Dar es Salaam

Trunk Infrastructure and Urban Growth Managing Rapid Urbanization under Poverty in Dar es Salaam, Tanzania

EnerKey Workshop Stuttgart, July 14th, 2006

MEGA:cities

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I. Project Organisation – Dortmund

Universität Dortmund
Fakultät Raumplanung

Project Coordinator: Prof. Dr.-Ing. Hans-Peter Tietz

Department of Utility Systems

Institute of Spatial Planning

IRPUD

Spatial Planning for Regions in Growing Economies

SPRING

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

I. Project Organisation – Dar es Salaam

University of Dar es Salaam

http://www.udsm.ac.tz/

UCLAS - University College of Lands and Architectural Studies

http://www.uclas.ac.tz/

Prof. Dr. Wilbard Kombe,
Dr. John Lupala

I. Project Organisation – Non-academic partners

Technical Implementation Partner

FICHTNER Engineering Services and Consultancy
Home Office Stuttgart, Germany
http://www.fichtner.de

Public Implementation Partners

- **Dar es Salaam City Council**
- **Three municipalities of Dar es Salaam**
- **Local community based organisations (CBOs)**
- **Ministries and agencies in charge of planning and infrastructure provision**

II. Project Focus

The project focuses 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**.

III. Objectives

- Determine how infrastructure is supporting, moulding and **influencing urban growth and development**.
- Identify **favour and taboo areas** for future urban expansion.
- Investigate how the supply of infrastructure can be used as a **tool to guide and to control urban development** by strategic provision of infrastructure in favour areas for urban development.
- Develop and implement **technical, legal and financial solutions** of infrastructure supply.
- Develop and implement **management measures on the citywide level** to secure better intersectoral co-operation

IV. Guiding Questions

- 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 and how are they **related to infrastructure provision**?
- How can infrastructure supply be used as a **tool to guide urban development**?
- How can the provision of trunk infrastructure be integrated into a **decentralised urban planning and management approach**?
- Which **techn. and organis. solutions for infrastructure supply** are appropriate to be implemented on the local level?

V. Methodology – Project phases

Analysis Phase (2 years)

Investigate

- **concepts and strategies** for the **provision of trunk infrastructure** (roads, water supply, sewage and drainage)
- **feedbacks between infrastructure and urban growth.**

Intention: Assess the potential of **strategic infrastructure provision as a tool to guide urban development**.

Implementation phase (up to 9 years)

Results from the Analysis Phase will serve as a base for **technical and managerial solutions** to be developed.

V. Methodology – Analysis phase

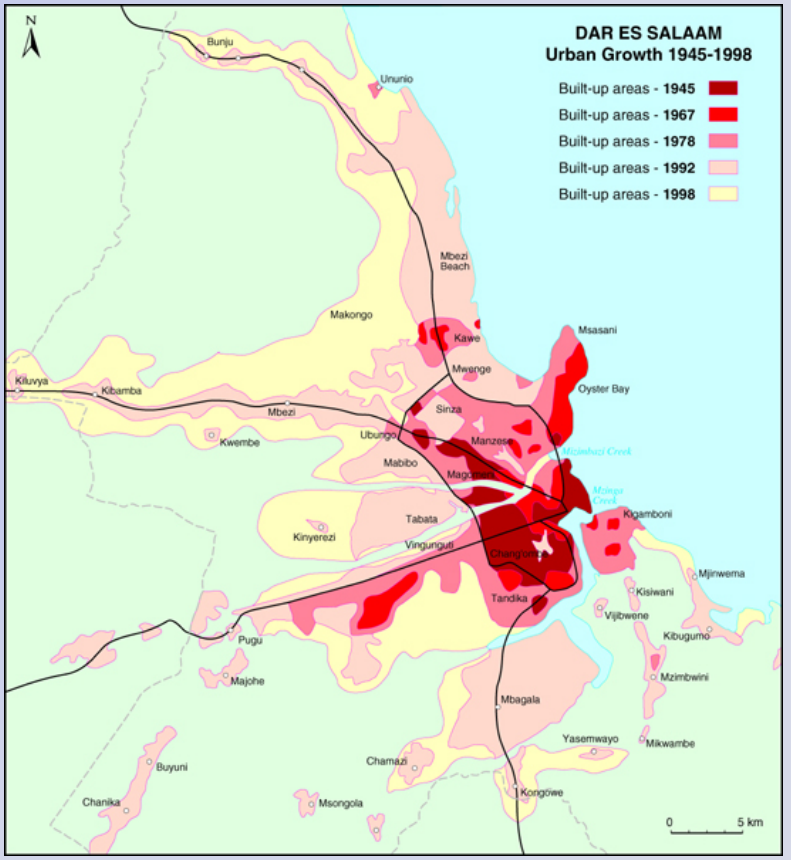
Two main approaches

qualitative – interviews and surveys to assess the role of trunk infrastructure and issues concerning provision

quantitative – development of a land-use model to simulate the urban growth of Dar es Salaam and to enable testing of planning scenarios

VI. Rapid urban growth in Dar es Salaam

- One of the fastest growing cities in sub-Saharan Africa.
- Population doubled in the past ten years, adding about 100,000 new inhabitants to the city every year.
- The city covers an area of 1,350 sq.km.
- According to the 2002 National Population Census, the city population stands at 2.5 million.
- Representative for many rapidly growing agglomerations in sub-Saharan Africa.

