuste, J.; S. Pauleit; D. Haase; M. Sauerwein (2021): *Urban Ecosystems. Functions, Management, Development*. Springer Spektrum, Berlin Heidelberg

Breuste J (ed), Artmann M, Ioja C, Qureshi S (co-eds.) (2020) *Making Green Cities – Concepts, Challenges and Practice*. Springer, Cham, Switzerland. ISBN 978-3-030-37716-8 (Cities and Nature Series)

Cities are the most attractive place to live for people worldwide. They offer the hope of a better life than in the countryside and what is often lacking or less available there: jobs with a secure income, health care, education, entertainment and social advancement. For many, however, this remains just an unrealized hope, which does not diminish the attractiveness of cities.

At the beginning of the 21st century, the threshold of seven billion people on earth was exceeded. **More than 50% of the world's population now lives in cities**. At the beginning of the 20th century it was only 13% and by the middle of this century it is expected to have increased to 70% (around 9 billion people). Although the number of megacities is around 400 today, a large part of the urban population lives in small and medium-sized cities, which will also support **future urban growth worldwide**. We have a lot of information about the 19 megacities with more than 10 million inhabitants, such as Shanghai, New York or Mexico City. In Europe, there are approximately 1000 cities with more than 50,000 inhabitants, but only 7% of the population lives in cities with more than 5 million inhabitants. Ecological phenomena are often related to city size and structure. They are different in small and medium-sized towns than in large cities or megacities, and their relevance to urban development and the living conditions of people in cities also varies depending on the size of the city.

Since cities are first and foremost **living spaces for people**, enabling healthy living conditions is the top priority for the organization of cities. This means assuming very different living conditions for large parts of the urban population worldwide and improving them through planning and targeted measures. Urban elites around the world have mostly taken care of optimally spatial organizing their

urban living conditions, without worrying about the rest of the urban population. This is not different e.g. in America than in Africa.

