THE GLOBAL ISSUE "MEGA-URBANIZATION": AN UNSOLVABLE CHALLENGE FOR STAKEHOLDERS, RESEARCHERS AND RESIDENTS?

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ABSTRACT:

This study aims at discussing the complex, multi-dimensional issue of the global phenomenon of urbanization. Based on a theoretical review and discussion on the situation of cities, the causes, dimensions and consequences of urban growth the idea is to raise the main questions for future activities to meet this challenge. For it a pragmatic and holistic framework is proposed to systematize the manifold approaches and to stimulate discussions on this issue addressing inter- and transdisciplinary thinking.

1. INTRODUCTION – THE FUTURE WILL BE URBAN

"Cities are perhaps one of humanity's most complex creations, never finished, never definitive. They are like a journey that never ends."(UN-Habitat, 2008).

Cities imply success. Cities produce dreams – big dreams. Especially the largest cities on our planet – so called mega cities (> 10 million inhabitants) or even meta cities (> 20 million inhabitants) – exist where there is success; on this note, today the driving factor for success is mainly understood as economic growth. From this perspective successful cities can be defined in economic apartheid, but for a liveable and sustainable city economic success can only be one part of the entire ensemble. However, large urban areas have become focal areas in our global world, selling dreams and become at the same time a conglomeration of individual dreams. In consequence more and more people are pushing faster and faster into cities. This phenomenon of having increasing proportions of the population living in urban areas is called urbanization (UN, 2008). It is not a recent process as urban transition already occurred in the 1950s and 1960s (UN-Habitat, 2008). However, scale, rapidity, and magnitude of current and especially prospective changes reach extraordinary numbers – mega-urbanization (Seto, 2009). In consequence, today we are already living in an urbanized world.

Today cities are the home of more than 50 % of the earth's population (UN, 2008). In Europe even 75 % of the population live in urban areas, which cover only 4 % of the area (Georgi, 2010). Consequently, urbanization is not local, regional or national, it is global. The worldwide phenomenon of urbanization is exceptionally dynamic in upcoming developing countries, where unprecedented urban growth rates have occurred over the last 30 years (Taubenböck et al 2009a). It is along with climate change arguably the most dramatic form of irreversible land transformation. The dynamics of urban development in recent history are nothing else than awesome. At the beginning of the 20th century, just 16 cities in the world contained at least a million people, the vast majority of which were in industrially advanced economies. Today, at the end of the first decade of the 21st century, there are more than 400 cities around the world that contain over a million residents, and about three-quarters of these are in low- and middle income countries (Cohen, 2004). With the words 'The world has entered the urban millennium' Kofi Annan, the former General Secretary of the United Nations, emphasized in 2001 (United Nations Centre for Human Settlements, 2001) that the highly dynamic and often uncontrolled process of urbanization throughout the world has an immense irreversible impact on the earth's system. Thus, urbanization becomes more and more the main challenge of the 21st century.

This study intends to theoretically list and critically discuss the existing and evolving problems and challenges of the process of urbanization for the different parties involved: stakeholders, researchers and residents. It is meant to raise questions as well as to indicate ideas and possibilities to tackle the challenge.

2. URBANIZATION – CAUSES, DIMENSIONS AND CONSEQUENCES

Urbanization can basically be caused by three factors: natural population increase, rural–urban migration, and annexation (Jacquemin, 1999; Brockerhoff, 2000; Taubenböck et al, 2009b). The most obvious consequence results in spatial expansion, often described as 'urban sprawl'. Drivers of urban development and urban sprawl are highly diverse: There are macro-economic factors (economic growth, globalization, etc.), micro-economic factors (rising living standards, price of land, availability of cheap agricultural land, competition between municipalities, etc.), demographic factors (population growth, increase in household, formation, etc.), housing preferences (more space per person, etc.), inner city problems (poor air quality, noise, small apartments, unsafe environments, social problems, lack of green open space, poor quality of schools, etc.), transportation (private car ownership, availability of roads, low cost of fuel, poor public transport, etc.), regulatory frameworks (weak land use planning, poor enforcement of existing plans, lack of horizontal and vertical, coordination and collaboration, etc.) (EEA, 2006). These manifold keywords are related to developments in mega cities and incipient mega cities around the globe. Prominent examples, just to name a few, are

