Trunk Infrastructure and Urban Growth – Managing Rapid Urbanisation in Poverty in Dar es Salaam, Tanzania

Geographical Position: Latitude= 6°48' South, Longitude= 39°17' East

Urban Area: 1393 km²

Population density: approximately 1793 inhabitants / km²

Population: Present 2.5 million (census data)
+1957: 128742 (census data)
+1988: 1.4 million (census data)
+2015: 4.3 million (estimate)

Population growth rate: approximately 4.4 %
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Project Focus

The project will focus on the mutual links between trunk infrastructure development and urban growth with the intention to identify access points for strategic interventions into rapid urban growth under poverty following the concept of guided planning by incentives and in co-operation with civil society groups. The regional focus will be on Tanzania, with the case study of the growing capital Dar es Salaam.

In the analysis phase, the concepts and strategies for the provision of trunk infrastructure, esp. for water, sewage and drainage, and the feedbacks between infrastructure and urban growth will be investigated. These feedbacks are reciprocal: urban expansion calls for infrastructure supply while the existence of infrastructure attracts urban development. With poor planning control, the outcome will be urban sprawl or linear development along major trunk infrastructure lines, which in turn imposes heavy costs on both settlers and municipal governments and leads to negative environmental impacts.

A second issue to be considered is the difference between formal and informal urban development regarding the sequence of development steps. Formal urban growth starts with planning and zoning for various land uses, followed by the provision of trunk infrastructure, which in turn leads to plot allocation and building construction, before the buildings are occupied. In the case of informal urban development, however, this process is reversed: at first land is occupied, then covered with buildings, which calls for the ex-post provision of infrastructure services together with the regularisation of tenure. This dichotomy arises from the poor settlers’ priorities which rank shelter first, followed by drinking water and access, and other amenities like lighting, drainage, waste disposal, security and community facilities. This sequence may increase the cost of infrastructure provision, but it corresponds to the perceived needs and demands of the settler households. The project will have to investigate these priorities and their relationship with the existing land management framework in order to identify entry points for the guidance of urban development by strategic infrastructure supply.

The project will be based on the following assumptions:
- In the absence of effective mechanisms to implement urban development plans, the location of new settlements is largely determined – on a citywide level – by the location of trunk infrastructure. However, other factors – especially related to the real estate market – have to be considered in informal urban development.
- Public actors are able to provide these trunk infrastructures but are unable to plan and control the subsequent allocation of informal housing along these lines.
- Public actors are unable to provide infrastructure to the household levels. Therefore, the informal provision or retrofitting with infrastructures to individual households is taken over by the settlers themselves, often in an illegal, unhealthy, and unsafe manner.
- Informal settlements can deploy self-organising capacities, which can sustain the development of their neighbourhoods until the consolidation phase without public authority interventions. However, their scope is limited to the settlement level.
- By providing trunk infrastructures and complementary services as incentives in strategically located areas, it is possible to guide informal urban development into favourable areas in order to control urban growth.

Based on these assumptions, which have already been corroborated in former research by the authors, the project will strive to develop concepts, strategies and instruments to support sustainable urban growth in an environment of scarce public resources and widespread poverty.

Guiding Questions

The following guiding questions serve as a framework for the project design, the empirical analysis and the development and implementation of solutions:
- Which impact does trunk infrastructure supply have on urban development and to which extent does it determine urban expansion?
- What are the criteria of informal settlers for choosing an area to build in and how are they related to infrastructure provision?
- How is the current infrastructure provision organised in formal and informal areas, who is doing what, why, where and under which (institutional and technical) frameworks?
- How can infrastructure supply be used as a tool to guide urban development?
- How can the process of providing trunk infrastructure be used to attract settlers in order to guide urban growth into favourable locations based on a citywide concept for sustainable urban growth?
- How can the provision of trunk infrastructure be integrated into a decentralised urban planning and management approach?
- What kind of technical and organisational solutions for infrastructure supply are appropriate to be implemented on the local level?
- Which institutional and legal set up has to be established to govern infrastructure supply on a local level?
- How and under which conditions is it possible to integrate the goals of sustainable development in informally growing cities?

These guiding questions will support permanent cross-checking of findings and activities.
**Research and Implementation Objectives**

The research objective is to assess the impacts resulting from the availability and non-availability of infrastructure services on urban growth and development under poverty; i.e. the extent to which infrastructure provision has stimulated and will stimulate, or restrained and will restrain formal and informal urban growth. The overall goal is to guide the given dynamics of urban expansion into a more sustainable direction, considering the existing economic, ecological and social implications and the legal and institutional framework and its capacity.