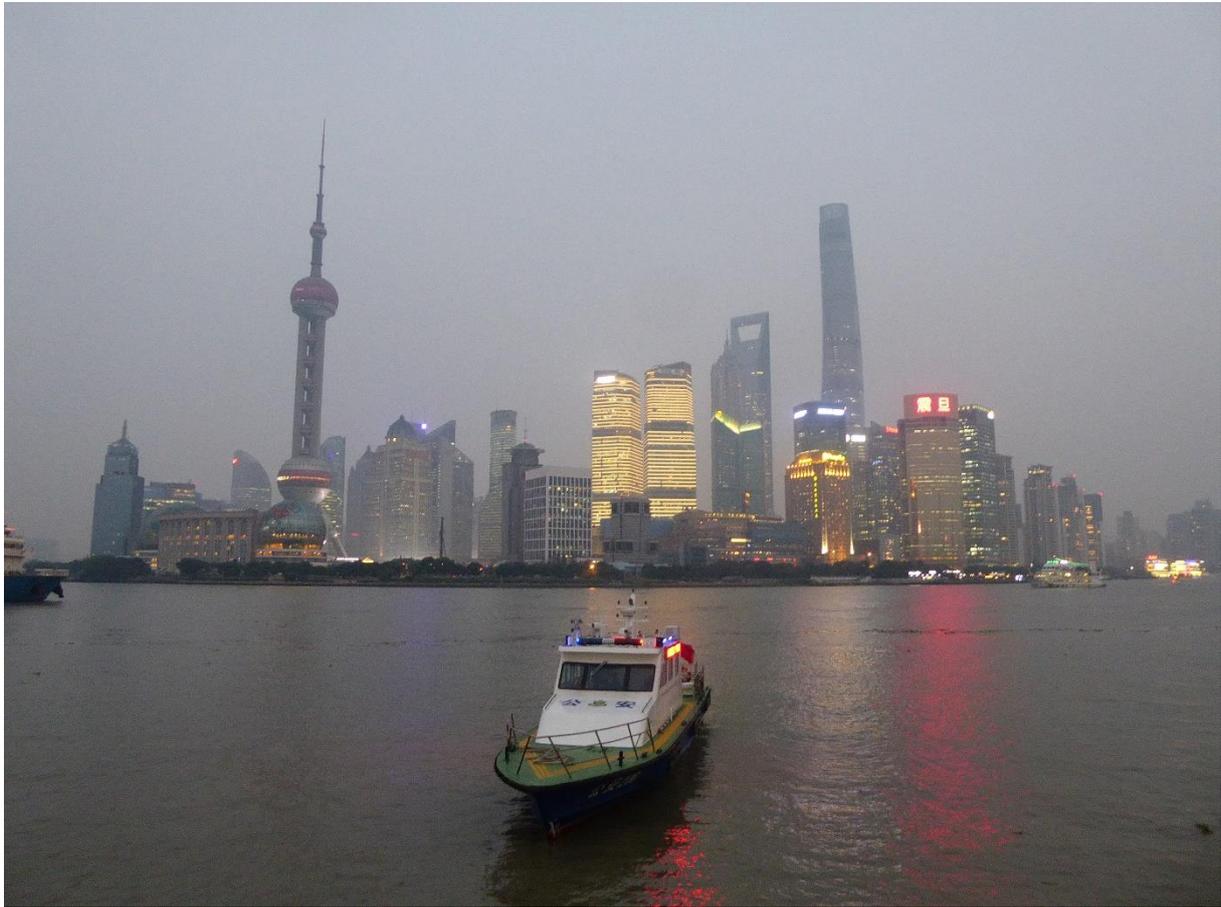
Urban populations are growing rapidly, especially in places where governmental and municipal organizations are often overwhelmed by population growth due to rural migration, e.g. in Africa, South Asia and Latin America. This is the **group of fast-growing cities in less able-bodied states**. These cities cannot even offer the most necessary infrastructure, such as water and energy lines, roads, sanitary facilities, etc. to the unplanned growing population. Extensive informal shantytowns of immigrants are being built where living conditions are worst: along railway lines, in areas at risk of flooding and landslides, and along major roads. In some cases, they are inhabited by one-third to two-thirds of the city's population. Exact figures cannot be determined.



Informal settlement in Karachi, Pakistan (Picture taken by Jürgen Breuste)

In China, over the last almost 30 years, we have experienced urban growth that is unparalleled anywhere in the world - **the largest urbanization in world history to date**. The number of Chinese urban dwellers has increased by more than 500 million in the past 30 years. This roughly corresponds to the population of all EU countries. There had never been such a wave of urbanization in human history. **In about ten years, every eighth person will live in a Chinese city**. A strong paternalistic state channels and organizes this mega-urbanization. Informal shantytowns do not arise. Every year since 1992, China has spent about 8.5 percent of its BIP on infrastructure. In the EU and the USA it is about 2.6 percent in the same period; in India 3.9 percent. These cities form the **group of rapidly growing cities in an authoritarian state capable of acting**. By 2025, five million new buildings with a total of 40 billion square meters of floor space are to be built in China. In Shanghai alone, more skyscrapers

have been built in the past 10 years than in all of New York City in 100 years of high-rise construction. Immense resource consumption leads to a huge, growing ecological footprint of Chinese cities. Can ecologically innovative, resource-saving solutions be created here as global examples?



Shanghai, China (Picture taken by Jürgen Breuste)

In the countries of Europe, North America, Australia, Japan and parts of Latin America, most of which have been urbanizing for 200 years, ***more than 70% of the population now live in cities and towns***. Their population is only increasing slightly, or is even decreasing in some cases. Here widespread social misery could be averted by controlling measures. A controlled urban development geared towards social balance, healthy living conditions and equal opportunities for all citizens has created ***socially differentiated cities with a high quality of life***. This does not always go hand in hand with resource, nature and environmental protection and ecological quality. These cities form the ***group of cities that are hardly growing anymore in states that are able to act in a balanced manner***.