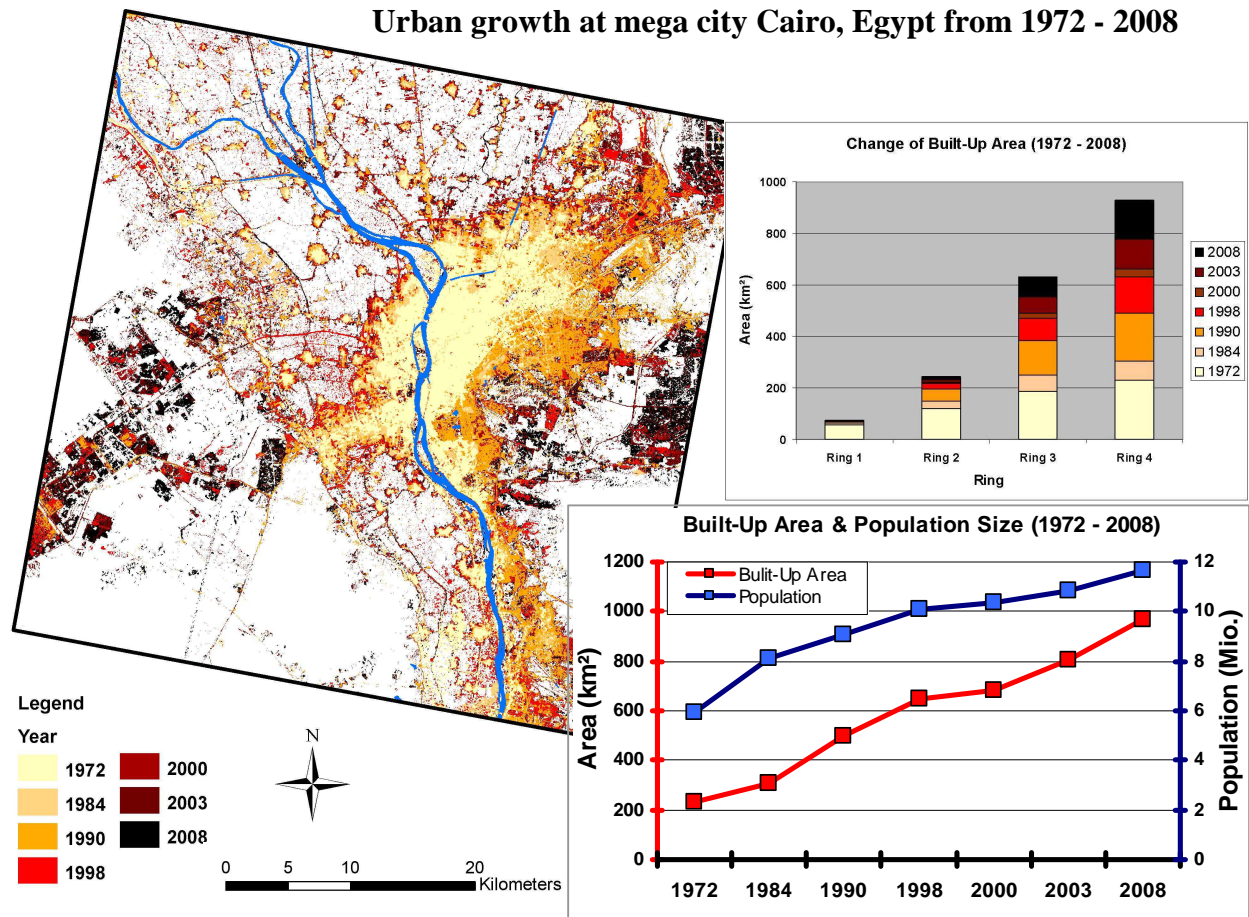## Urban growth at mega city Cairo, Egypt from 1972 - 2008

Figure 1. Urban growth analysis using multitemporal remotely sensed data

e. g. mega cities like Manila, Philippines, L. A., USA, Sao Paulo, Brazil or Istanbul, Turkey or incipient mega cities like Hyderabad, India, Kinshasa, Congo, Santiago, Chile or Cairo, Egypt.

