Lazarus Jambadu

Repair and maintenance of urban water supply in Accra and Dar Es Salaam

Spatial Planning and Architecture / Prof. Monstadt and Prof. Rudolph-Cleff DAAD scholar
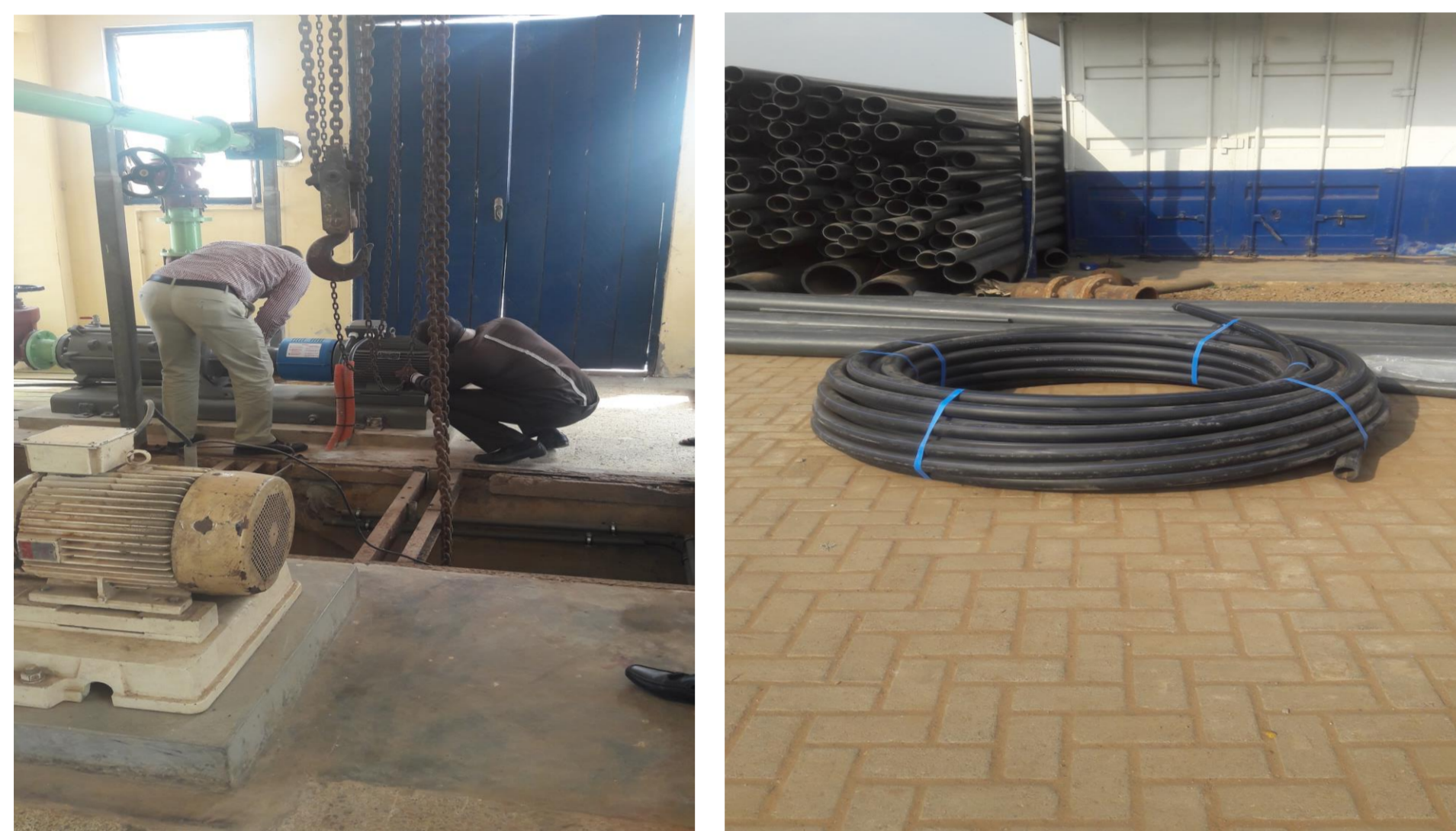
GRADUIERTENKOLLEG
KRITIS

Research problem / context

- Repair and maintenance (R/M) is very crucial for the functioning of critical urban infrastructures.