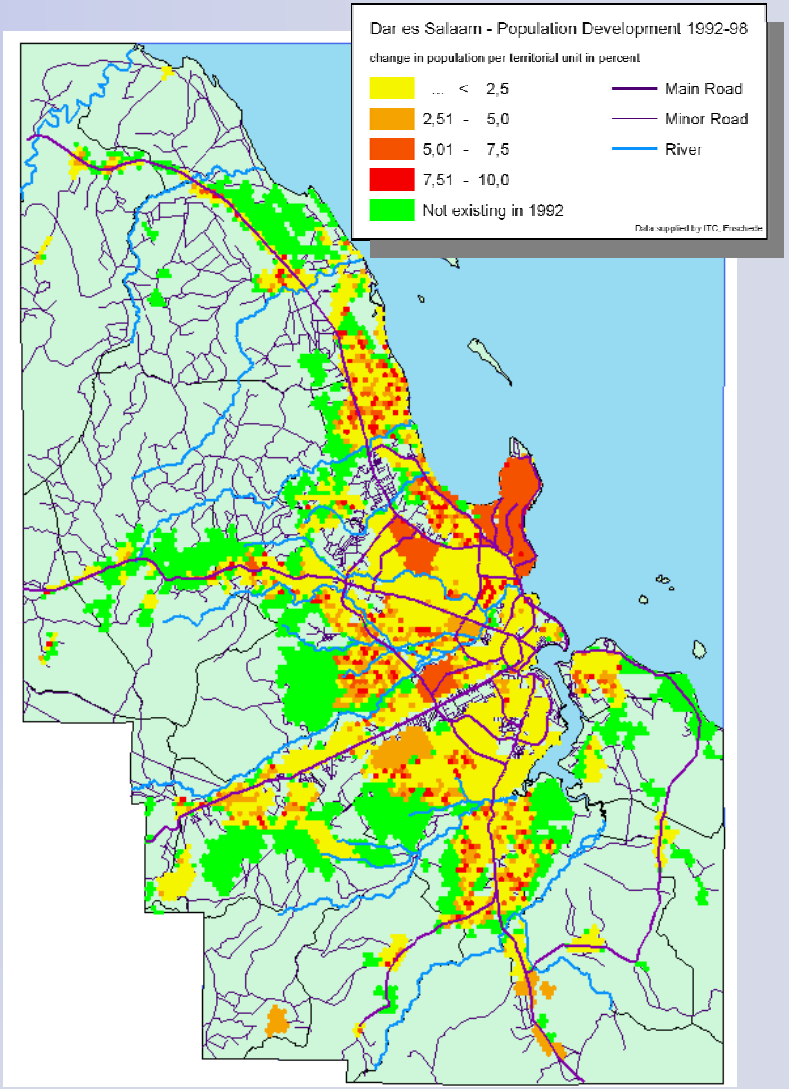


Source: Mike Shand, University of Glasgow

VI. Rapid urban growth in Dar es Salaam (2)

Population growth

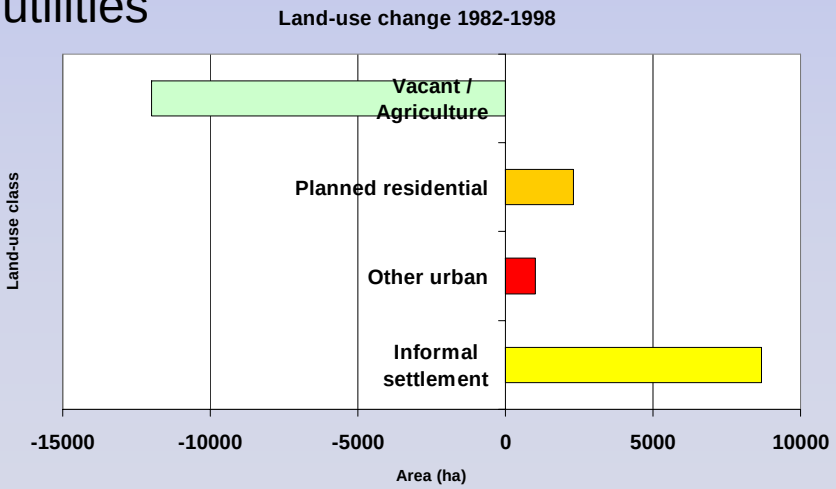
- Extensive densification and consolidation processes in existing settlements
- Main development along line infrastructure (esp. main roads)
- Rapid urban sprawl at the city's fringe areas
- Construction largely confined to single storey buildings