The latter one serves to exemplify the spatial dimension of mega-urbanization over the last decades. Based on a study using multi-sensoral remote sensing data spatial growth has been monitored on a coarse urban footprint level from 1972 until 2008 for the mega city Cairo, Egypt (Taubenböck et al., 2009c). Figure 1 visualizes a sprawling metropolis that more than quadrupled its spatial dimension and at the same time – from official numbers (UN, 2008) – more than doubled its population over 36 years. The change detection derived from multi-temporal remotely sensed data (Landsat & TerraSAR-X data) shows a city at transition from a basically monocentric and compact urban landscape to a highly complex polycentric urban pattern.

In consequence of this explosive current situation of mega city Cairo and many other prominent examples, the vision of the 21st century - the century of urbanization – is threatened to perish in agglomerated poverty and social fragmentation. Thus, is the implication of the cities' success a complete misunderstanding? Is this even a lie? Are cities more and more becoming a location of illusions blinding with a facade what the interiors cannot hold? In the 19th century the ethical disgust about the calamity

and misery in cities partially led to social reforms and to architectural alternative drafts of urban and landscape planners. Today a comparable reaction to improve the current situation at explosively growing cities in upcoming industrial or developing countries has still to be developed.

Based on a study of the consultants Mercer the most liveable city in the world is Zürich, Switzerland (Mercer, 2009). The criteria used were political stability, criminality, economic circumstances, freedom of individuals and the media, medicare, school system, living situation and environmental pollution. Furthermore parameters like electricity and water supply, telephone and transport network and the availability of food and alcohol. Last, but not least, indicators like leisure time facilities like cinemas, theatres or sports were considered. Developing concepts, ideas and research along these indicators may be of crucial importance, but we do not even know if all these indicators would reliably work for a different cultural area. And are these questions regarding these indicators not too detailed in a world where very basic mysteries exist; just to name one example, between the official number of inhabitants for mega city Cairo and the assessed number of inhabitants an immense gap of 10 million people emerges. How is good governance possible without knowing the correct dimension of people for whom infrastructure has to be provided– or basically with the lack of up-to-date information ready?

But what are the consequences of the ongoing, unstoppable and uncontrolled urban dynamic? What brings the future? Have the dramatic dimensions of urbanization processes overcome our ability to govern cities or are cities now governing us? Or are residents, researchers and stakeholders lacking concepts, ideas, data, methods and instruments to meet the challenges that come along with this processes of mega-urbanization?

3. MEGA-URBANIZATION – AN UNSOLVABLE CHALLENGE?

3.1 From isolated ideas to the need of thinking holistically

It is obvious that the issue urbanization is of multidimensional complexity. The issue is addressed by politicians, stakeholders, industry, science and even by the residents themselves. The different groups have different perspectives, different unsolved questions, and different open issues. Thus, new strategies need to be developed for a more holistic and systematic framework to meet this challenge.

As example, the science community for urban research has as many differing thematic directions as there are types of urban systems themselves. The community analyzes in highest detail specific questions about e. g. economic interrelations, demographic development, social patterns, ecologic changes, risks and vulnerabilities, historic evolvement, governance, political issues or physical structure. No doubt, every individual research question is of crucial importance, but are we loosing the integration of the little bits and pieces of research into the necessary holistic and general overview along the way? Let me resolve the manifold perspectives again down to the most important questions: What kind of city do we want and how do we intend to get there?

Obviously, there is no easy and in general valid solution. Urban systems are complex – very complex – probably even too complex to fully understand in a holistic sense. In the urban science community a paradigm shift is already discussed because it is understood that single disciplines are decreasingly able to progress individually (Ehlers, 2004). But in reality the research community often realizes projects on marginal or isolated questions failing to integrate them on higher-ranking goals and in addition without collaborating with other research disciplines. And even interdisciplinary projects are often misunderstood by combining results instead of understanding interrelations and developing methods and tools in cooperation. However, interdisciplinary research is only one first step towards a framework necessary to understand "urban systems". The scientific results are valueless if they do not transform into practical value (Taubenböck et al., 2009b). With a step back from this example, the science community is only a small part of the complete picture on the way from unsolved questions to ideas and to solutions. But is there an overarching framework or strategy on how to handle the problem of "mega-urbanization" existing?

