

REFLECTION

Project overview

The Growing Library explores the use of Baubotanik – building with living trees – in a tropical urban environment. Situated on the riverside of Yogyakarta (Indonesia), this project sets out to design a library embedded into a public green space, with the living roots of the banyan tree (*ficus benghalensis*) at the core of the design. The chosen site is a vacant plot that has the potential to revitalise the run-down/neglected riverside and turn this area into an urban feature that showcases the potential of Baubotanik and promotes re-connecting with nature on several levels.

Research and design. Project, process and working approach.

The research paper establishes a systematic framework for understanding Baubotanik across climates, spatial functions, seasons, and species. It identifies suitable ways and spaces in which to implement Baubotanik in architecture.

These findings set out a strong starting point for the design project and shape the early design decisions of the Growing Library in several clear ways:

Climatic suitability (Tropical > Temperate):

The finding that Baubotanik is significantly more compatible with tropical climates validated the decision to locate the project in Yogyakarta and shaped the design toward permeable, outdoor-oriented spaces.

Species selection (aerial-rooted ficus species):

The research demonstrates that aerial-rooted species enable flexible forms and greater design freedom. This directly supported the choice of *Ficus benghalensis* as the structural living organism of the project.

Spatial typologies (Type A/B):

Because Baubotanik performs best in low-control (Type A) and medium-control (Type B) environments, the library programme is chosen as a suitable option that has a high outdoor / semi-outdoor potential.

Construction complexity:

The need for hybridisation in medium-control spaces led to a hybrid structure that combines living trees and bamboo.

The design project explores what it actually means to construct with living trees in a tropical climate. How do you incorporate a living organism into the architectural intervention? What role does it play? What forms does it take? How does it interact with other (technical) elements? How does it behave as a (living) material? What spaces are created?

During the design process, these questions led to several key aspects being explored in more detail: growth, time, indoor-outdoor relationship, hybrid systems, library as a place for knowledge exchange... What started off as a set of separate ideas, some stemming from the research, others from the site analysis, tree requirements, spatial explorations... would slowly start to come together to make a whole.

For example, in the process of exploring the indoor-outdoor relationship, the 'whole' only began to take shape after exploring it from different angles. The research paper was the starting point: Type A and Type B spatial typologies were the most desirable for Baubotanik. This was to be translated into the library programme. Looking at library precedents and typical approaches to library design, it was clear that indoor spaces take precedence in spatial design, that the landscape is often an afterthought, and that outdoor spaces are not really part of the programme. Can we see the library as a place of knowledge exchange, rather than knowledge being confined within a building? How can outdoor spaces constitute core library functions? What knowledge does the outdoor hold? How can the outdoor contribute to knowledge exchange? How can we extend/push the library programme to the outside? What spaces can be outdoors? Which ones are more rigid?

Parallel to that, what kind of 'knowledge' the library should host was investigated. Are we hosting traditional resources alongside (printed resources, digital resources)? What is the collection of knowledge that this library should host? Can we extend this definition to the outside? Can our surroundings become part of the knowledge? What can we learn from our surroundings? This line of thought brought less conventional resources into the collection that this library should host: people, speech, living resources (trees), non-living resources (surroundings), which in turn led to questions like: what spaces are needed for this type of (less conventional) knowledge exchange?

The tree growth timeline also played an important role in shaping the order in which these programme functions arise or are shaped, with the library initially being made up of outdoor spaces alone, and other parts of the programme growing as the tree grows and more spaces are created. As such, we are looking at a programme that is incomplete at the start, one that is growing in footprint.

This indoor-outdoor relationship also became key to the ventilation strategy and by extension, the zoning of the building. Similarly, the structural strategy also reflects this distinction between outdoor, semi-outdoor and indoor spaces in its selective application of Baubotanik and the resulting root/architectural language.