The purpose of the research component in the initial phase is, therefore, to analyse the impacts of infrastructure on urban growth and the functioning of a city, and to assess its potential as a tool to guide urban development. The results of the analysis phase (Work Package 3) will serve as a basis for the implementation of technical and organisational solutions developed in the implementation phases 1-3 which will already be prepared in parallel to the analysis in the initial phase (Work Package 3).

In analysing the impacts, the following specific objectives will be observed:

- The first objective is to find out how infrastructure is supporting, moulding and influencing urban growth and development. This leads to an analysis of urban development and its driving forces regarding infrastructure, and to an analysis of land use development, the underlying choices and conflicts that emerge as a result of varying infrastructure investments. The aim is to understand the citywide distribution and patterns of informal settlement development and determine the degree to which trunk infrastructure influences this pattern. In order to explain the major driving forces of this development and the way they interact, a simulation model will be developed and used to test alternative development paths and illustrate their effects.

- The second objective is to identify favourable and taboo areas for future urban expansion regarding land use (conflicts), potential and existing infrastructure supply and sustainable city structures. This leads to a planning concept for future urban development considering the weak impact of statutory planning and the dominance of informal urban development processes and their driving forces.

- The third objective is to investigate how the supply of infrastructure can be used as a tool to guide and to control urban development by the strategic provision of infrastructure in favourable areas for urban development. This means to suggest ways of intervening and exploiting opportunities emerging from infrastructure provision for promoting coherent urban growth.

- The fourth objective is to develop and implement technical, legal and financial solutions of infrastructure supply, which on the one hand allow for informal settlers to connect to trunk infrastructure in a safe and healthy way, and on the other hand in a way which allows cost recovery and easy maintenance. In applying this model to the case study of Dar es Salaam, easy-to-connect infrastructure nodes in strategically located areas will be provided in the defined favourable areas of urban development. Major elements of this concept are the co-operation of different supply agencies, especially concerning the use of the infrastructure lines and facilities, the co-ordination of road construction with other infrastructure sectors (esp. water mains and sewers), and the development of insular supply solutions on the settlement level which later on can be integrated in a city-wide network.

- The fifth objective is to develop and implement management measures on the citywide level to secure better intersectoral co-operation between the municipal agencies concerned with infrastructure provision and urban growth regulation as well as between public and private actors and stakeholders. On the local level, management concepts will be developed to facilitate equal access to trunk infrastructure and to secure cost recovery. Management concepts on the local level also have to ensure equal distribution of services into the settlements, prevent misuse of services and avoid land speculation. The project findings will be scaled up and generalised to provide guidelines and best practices for the regulation of rapid urban growth under poverty in other African countries.

Guidance of informal urban growth through the provision of trunk infrastructure – or its facilitation through the reservation of linear open spaces – is supporting economies of scale for the supply agencies while facilitating improved livelihoods for the settlers. The concentration of urban growth along infrastructure mains will direct urban sprawl into favourable areas provided the criteria for trunk infrastructure planning have included these foreseeable effects. Water mains and major roads can thus be used to distract settlers from taboo areas while directing them into favourable zones to a degree which cannot be achieved through conventional planning schemes and tools because the planning capacity of public authorities is far too weak. Rapid urban growth in poverty follows the "shelter first" principle creating a high and ever increasing demand for affordable plots in the urban periphery. The concept of guided planning provides for the recognition of the later benefits emanating from infrastructure access already in the initial allocation decision.

**Project Outcome and Results**

The final outcome of the project will consist of instrumental knowledge and practical experience in the following crucial issues of strategic management for sustainable urban growth:

- impacts of infrastructure on informal urban growth;
- favourable and taboo areas for urban development;
- guided planning of urban growth through strategic infrastructure development;
- technical solutions to distribute infrastructure on the local level;
- management and maintenance of infrastructure on the local level;
- concepts for scaling-up and generalisation (e.g., interfaces with administrative regulations and legal frameworks);
- programmes and tools for capacity building.

The initial phase of the project provides a knowledge base for the case study city as well as for similar urban areas. The experience collected in the implementation phases can be used to develop concepts and tools to be applied in other cities. Every milestone will support the evaluation of the project and necessary adjustments and provide a base for new partners to join.

The implementation of the project will offer opportunities to companies dealing with infrastructure supply for stepping into the growing utilities market in developing countries. The case study city of Dar es Salaam will be provided with tools to guide urban development, to supply infrastructure in informal settlements and to manage infrastructure on the local and the user levels. This means considerable improvements for the local population in the sectors of health, water supply, electricity, and access, and in urban livelihoods.

The findings and experiences from the project can be used as best practice examples to transfer the concept to other cities, considering the local physical, social, economic, environmental and cultural settings, the legal and institutional framework as well as the needs of residents. Any implementation has to follow participatory principles.

**Förderkennzeichen**

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**Internet**

http://www.raumplanung.uni-dortmund.de/irpud/megacities/index.php