A common vision is the concept of *sustainability* (UNCED, 1992). Sustainable development is often referred to as development that meets the needs of today without destroying the future (Blanco, 2010). But the global and complex issue of urbanization can not be addressed effectively by general concepts, but needs a pragmatic, realistic and problem oriented approach. A clear translation of this vision into programmes, effective mechanisms and actions is still unclear or even missing. A basic framework proposes systematization for a

chronologic workflow to approach the global problem of urbanization from the problem statement to the benchmarking of success or failure (Fig. 2):
Firstly, the manifold and divers unsolved questions need to be identified and listed assembled by all involved parties – politicians, stakeholders, industry, science and the residents themselves– to overcome the problem of isolated approaches. A systematization of the open issues, clear problem definitions and a subsequent prioritization of the most pestering questions are crucial and may lead to a definition of definite goals. The goals need to be further systematized regarding scale issues – from a global or national aims such as generally reducing migration into cities to regional or local aims such as providing educational institutions, and regarding time issues – developing a road map with short-term, mid-term or long-term goals.

Picking up the example of Cairo and the lack of knowledge on how many people are living in the mega city today, a problem oriented systematization of unsolved questions could prioritize this question over questions such as planning of supply or traffic infrastructure. This could be justified by the need for information on the population distribution for the planning of supply. In consequence a research field suitable to solve this basic question would have to be identified. For this inherently spatial question data could possibly be gathered from institutes for urban planning, cartography or surveying, or from a census or from remotely sensed data. The analysis of current situations and the prediction of urban growth and trends in city sizes over time are still constrained by one major problem, namely the lack of regular, reliable, available, area-wide and up-to-date data (Cohen, 2004).

A pragmatic solution in this case could identify the use of area-wide available remote sensing data as an independent, up-to-date, affordable and reliable data source to provide a physical analysis on the current morphology of the mega city. Based on that, the requirement analysis could determine the level of detail needed – urban footprint, district or individual building level – to map the urban morphology, which would be the basis to correlate the physical urban appearance with population distribution. Thus, in consideration of available funds and resources, the defined goal and aspired impact and benefit have to be balanced. With respect to the availability of, in this case, needed remotely sensed data from satellite or airborne sensors, a realistic definition of the expected result can be planned. In comparison to the urban footprint analysis presented in figure 1, the requirement could be to extract information on higher thematic and spatial detail, e. g. on individual building level. State of the art analysis proves that assessing population densities using remotely sensed data is an established research area (Chen, 2002; Ehrlich et al., 2009), even on this high resolution requirement, and identifies current techniques to meet the requirements. Furthermore, the results must be scientifically robust, plausible and communicable to multiple stakeholders or to the public, yet sensitive to the needs of the political leaders and decision makers.

