GRADUATION PLAN
PRAYING FOR WATER

Master of Science Architecture,
Urbanism & Building Sciences

Armin Fuchs
GRADUATION PLAN
PRAYING FOR WATER

PERSONAL INFORMATION

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GRADUATION STUDIO

Name of the studio          AR3AE015 - Architectural Engineering
Architecture Teacher       Monique Smit
Research Teacher           Dr. Nico Tillie
Title Graduation Project   Praying for Water

Argumentation of choice of studio

I am fascinated by integrating different cultural and social backgrounds with climate based considerations and innovative construction methods. To me, the Shared Heritage Lab with AE background seemed like an excellent opportunity to follow this passion. Especially because I saw a lot of potential in the rich context of Bandung's former colonial site that fits very well to my personal design approach: I understand architecture as a catalyst to merge technical, social, cultural and political aspects in a way that creates multifaceted synergies.
The growth of informal urban areas exceeds by far the developments for planned social housing and makes dealing with them an obligation for architects. The area of Kampung Tamansari, Bandung, is a typical example of rapid and uncontrolled urbanization after World War II and Indonesia’s independence in 1945. The informally developed area that was originally planned as a green belt along the Cikapundung River is characterized by a high density with up to 1300 people/ha and a constant predicted growth. Due to the informal nature of the area the infrastructure is not developed. This raises big issues around clean water supply which, according to the UN is a human right since 2010.

Drinking water is not directly available but has to be bought in plastic bottles. The expenses are a burden for the socially deprived. Water for other uses is not always available. Especially during the dry season water shortages occur while stored water is often contaminated, due to a lack of knowledge and hygiene. Service water from low wells is often contaminated by the nearby Cikapundung River, which touches on the second big water related issue: the dealing with sewage: All waste water is released into the river with no or insufficient treatment, causing pollution of both, river and groundwater. The people’s reluctance to change these habits is mostly due to a lack of knowledge and economical incentive. There is no connection to a central sewage system and no intention by the government or government related companies to change that. First, because the implementation exceeds the technical possibilities and investment scope; second because the government does not take much responsibility for illegal settlements such as Kampung Tamansari.

Its informality is both, the biggest weakness and strength. The lack of the authorities involvement led to all the mentioned issues but at the same time to a strong neighborhood community. They are taking care whenever the government refuses to get involved, financing educational and religious facilities and practices, organizing cultural and artistic activities, their own waste collection system, beautification of
Lack of Public & Green Space

Solution approaches should consider this potential and build up on that. Concerning drinking water, 50% of the households think the supply should be handled by the community, 70% have the same opinion about sanitation services waste water treatment. The neighborhood’s organizational structure works efficiently but space for activities is a rare good. Public spaces such as green areas, playing grounds, parking areas, space for religious and educational practices are disproportionately small, which is a problem that all locals agree on.

OBJECTIVE

Decentralized Communal Water system

The objective of my graduation project is to develop a bottom up and community based approach to improve the water supply in Kampung Tamansari. Besides, more green and public space is necessary, especially as a place to spread knowledge and rise of awareness for the topic. To achieve this, the omnipresent type of the Mosque will act as a catalyst:

Mosque as a Catalyst

My aim is to further develop the existing mosque-type into a decentralized water purification and supply unit. Added functions will not only improve the water infrastructure but also provide more green public and space and therefore a more healthy environment.

Prototype

The successful advancement of a new prototype of mosque has the potential to be adapted in many informal urban areas with similar characteristics. A successful concept of spread is essential because the involvement of architects and other professionals in the informal building sector are exceptional and hence of very limited impact. To become viral, the building has to attract people, be accessible, it’s inherent principles have to copyable.

The water mosque type will make informal areas more resilient by solving one of the most essential problems, clean water supply.

Future Resilience

Gender Equality

Finally, there is also a cultural aspect regarding gender equality that I would like to address: The importance of women to improve the water infrastructure cannot be underestimated. In their primarily tradi-
How can a Mosque become the Catalyst to implement a decentralized Water management System in the informal urban Settlements of Tamansari, Bandung?