In the three groups of cities, the options for creating ***cities with healthy living conditions for all city dwellers while conserving and preserving resources and biodiversity are nowhere near equivalent to the goals of green urban development***. Differences among cities are economic, cultural and natural and dependent on the size and location of the city. However, every city can adopt the goal of becoming a Green City as a model and, depending on the initial conditions, determine suitable steps to approach it. ***This process is what ecological urban development into a Green City is all about***.

Cities are often located in fertile areas and in locations favorable for trade and the supply of goods, such as rivers and seas. As much as these locations promoted the development of cities, urban

ecological problems are also associated with them. Examples of this are the expansion of settlement areas on agriculturally productive land or challenges for the **protection of cities from natural hazards** such as flooding on rivers and sea coasts. Problems are expected to be exacerbated in the course of urban development in a context of global climate change.

Characteristics of urbanity do not only relate to the physical structure of cities such as building density, surface sealing, the pattern of uses and the social situation, or the city-specific natural features. Rather, they also relate to urban lifestyles and associated consumption patterns, as well as to the functional relationships between cities and their (global) surroundings. Globally, the urban area is growing about twice as fast as the number of inhabitants, i.e. more and more space is being used per capita. This has led to urban sprawl all over the world. Large **urban regions** have emerged, which are interconnected by transport infrastructure. The city, isolated in the agricultural landscape, only rarely exists anymore. Valuable, high-yield soils are urbanized and sealed, resulting in: a) urban overheating causing health risks on hot summer days; b) an increased risk of flooding by superficial rainwater drainage during heavy rainfall events. The last remnants of existing nature are disappearing and new greenery is far too little integrated into urban development. **Urban sprawl is leading to the loss of near-natural habitats** everywhere, to their fragmentation and degradation, and to a decline in biodiversity. The reason for this is **the market-regulated land economy**, which can only be mitigated by state and municipal regulation, but cannot be abolished. The intensive land use caused by the price of land promotes an often ecologically disadvantageous but also resource-saving **constructional densification**. Classic top-down urban planning has so far proven to be only partially effective worldwide in limiting this negative development for life in the city. Nevertheless, **cities are engines of innovation** and can show in an exemplary manner how efficiency in the use of resources and healthy living conditions can be created. In order to counteract the problems of urban growth, politicians and planners are demanding space-saving, **"compact" urban development**. This is currently hardly enforceable, particularly in China, and has been tried in Europe.

Cities are centers of cultural, social and economic progress. Today they generate about 90% of the global BIP. An ecologically oriented urban development currently faces three challenges:

1. Securing and promoting the **quality of the environment and life** for the growing urban population,
2. Reducing the consumption of limited natural resources (**resource efficiency**),
3. Promoting the **ability to adapt to global climate change**, but also to other change processes.

Environmental problems such as the supply of clean drinking water or the supply of food are certainly particularly urgent in cities in the group of rapidly growing cities in countries with little capacity to act. In the cities that are hardly growing anymore and in states that are capable of taking action to compensate, such problems have been solved or at least significantly reduced, while questions of quality of life and healthy lifestyles are becoming increasingly important. Reducing stress and promoting physical activity in attractive open spaces and the experience of nature in cities are becoming important goals of urban development. In many cities, **a major reduction in the need for natural resources and greenhouse gas emissions** is an additional goal.

In addition to the general model of the livable and resource-saving city, the resilient and adaptable city is a necessary goal in a rapidly changing world. Cities are not only a contributor to global climate change; they are also particularly affected by its effects. In addition to long-term changes in average

global climate conditions, cities are particularly at risk from an **increase in extreme events** such as droughts, heavy rain, heat waves and storms. This is evidenced by many recent catastrophes. The extent to which cities will be affected by climate change depends on their **vulnerability**. The **adaptability** of cities to unavoidable global climate changes must be strengthened. The **protection and increase in the functionality of the ecosystems** play an important role in this context, for example when protective mangrove forests are preserved on the coasts, inner-city floodplains are re-natured to strengthen the retention capacity in the event of floods, and attention is paid to ensuring that the city districts are well greened in order to alleviate heat waves and to infiltrate the water from heavy rain events.