In an idealistic project the workflow described started with city authorities identifying this crucial user-oriented problem, having in mind future planning decisions regarding energy supply or waste disposal. Using the remote sensing science community a coarse assessment of spatial population distribution could be the outcome and also basis to develop strategies to plan and organize subsequent questions. Benchmarking as a last step of this transdisciplinary collaboration allows analyzing its actual impact and thus providing solutions or failures to learn for related projects.
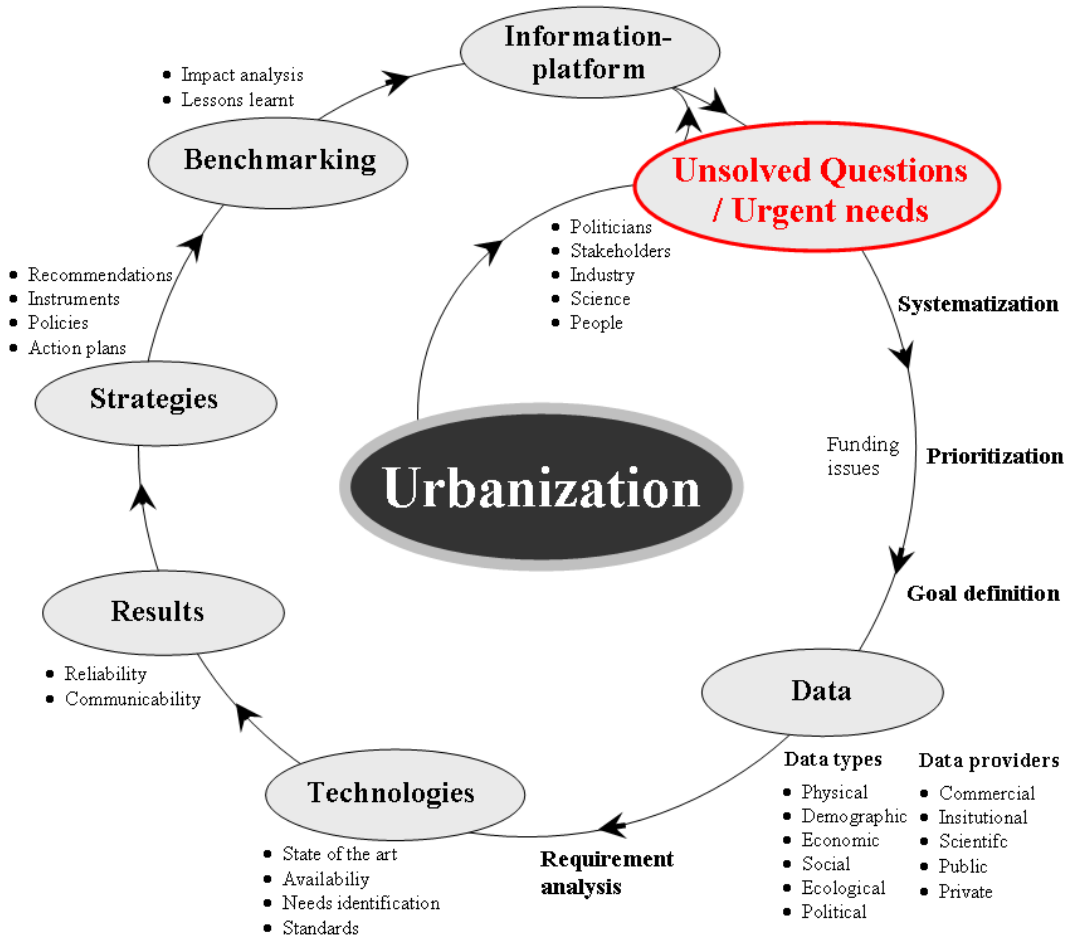
Figure 2. A framework for holistic strategy development to address the global challenge of mega-urbanization

On the topic of urbanization an unmanageable number of projects have been, are, or will be running. In general, reporting and thus information sharing is a critical problem and with the possibilities to disseminate results through online solutions, this is not tolerable. To date, there is no general information platform gathering at least the bulk of projects, their ideas, their experiences, their results, documenting successful solutions or failures. Work is doubled, parallel developments not adjusted, etc.

One example of a cross-territorial and cross-sectorial platform evolving out of the identified problem of "mega-urbanization" is the '*Urban Age*' network; a network of large cities such as New York City, Mumbai or Sao Paulo. They bring together professionals from a variety of different disciplines and backgrounds. Sociologists, geographers, economists and political scientists join practitioners such as planners, architects, developers, transport experts and engineers in a dialogue with political decision makers (Urban Age, 2010). This is one example that seems to be a promising and proactive idea to share experiences (best practice), collaborate and learn from each other.

3.2 From holistic ideas to reality

The often stated objective of sustainability, no matter how vague it may be, is a reflection of this search for long-term balance between the forces and actors that together make up the city. At all times humans tried to develop conceptual designs to structure the city with more or less success aiming at a liveable urban environment. Past experiences regarding planned cities reveal that even though they are mostly built with respect to clear theoretical (sustainable) concepts, the top-down implementation strategy often just did not work in reality (e. g. Astana, Brasilia or Canberra). Thus, the city is not just the sum of its parts, and a simple copy of successful stories in other cities may not lead to a solution.

With respect to the proposed need for thinking more holistically – in a thematic sense as well in a sense of integration of a wide variety of participants – we observe the fact, that in reality required multi-, inter-, and transdisciplinary cooperation for broader approaches is rarely realized in an adequate manner. The problem is basically double-structured: From a bottom-up perspective there are reluctant positions or incapability of individual disciplines to reconsider and challenge their traditional concepts and self-interests instead of having an eye on higher-ranking objectives – from poor communication, local rivalries, one-side formulating of questions, lack of information-

sharing or problems with semantics to misconception of new roles and a subsequent lack of commitment and will or denial of failures. Furthermore, we observe on residential level an increasing feeling of unconsciousness and of being left alone by the stakeholders. The ongoing overwhelming dynamics of urbanization cause a loss of personal identity and thus, this loss of feeling responsible is a self-energizing problem.