Reflection on mentor feedback and how it translates into the project

The tutorials have been very valuable in shaping this project and keeping it in check, preventing it from getting lost in the details. Due to the nature of this project, the uncertainties that come with it and the endless scenarios/possibilities, I have at times found myself getting lost in the details or overwhelmed by the infinite possibilities. The feedback from my tutors has been very useful in learning to accept these types of uncertainties and making them

part of what the project is about. Their insights have helped me take a step back from the detailed aspects of the project and see the bigger picture. I also really appreciated their input and take on the project, which allowed me to explore different directions. Their guidance has definitely helped make the project more coherent.

A team of 3 tutors has been a new experience for me, as opposed to having just one. Having this many opinions/new ideas has often made it more difficult to find my own voice in the project. It has highlighted the importance of processing feedback and assessing what the project actually needs, instead of jumping to act on every piece of feedback. This is easier said than done, and for me personally quite difficult when I am in the middle of shaping the project, experimenting, figuring things out and undecided about things.

How have you learned from your work?

The growing, changing, uncertain nature of this design project has probably been the biggest challenge for me as a designer. Trying to get to grips with it, embracing this aspect and integrating it into the design has been a difficult process. During the design process, the lack of real-life precedents has made it difficult to validate the work I am doing, and it means that much of the design is 'floating' in uncertainty, which is a daunting thought. Accepting this fact is a part of this project and you learn to substantiate decisions in a different way and with a different type of rigidity. I learned to accept indeterminacy, recognising that design decisions must sometimes leave space for biological variation. Another lesson is that long-term thinking is essential when designing with living materials; architecture becomes a timed process rather than a fixed product. Despite being well aware of this from the start (in theory at least), it took a while for the project to be able to embody this idea and for it to come across as an integral part of the project and not just a superficial add-on.

Relation graduation project topic, Architecture track and Msc AUBS

By undertaking my graduation project with the Explorelab studio and being able to research a topic I am deeply interested in (Baubotanik), I have been presented with the freedom to pursue the interdisciplinary nature of the project and to operate freely across a variety of specialisations (architecture, landscape, structural design, botany, environmental design, urban design, material experimentation...). The project, investigating the architectural applicability of Baubotanik and translating it into a public library in tropical Yogyakarta, builds upon the track's ambition to explore innovative construction methods, sustainability, and contextual responsiveness. The cross-scalar nature of the project (tree physiology, spatial design, and urban public space) resonates with the programme's interdisciplinary ethos, where architectural design is approached both as a technical and a socio-environmental practice.

How do you assess the academic and societal value, scope and implication of your graduation project, including ethical aspects?

From an academic perspective, the graduation project contributes to expanding the knowledge in this young and underdeveloped field by offering some new research insights and design approaches. The research project contributes by offering structured design guidelines, something currently missing in Baubotanik literature. The design project showcases a convincing and transferrable way of dealing with living materials, long-term growth and change.

From a societal perspective, the design proposes an alternative approach to urban development in tropical environments—one that emphasises ecosystem services, public space enhancement, and ecological awareness. It repositions trees as active agents in urban architecture, not background elements.

From an ethical point of view, the project has highlighted that working with living organisms requires respect for growth cycles and ecological integrity. Additionally, the research highlighted the need to consider cultural attitudes toward manipulating trees, which is woven into the design project by rejecting invasive construction techniques and instead relying on non-invasive methods.

How do you assess the value of the transferability of your project results?

The aim of the research project was to provide a set of design considerations that serve as advice for designers. These help designers assess where, when and how to use Baubotanik in a project.

The design project contributes to an under-represented pool of baubotanical precedents, especially in tropical climates. It offers a way of dealing with and integrating living organisms into an architectural project in the urban environment. The way the project addresses growth, time, hybrid construction and uncertainty is highly valuable for any future project of this kind.

These results make the research and design project highly transferrable and worthwhile for both academic and real-life projects. This knowledge can be applied to tropical and temperate climates exploring living construction techniques, public space design (walkways, pavilions, public spaces), climate-responsive architecture, hybrid construction projects and long-term ecological infrastructure.