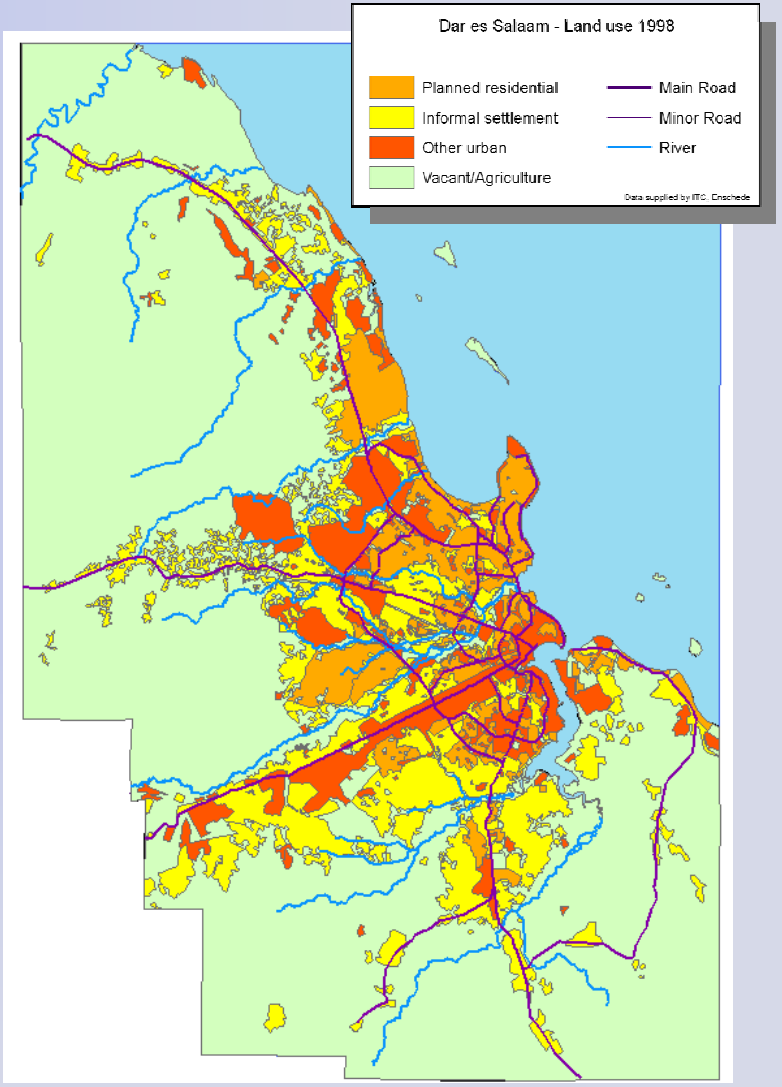


VI. Rapid urban growth in Dar es Salaam (3)

Land-use development

- Above average growth of informal settlements
- No comprehensive land-use plan effective for the past decade
- Little coordination between urban planning and utility suppliers
- Large parts of informal settlements unserviced or informally serviced with utilities