From a top-down perspective this overarching framework or strategy including a clear and transparent leadership from organizations such as the United Nations is not clearly observable yet. The problem is not that clear goals are missing – as example Kofi Annan announced millennium goals on sustainable urban development regarding social, economic and ecologic development – the problem is rather the structural and organizational connection between overarching political goals and transforming them into reality. It needs to be accepted that a common vision is essential, but different local solutions need to be found. There is a lack of reliable instruments or even knowledge, on how to transfer these goals into implementation observable. Amongst others, this is caused by many scientific studies not including an implementation part. No doubt, this is a very difficult task from allocation of responsibilities and tasks for implementation and reflexive governance. Furthermore, ignorance of real situations such as denial of corruption, lack of political will or knowledge, lack of excellent open-minded staff, documentation of failures, etc. is common practice.

To achieve system equilibrium needs the combination of overarching schemes, with local distribution in all fields. As stated above, in reality a huge gap arises between bottom-up and top-down perspectives. It is too easy to simply state that more involvement of government is design of solution, if – at the same time – ideas and solutions are embedded in societal acceptance. Once more, there is no general solution or strategy, but a first step towards this idea is formulating the appropriate questions. There is the need to overcome retro thinking questions such as "How liveable are today's cities?" with proactive solution-oriented questions like "Which strategy will make cities more liveable?" In short, there is a need for a paradigm shift from diagnostic projects to the point of proactive prevention and therapy strategies.

4. CONCLUSIONS AND OUTLOOK

In one sentence, we have no clue what the city of the future – maybe in an idealistic sense – should look like. Yes, you may say, it should be sustainable, meaning economically successful, physically well structured, socially mixed and balanced, etc. But these are just keywords, not solutions of how to achieve this. How does a well structured and perfectly mixed urban landscape look like? Would it be a clone of the most liveable city of Zürich, or do we need to develop new ideas and concepts to transform mega-cities like Sao Paulo, Lagos or Jakarta struggling with poverty, criminality, etc. into cities of the future?

Urban planning and its concepts was subject to severe criticism for its failure to be effective in the management of urban development and the creation of high quality, sustainable living environments, both in developed and less developed countries (Sliuzas, 2008). One of the main reasons for unreliable combination of strategic and action planning is the lack of spatial data available. Further reasons are the lack of collaboration between the different groups involved – from stakeholders to the residents. And new challenges will appear,

especially in a time when a new kind of city is emerging: globalized (connected to other cities in global networks); quaternized (dependent almost entirely for its economic existence on advanced services); 'informationalized' (using information as a raw material); and polycentric (dispersing residences and decentralizing employment into multiple centres or 'edge cities') (Hall, 1997). In general, the need for substantial but systematized research on the most pestering urban questions is obvious, but needs to be embedded into a holistic framework of its multidimensional parts.

Currently, without a proper, accepted, realistic framework and implementation strategy on the horizon, it is almost unimaginable what today's mega-cities will look like in only 10 years from today with the effects of uncharted urbanization. Without dedicated efforts both locally and internationally, where can we expect the hospitals, schools, jobs or security facilities to find themselves? It is hard to comprehend that we might look back on a picture of São Paulo's, Mumbai's or Jarkarta's slums as images of better times.

The solution for the global issue 'mega-urbanization' can not primarily be archived by a conversion of the situation: a limitation of growth (how could this ever be accomplished?) or decentralization by promotion of rural areas will only lead to partial success. The solution lies within the cities themselves. And the described framework is proposed as one strategy for a systematic, problem-oriented, trans-, multi- and interdisciplinary approach to find pragmatic, realistic and accepted ideas and goals on the way to a better urban future. It is supposed to start a critical discussion on this challenge at very different levels. This paper is an appeal for an open dialogue regarding these issues. And with it, to change the vision of our urban future from the stereotypic negative connotation related to the phrase "mega-urbanization" to a credible vision of opportunities and chances for residents, researchers and stakeholders.

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