- But urban scholars, planners and policy makers alike, have hardly paid attention to R/M of infrastructures.

- This research aims to understand the role of R/M practices in urban water supply in Accra and Dar Es Salaam for urban and infrastructure resilience.

Figures 1-4: Water infrastructures in Accra and Dar Es Salaam (fieldwork, 2018/2020)
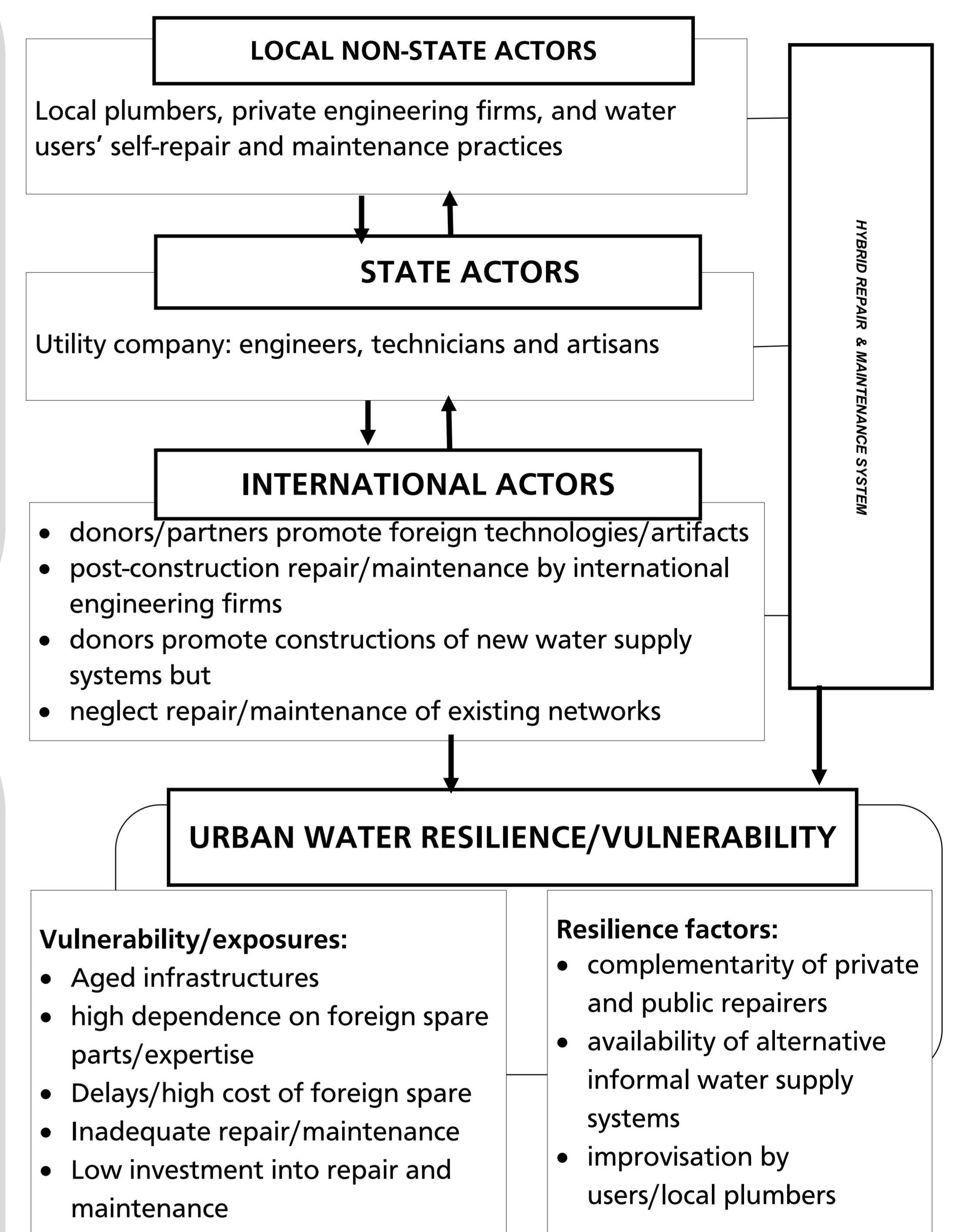
Research questions

- How do informal R/M practices of users and local plumbers affect urban water networks?