How to develop a decentralized and integrated water management System for Neighborhood Communities within Indonesia’s informal urban Settlements

Subquestions

What are the current water sources and how are they used?

What is the potential of the current water sources to develop a decentralized and integrated water Management System (DIWMS)?

Who are the existing stakeholders and community institutions?

What is their potential to implement the DIWMS?

What are good examples for thechnical systems and implementation approaches in comparable cases?

Which technical componants are appropriate for the system?

How do the components work together and what's their spatial impact?

How can the system be implemented?
To define my methodological approach I would like to introduce the term of Synergetic Interrelation. It can be understood as architectural design that works as a catalyst to connect technical, social, cultural and political aspects, creating multifaceted synergies. With my approach I aim to provoke a highly synergetic kind of design solution. My thesis question touches upon different areas within architecture that are defined as three potentials. Exploring each potential requires a different research methods with design as a synthesis.

To develop a concept of a decentralized water supply system, I need reliable technical data. Hard facts about the flows of water, sewage, money, energy etc. are absolutely necessary as well as an understanding of how they are interact. The research approach is focused on understanding and quantifying metabolic systems. The building, the neighborhood and the city are being analyzed regarding inputs and outputs of energy and water and nutrients. It is often referred to as Flow Analysis. Data for this methodological approach should come from scientific studies, interviews with locals, officials and professionals, observation and photographic documentation.

To implement the improved water system, non-technical aspects become more important. Habits, social behavior and relations, neighborhood structures, educational processes and other internal dynamics have to be researched in a different way. Interviews with locals, officials or professionals will give insight.

First drawn conclusions made me consider the potential of Mosques as the architectural catalyst that I was looking for. However, it created the need for another kind of research. When visiting mosques in the informal urban settlements, I discovered that typological thinking would bring me further: Kampung Mosques are often built on basis of a stereotype or model. That bears both, risks and chances for sustainable buildings: on the one hand, if repeated irrationally from one place to another even within an identical climatic region gives rise to some grave problems which can compromise multiple dimensions of sustainability. On the other hand, this shows the potential for the wide-spread impact of an improved and more sustainable mosque prototype.
Praying for Water fits well into the Architectural Engineering Studio because of its emphasis of an elaborated technical system on the one hand and the synthesis with architectural thinking on the other: the relevance of social and cultural topics. Design is the merger of these poles.

The Water Mosque creates synergies between technical, cultural and social aspects. Improving water supply is often seen as a purely technical challenge and the involved disciplines reflect this attitude. But in fact, most projects don’t fail because of the technology but because of the people that don’t have the right knowledge, habit or incentive. The architect’s position is beneficial because it can cover all three aspects and therefore increases the chance of success.

The challenges that rise from the uncontrolled growth of informal settlements are an issue that are usually not tackled by architects because people cannot afford them. The aim of the project to work towards a prototype, a collection of principles that can be adapted to similar contexts makes it relevant in the first place. Step by step, the mosque-type would provide clean water to one neighborhood, one Kampung, along the whole river, other rivers within Bandung, Java and even other parts of Indonesia.


Irda Sari, Sri Y., Deni K. Sunjaya dk_sunjaya@yahoo.co.id, Hana Shimizu-Furusawa hana-shimizu@umin.ac.jp “Water Sources Quality in Urban Slum Settlement along the Contaminated River Basin in Indonesia: Application of Quantitative Microbial Risk Assessment.” Journal of Environmental and Public Health 2018 (2018)


Reed, B. J. “Minimum Water Quantity Needed for Domestic Uses.” WHO Regional Office for South-East Asia, 2005.


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**Context:** Interviews, Literature & Case Studies, Mosques

**Writing:** Graduation Plan, Research Paper (RP)

**Designing:** Concept, Sketch Design

**Presentation:** Preparation, Reflection

**Other:** Research Methods (RM)