



# **PRAYING FOR WATER**

## **Reflection Paper**

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May 2019

## Relationship between research and design

The focus of my research was on the development of decentralized and integrated water management systems for neighborhood communities within Indonesia's informal urban settlements. It started with a technical fascination for decentralized water systems, a topic of big relevance in informally growing areas all over the world. Despite of being a human right<sup>i</sup>, most of them miss basic infrastructure such as clean water access and a working sewage system. One of my key findings was that decentralized systems have to be tailored to their specific context to work, by using its social and cultural potentials instead of thinking in solely technical system measures. If taking these into account, architectural interventions can work as catalysts to implement a supply system on the one hand and create benefits for all involved stakeholders on the other hand.

Involving a sociocultural dimension to the research was only possible due to our three week study trip in Bandung, Indonesia. I spent most of the time in the informal settlements along Cikapundung River, the so called Kampung ( *transl: village*). My initial goal had been to look specifically at water issues. However, being fascinated by the strong social cohesion within the neighborhoods, I started to investigate on the Kampung's stakeholders and community institutions and their needs. Without this experience, the idea of implementing the water system through the already existing community structure would not have been workable. I identified religious institutions in communities with 99% Muslim population as one of the best working parts of a "sociocultural infrastructure" and the Kampung-Mosque as a potential catalyst to implement the decentralized water supply. Funding system, management structure, spiritual and practical relation to water, educational resources, catchment area – everything was already there and only had to be directed to the topic of water supply. This lead to my design proposal: the Mosque as a catalyst towards a decentralized Water management system in the informal urban settlements of Kampung Tamansari.

To conclude, it can be stated that research and design are strongly intertwined. The design of the Kampung Mosque as a water supply center and the core of a decentralized water supply system is directly linked to the research. The research aims to cover technical aspects of the water system as well as implementation method, funding, feasibility and management and acceptance of the system. All these aspects are strongly reflected within the design program, the placement of the building, the role of water etc. The strong influence of the research actually became the main challenge because its complexity and restrictions had to be synthesized into a simple design. It took me some time to realize that the overall goal of my project was to recreate a holistic and positive relation to water. I believe that the emotional aspect is crucial for sustainable behavior, which is why beyond all ratio, I had to give more room to it. Contemplation, playfulness and of course spirituality are values themselves but would also add value to the cause of a working sustainable water system.

## Relationship between the graduation topic, the studio topic, the master track and the master programme

In the architectural engineering studio, students make a choice between “make” and “flow”. This project is clearly located at “flow”, dealing with urban metabolism and water cycles in the first place. My technical fascination for decentralized water systems made the choice of the studio easy for me.

Being part of the Shared heritage Lab within the AE studio had an even wider impact on my project. The studio deals with Indonesia and the Netherlands’ shared cultural heritage. Involved students tackle problems in Bandung - a city with a long colonial history - from the perspective of their studio background. The city has been planned as a garden city by the Dutch but after the Indonesian independence the green corridors along the river became replaced by Kampung. Within the graduation project, I am reinterpreting this green corridor with today’s premises: as a productive landscape. Beyond its original function as a place for leisure activities it has a crucial role as water filter, contributing to the water supply and the quality of the river.

Looking at the relevance to the MSc Architecture, I see architecture as a catalyst to merge technical, social, cultural and political motions in a way that creates multifaceted synergies. It can bridge several disciplines and combine its benefits.

## Elaboration on research method and approach chosen by the student, reflecting thereby upon the scientific relevance of the work

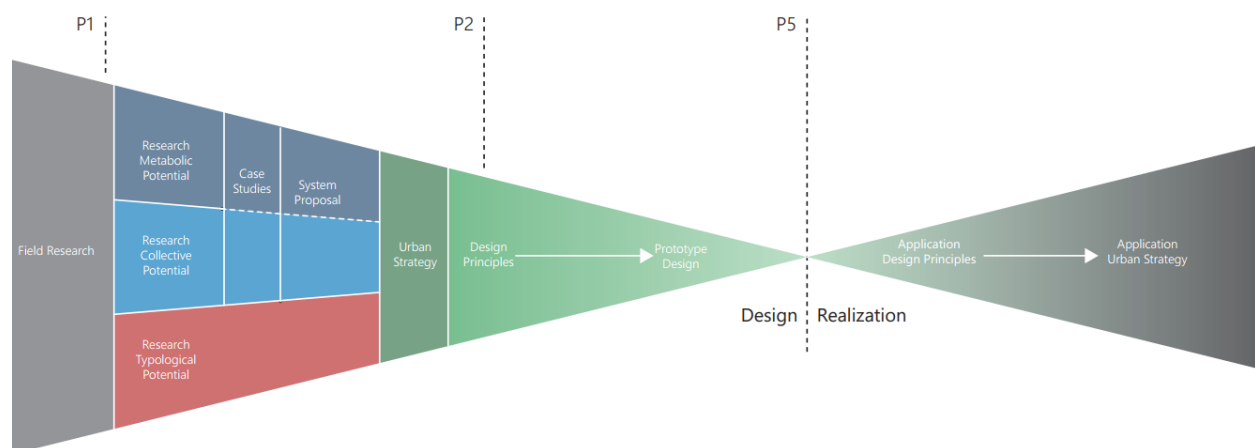


Figure 1: Research and design process (own image)

To define my research approach I would like to introduce the term of *Synergetic Interrelation*. It can be

understood as design that works as a catalyst to connect technical, social, cultural and political aspects, creating multifaceted synergies. In earlier projects, I made this experience several times without planning it. In my graduation project, I tried to make it an active driver of my design. In that sense, the big potential here is to bridge different disciplines and create additional benefits. This approach required a range of methodologies to look into different fields that I call metabolic, collective and typological potential.

