

Seed Funding Global South 2023 – Project report

Sustainable Architecture

- **Chair at the TU Berlin:** Architectural Representation and Design (CoLab)
- **Partner country/countries:** Thailand
- **Partner institution (s):** Faculty of Architecture at Chulalongkorn University (CU)

Sustainable Development Goals (SDGs):



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SDG 4: Quality Education

SDG 9: Responsible Consumption and Production

SDG 11: Quality Education

SDG 12: Responsible Consumption and Production

SDG 17: Responsible Consumption and Production

Two researchers affiliated with the Chair of Architectural Representation and Design (CoLab) at TU Berlin, in partnership with researchers from the Faculty of Architecture at Chulalongkorn University (CU) in Thailand, organized a collaborative workshop, enhancing capacity and promoting knowledge exchange. This initiative collaboration aims to advance a more sustainable approach to architectural design. The focus of this endeavor encompassed digital prefabrication manufacturing, participatory methodologies, and the utilization of locally available biogenic materials, precisely engineered bamboo. This collective effort aimed to cultivate comprehensive expertise within the local economy and foster a circular approach to materials within architecture.

Thailand's visit strengthened the existing partnership by establishing tangible collaboration and provided a precise assessment of opportunities for cooperation in joint ventures and experimental facilities. Moreover, the funding facilitated the exploration of potential collaborations with other university departments and faculties, including the Department of Civil Engineering at CU or the Faculty of Forestry at Kasetsart University, for future bamboo material testing or further investigating into the sustainable bamboo material supply chain with more biodiversity focus at the. Such interactions have the potential to pave the way for multidisciplinary research, contributing to the realization of Sustainable Development Goals (SDGs):

SDG 4: Quality Education

The knowledge exchange revolved around critical areas such as biogenic materials, additive manufacturing, value chain analysis, and integrating knowledge relevant to architectural design. These skills are crucial for promoting sustainable learning and expertise aligned with SDG-focused projects.

SDG 9: Industry, Innovation, and Infrastructure

This endeavor highlighted the importance of instilling an understanding of reduced emissions throughout the lifecycle of building materials, starting from their inception. This goal was pursued through gamified participatory methodologies grounded in real-world data alongside an innovative prefabricated construction system designed to facilitate the sustainable circularity of materials. These efforts directly contribute to the cultivation of a more sustainable industry and the promotion of innovation.

SDG 11: Sustainable Cities and Communities

The workshop leveraged localized insights into bamboo, tapping into the knowledge of local manufacturers and integrating technological tools and spatial data related to material resources and environmental impacts. This approach aimed to develop materials to support the creation of future sustainable and affordable prefabricated housing. Moreover, the visit nurtured connections for collaborative research spanning from material production (forestry) to its application (construction), establishing a holistic framework for sustainable cities and communities.

SDG 12: Responsible Consumption and Production

The capacity-building process consisted of two core aspects: a participatory approach based on the Value Chain Methodology to understand the existing material flow and propose improved scenarios through educational methods. Simultaneously, additive manufacturing empowered workshop participants to create tools for generating solutions that promote material circularity in construction. This approach yielded sustainable building components and outcomes.

SDG 17: Partnerships for the Goals

Within this collaborative project undertaken with partners from the Global South, the initial workshop served as an invitation and showcase, bringing together stakeholders from various industries such as architecture, forestry sectors, and local manufacturing. The objective was to foster collaboration and unified action in pursuit of the SDGs.



Fig 1. Students in participatory workshops work on sustainable engineered bamboo value chain (Source: Faculty of Architecture, Chulalongkorn University, 2023)



Fig 3. Material testing facilities, Department of Civil Engineering, Faculty of Engineer, Chulalongkorn University (Source: CoLab, 2023)



Fig 2. The final presentation of the workshop on 3D printing joints for material circularity (Source: Faculty of Architecture, Chulalongkorn University, 2023)



Fig 4. Bamboo processing factory, Prachinburi, Thailand (Source: CoLab, 2023)