- How can we explain the 'everyday' R/M practices of utility companies?

- To what extent do (and could) international donors and partners anticipate and promote R/M activities in urban water supply?

- How can we understand the resilience and vulnerability of urban water systems through the interplay of "formal" and "informal" R/M Practices?

Methods

- **Qualitative research design:** comparative case studies

- **Data collection method:** expert interviews; focus group discussions; field observations, and 'informal' conversations.

- **Respondents:** utility engineers, technicians, and managers; government officials; NGOs; international donors and partners; water users; local plumbers and enterprises.

- **Major challenge** – fieldwork in Dar Es Salaam interrupted because of the COVID-19

Conceptual Framework

LOCAL NON-STATE ACTORS
Local plumbers, private engineering firms, and water users' self-repair and maintenance practices

STATE ACTORS
Utility company: engineers, technicians and artisans

INTERNATIONAL ACTORS
- donors/partners promote foreign technologies/artifacts
- post-construction repair/maintenance by international engineering firms
- donors promote constructions of new water supply systems but
- neglect repair/maintenance of existing networks

HYBRID REPAIR & MAINTENANCE SYSTEM

URBAN WATER RESILIENCE/VULNERABILITY

Vulnerability/exposures:
- Aged infrastructures
- high dependence on foreign spare parts/expertise
- Delays/high cost of foreign spare
- Inadequate repair/maintenance
- Low investment into repair and maintenance

Resilience factors:
- complementarity of private and public repairers
- availability of alternative informal water supply systems
- improvisation by users/local plumbers

Source: author's construct (2020)

Results

- Informal' R/M practices are crucial for meeting everyday R/M needs in water supply and for making infrastructures more resilience. However, they can equally undermine the system's functionality and challenge the utility companies engineers.

- Everyday R/M practices of utility companies are shaped by (and are contingent on) materiality, institutions, knowledge and discourses in urban water supply.

- International donors/partners promote construction of new water supply systems while neglecting the aspect of R/M. Moreover, their investments policies/schemes promote 'foreign technologies' that are hardly met by local R/M expertise.

- Higher levels of resilience in urban water supply could be achieved by strategically exploiting synergies and complementarities between R/M practices of private local plumbers, private engineering firms, and public utility companies.

- International donors and engineering firms should better anticipate and financially support the development of local R/M capacity and expertise.

Cooperation & Highlight

- Joint PhD (Utrecht University & TU Darmstadt)
- KRITIS colleagues have shaped my project, through collaborations, focus group discussions and feedback

Contribution to KRITIS and significance
- My research contributes to urban infrastructures studies and science and technology studies, by exploring the role of R/M in urban water supply.
- It also contributes to a situated understanding of functional crises; vulnerability and resilience of critical infrastructures systems in African cities.

Integration into the Research Programme

Research Area: Functional crises in urban water supply

Key Concepts: Criticality; Resilience and Vulnerability and the role of R/M

- **Criticality:** urban water supply is a critical infrastructures and R/M is equally critical for continuous functioning and resilience of urban water infrastructures.

- **Resilience**: is the capacity of water supply systems to either 'resist' disruptions, to quickly restore its functioning after a breakdown and to learn from crises and breakdowns by adapting to local conditions and practices. Hereby, R/M practices are crucial for mitigating, coping with and preparing for the impacts of infrastructure failures, as well as for restoring key functions.

- **Vulnerability**: Exposure of water supply systems to external threats, and susceptibity to failures and their adaptive capacity, face to the interplay of formal and informal R/M practices.

TECHNISCHE UNIVERSITÄT DARMSTADT

DAAD
Deutscher Akademischer Austausch Dienst
German Academic Exchange Service

DFG