*Metabolic Potential:* To develop a concept of a decentralized water supply system, I needed 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 therefore focused on understanding and quantifying urban metabolic systems.

*Collective Potential:* To implement the improved water system, non-technical aspects become more important. Habits, social behaviour and relations, neighbourhood structures, educational processes and other internal dynamics have to be researched in a different way, in this case field research in the Kampung with lots of talks and interviews with the locals. Most systems fail because of *soft factors* and not because of a technical error.

*Typological Potential:* 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: 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<sup>ii</sup>. On the other hand, this shows the potential for the wide-spread impact of an improved and more sustainable mosque prototype.

Finally, I had to combine those strings of research into my design. My aim was to identify Tamansari's wide range of potentials in my research and synthesize them into a bottom up urban strategy and several design principles. These principles were applied at a specific site, creating an architectural prototype. I determined these principles quite early and tried to stick to them during the whole design process. This was a rather challenging task because this resulted in many design parameters that had to be brought together.

**Elaboration on the relationship between the graduation project and the wider social, professional and scientific framework, touching upon the transferability of the project results**

The rapid expansion of cities in the global south comes along with massive challenges in the sanitation sector. The government's failure to provide enough affordable living space results in the uncontrolled growth of informal settlements where the lack of clean drinking water and adequate sanitation is omnipresent. 32% of the world's population lives in informal settlements by now, the total number is still increasing. The disproportion of urban growth and planned infrastructures and buildings shows us that the informal building sector is not a transitional phenomenon but a reality that has to be dealt with.

This graduation project provides a way to do so. The results of the research are a useful guide on how to identify possible stakeholders and community institutions that make the implementation of a decentralized water system realistic; in short, it shows how to make use of the existing "social infrastructure" to create a physical water infrastructure. As mentioned before, decentralized systems are highly site specific, the research exemplarily shows how to deal with these circumstances. With it comes a calculating tool, that gives an overview to the necessary technical system components and their sizing based on the population, rainfall and use of water. In my design I become more specific: a high percentage of Muslim population is necessary and the projects reacts to the circumstances as found in the Kampung along the river. However, the design is a proof that a bottom up principle works on neighborhood scale and includes a concept design on how to apply it along the river and citywide in whole Bandung. Other Indonesian metropolis show similar characteristics and are therefore relevant too. In a best case scenario, the 280.000 deaths caused by water pollution only in Indonesia could be significantly reduced while enhancing the water quality of the polluted rivers.

## **Discussing the ethical issues and dilemmas**

There are several ethical issues that I encountered during the graduation project and that I want to take position to:

*Statement 1: Water in the hand of a religious institution; isn't that dangerous and/or exclusive?*

Water supply should be a public matter, water should be a common resource. Judging from a European perspective, that should mean that water is owned by the state. However, things are different in Indonesia, especially in the Kampung: They are informal which means that the state takes almost no responsibility for the people living there. On the other hand, Kampung Mosques are owned and funded by the neighborhood community, a micro-democratic system. The Mosque is the center of the water system, however, the water itself is owned by the community and managed according to the principles of the commons (after Nobel Prize Winner Elinor Ostrom). This means that separation of powers and mutual monitoring realized.

*Statement 2: Women as a main target group for water education– isn't that undermining the equality of genders?*

I do criticize paternalistic structures that are often manifested in the interpretation of Islam and even in the buildings themselves. Muslim women in different Islamic countries have been complaining about being treated second class believers, not being wanted in Mosques. With my building, I try to create a positive dynamic to improve both, sustainable behavior and gender equality: Optimal conditions such as integrated childcare for women encourage them to come to the Mosque. A strong argument to build Mosques that way (apart from gender equality) is that they are the target group that has to be educated and therefore crucial for the project's success.

*Statement 3: Moving people from the riverside to implement the green filter system – isn't that unethical?*

Forcing people to move from the riverside without offering them new homes would be Utilitarian. Therefore, people must be offered replacement in one of the vertical Kampung that are in the process of being built at the moment. This is most likely to happen because the government plans to clear the river front for security reasons: there is a high risk of landslides. Besides, people at the riverfront live under the poorest conditions, at constant risk to be flooded and have the worst access to water – so if people are moved to better dwellings, they should be it.

*Statement 4: A religious person could say that "using" a religious building for profane function doesn't feel right.*

I decided to separate profane and sacred functions in different buildings. Concerning the Minaret that works as a water tower, I asked an Imam for approval. Besides, Muslims I talked to have been very positive about the combination of water purification and Islam, as long as contaminated water doesn't touch the Mosque. One reason might be, that the religion has developed in countries with constant water scarcity. Many Quran passages directly address the right use of water and ban its polluting it. The cleaning of water can therefore be justified by the holy scriptures.

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<sup>i</sup> UN Committee on Economic, Social and Cultural Rights, "The Human Right to Water and Sanitation, Resolution A/RES/64/292" (United Nations, July 2010).

<sup>ii</sup> Tayyab Ahmad and others, 'Implications of Stereotype Mosque Architecture on Sustainability', *Procedia Engineering*, 145 (2016), 96–103, p. 3