The **need for urban ecological research** to further investigate and better understand the **interactions between human activity and ecological processes** is becoming increasingly apparent in order to be able to meet ecological challenges. It is becoming increasingly clear that urban nature brings a wide range of benefits for city dwellers, more than could be calculated from financial savings, and is able to make a significant contribution to moderating the effects of global climate change in cities through clever and targeted planning. This makes it possible to work with urban nature to solve problems and reduce risks (**nature-based solutions**). Good, implemented examples can give you the courage to follow them a step further on the way to becoming a green city.

The **road map to the Green City** can be diverse and should be developed in accordance with the local and regional context. Cities with good prerequisites (e.g. already many green spaces, functioning, well-equipped and assertive administration, committed citizens, state support, etc.) will be able to use different road maps than those where the change process has been started by committed citizens at the district level or with the development of an ambitious project. This means that the road map to the Green City cannot be generalized.

Urban nature in the form of green and blue infrastructure is, like technical infrastructure, infrastructure for the functioning of a livable city. This is being recognized more and more and the appreciation for urban nature is growing with it. International projects for the development or restoration of different types of urban nature can be found everywhere. Their driving questions are:

1. How can ecosystem services be determined and quantified more precisely and locally?
2. How can (new) urban nature bring benefits in urban areas with environmental and social problems?
3. How to determine optimally performing quality, quantity and form for urban nature endowments in different urban structures?
4. How can the direct and indirect effects of the expected global climate change on concrete urban nature connections be determined with regard to urban quality of life?
5. How resistant is designed urban nature (especially the tree population) to the effects of global climate change and how can this resilience be improved?
6. How can the supply (quantity and quality of ecosystem services) and the management of urban waters be improved by linking them to urban nature?

The aim should be to create awareness of the problem and acceptance of the requirements of Green Cities in the population, to develop strategies and concepts in the city administrations and to start with a first project and gain attention.

The desired "**double internal development**" tries to give preference to structural "internal development" (in the existing building stock) over external development (on the outskirts). Development should seek to preserve and develop urban nature in the city, in the living environment of city dwellers, and not to consume it. Double inner development means developing land reserves in the settlement stock not only structurally, but also as urban greenery.

The aim should be to preserve, create and network as much space as possible for all types of urban nature.

The formation of a **green-blue network** of urban nature areas is often based on existing watercourses. The aim is not only and primarily the connection of biotopes to form a habitat network (biotope network), but above all to network the urban natural elements for use by city dwellers.

The aim should be to enable all citizens to visit sufficiently large urban nature areas in everyday life, i.e. urban nature areas should be located within a short distance from their place of residence.

Urban nature is not only unequally distributed between cities, but also within cities, due to the peculiarities of the location, historical development and culture. Scandinavian cities often have extensive green and blue infrastructure, which cities in e.g. Italy or Greece lack. A lower availability of urban nature leads to a poorer supply of urban nature. Within cities, the goal of "**green justice**" is part of the environmental justice to be striven for. What is meant is that public goods such as greenery should benefit all citizens equally. This requires free access to urban green spaces/urban nature.

The aim should be to support the ecosystem service concept in decision-making at the local level and to gain an overview (monitoring) of the local urban nature and its performance characteristics. This overview should be continuously updated, be available for public information and include all nature types and forms. With its help, concrete urban nature can be preserved and increased. The initial aim is not to preserve rare species and habitats, but to let the local population benefit from urban nature.