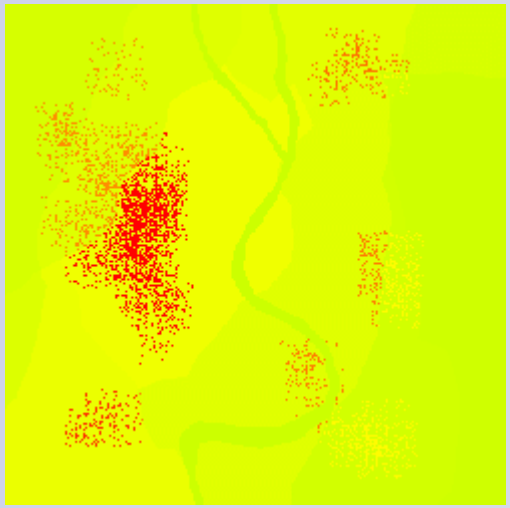




VII. Land-use simulation model

Purpose

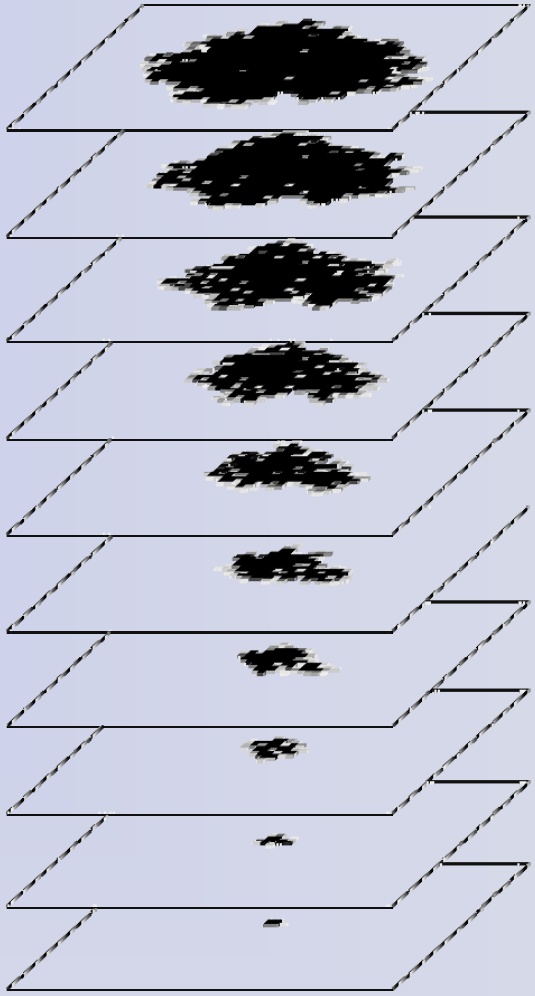
- Simulate urban growth
- Investigate the impact of trunk infrastructure provision
- Test (planning) scenarios
- Discuss possible outcomes of policy options
- Provide a decision support system for urban-regional development



VII. Land-use simulation model (2)

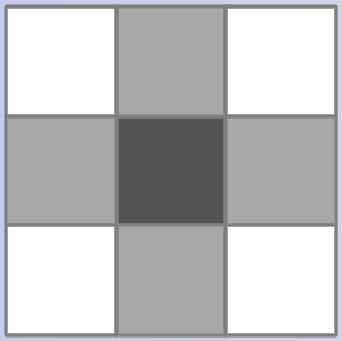
Cellular automata (CA)

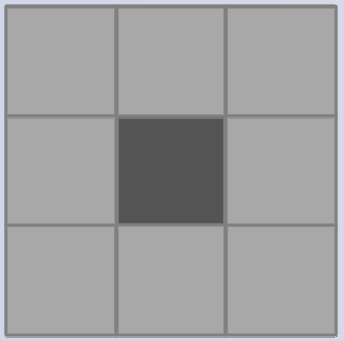
- Capable of simulating complex spatial processes by (relatively) simple underlying rules.
- Raster-based approach; area is divided into evenly spaced cells of appropriate size (e.g. 100x100m).
- Each cell is assigned a specific land use (i.e. the main land use in this cell).
- Cells change their state from one simulation period to the next one.
- Transition rules determine land-use allocation.



VII. Land-use simulation model (3)

Cellular automata (cont.)





- Incorporation of neighbour-hood effects.
- Exogenous demand functions (e.g. population projections) generate overall demand for each land use.

Database

- Land-use data (time series)
- Urban development plans (planned/unplanned areas)
- Transport infrastructure (time series)
- Utility networks (water/sewage) (time series)
- Digital Terrain Model (slopes)
- …

VII. Land-use simulation model (4)

Key driving forces

- Accessibility
- Access to water supply / drainage
- Topographic suitability (e.g. slope, terrain roughness)
- Land-use zoning status
- Neighbourhood

Challenges

- Need for sophisticated database
- Accuracy in (re-)producing urban patterns
- Calibration

VIII. Expected Outcome (Phase 1: Analysis)

Instrumental knowledge and practical experience in the following crucial **issues of strategic management for sustainable urban growth**:

- **Impacts of infrastructure** on (in-)formal urban growth
- **Buildable and constraint areas** for urban development
- **Guided planning** of urban growth through strategic infrastructure development

VIII. Expected Outcome (Phase 2: Implementation)

- **Technical solutions** to provide and allocate infrastructure on the local level
- Improved opportunities for the private sector to engage in the **utilities market**
- **Management and maintenance support** for infrastructure on the local level

… to direct urban growth in a sustainable way

IX. Outlook – Coming Workshops (2)

Workshop 3 (September/October 2006)
Combine findings from fieldwork and from simulation model (including scenarios); elaborate underlying mechanisms of urban development with special reference to infrastructure.

Workshop 4 (January 2007)
Discuss findings from fieldwork with all partners, local institutions and NGOs in Dar es Salaam.

Workshop 5 (May 2007)
Confirm final report and identify suitable projects and cost implications with all partners and local institutions in Dar es Salaam.

Thanks for listening!

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