The **ecosystem service concept** can support cities if ecosystem services are taken into account from the outset when making decisions about benefit considerations. In many cities, however, ecosystem services have not yet been translated into decisions, or only to an insufficient extent. The reason for this is often ignorance of the services or a lack of quantification in comparison with quantified alternative uses. Ecosystem services are often only preserved when concerns arise among the urban population about projects negatively affecting a certain ecosystem service perceived as beneficial. Overall, it is important to ensure that the ecosystem service concept is incorporated into formalized planning and decision-making processes. This is mostly not yet the case in states and cities with a developed planning system (top-down approach).

The aim should be to make contact with nature in the city part of everyday life for children and young people and to stop the existing alienation from nature. To this end, spaces for experiencing nature, especially for children and young people, should be preserved and expanded. Green learning spaces should be available formally and informally for children and young people first.

For most people, nature can primarily only be experienced in cities! However, it is often missing there. Alienation from nature has become a characteristic feature of many developed societies, even though never has more information about nature been available to all people than today. Most people are not aware of the difference between: a) what is "natural" and unaffected by humans, and b) what is "natural" but heavily influenced by humans. Plant and animal life surround us but have disappeared from the everyday experience of many. There are glaring deficits in knowledge, contact and emotional experience in relation to nature, especially in developed, urban societies and among the majority of the population living in cities. **City life has alienated from nature.**

The aim should be to make urban nature usable and accessible to all citizens, while at the same time protecting it in an appropriate, differentiated manner.

The Green City can now come about if **urban nature is valued, protected and developed.** However, this also requires a broad understanding of different natures, natural processes and their sensitivity or robustness. Urban nature should **not have a "reserve character" and be "visited", but used.** This requires widespread ideas about the **non-destructive usability and resilience of various concrete parts of urban nature.** This applies to the lawns of a park as well as the wooded area on the outskirts of the city. **The exclusion of human use of nature should be the rare exception in cities.** In cities, nature conservation is best fulfilled through a responsible use of nature, based on basic knowledge about nature.

In order to counteract the consequences of global climate change, **the aim should be** to achieve a targeted increase in the proportion of green space in general and especially in vulnerable and heat-stressed parts of the city in the medium term. The stock of urban nature, especially shady trees, should be preserved and, if possible, expanded.

The expected global climate change can already be felt **in cities, which are "real laboratories" of climate change.** On average, cities have a warmer and drier climate than the surrounding area. They are affected by more extreme climate events. Summer temperature extremes are the most stressful part of the urban climate for city dwellers. These will continue to take place in the future. Here, climate moderation to lower the temperature is a desirable goal in order to avert health hazards for particularly sensitive, vulnerable sections of the population. Cities can take medium to long-term structural measures to avoid or reduce overheating effects and use urban nature to moderate or optimize the existing urban nature for this purpose.

The aim should be to use urban nature to help solve city problems and reduce risks, so as to improving the city as a living space for city dwellers (nature-based solutions, NbS).

Within the framework of urban development, technology is usually used to solve problems and reduce risks. Technology as a problem solver is familiar, predictable, well-established and recognized outside the community of technicians. This is often the reason for preferring technical solutions over **environmental engineering** solutions. Environmental engineering, which integrates the debate about

ecosystem services, has long offered the option of working with nature to solve problems. Solutions are offered outside of the technical domain or fostering the use of nature besides the use of technology. Financial considerations and a broader perspective of urban planners are indispensable/ should be taken into account to make the use of “**Nature-Based Solutions**” (NbS) possible in cities.

The aim should be to set good examples locally, in districts or in urban development plans and new urban designs, thereby proving that the Green City can be implemented. The Green City is very much the city of today, complemented and enhanced by the improvements we make to it for the benefit of urban dwellers.

The ideal as a concept on the way to the Green City needs to be adapted to every context. Green Cities should be the result of a transformation process in small steps of existent cities. This conversion process with many different requirements takes place in all areas. It depends on whether and what role urban nature can play.

Only a few societies are currently able to build new “**eco-cities**”, above all China. The eco-city as a Green City can also be rebuilt. However, this remains the exception. In addition, even if several hundred cities worldwide, especially in China, already have this title, the actual realization of their ecological quality often remains incomplete.