

Build4People Project

Work Package #2: Sustainable Building Research Approach

INSPIRED BY



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RATIONALE & BACKGROUND

Although the construction activity is highly dynamic in Cambodia already today, the major transformation is yet to be expected. It will result in significant impacts through increased energy demand and use of resources. In the early stage of development, the situation in Cambodia is unique (e.g. high energy prices, contemporary tropical design experience).

Early and effective interventions in the urban and residential built environment based on evidence and transdisciplinary research of this project shall lead towards sustainable qualities in the urban context and to comfortable and energy-efficient living conditions in future sustainable buildings. Thereby the functional and technological augmentation of traditional building concepts, shall be developed as preferred strategy of the transformative process.

THEORETICAL FRAMEWORK

The theory seeks to understand the starting point of sustainable building today and the preferred future condition of the built environment. It will develop pathways from the condition today to a future stage avoiding harmful detours (Kosow & Gaßner, 2008).

We will apply three conceptual frameworks for analysis, and adapt these to the Cambodian context:

1. Framework of locally adapted architecture and building technology (Schwede, 2019)
2. Framework strong sustainability in building (efficiency, sufficiency and consistency) (Hegger et al., 2013; Ott & Döring, 2004)
3. Life-cycle assessment (settlement, building, component, Material level) (DIN EN 15804:2014-07)

RESEARCH QUESTIONS

- What are the parameters of desired living conditions and the perception of “Quality of Life” of the modern population in Cambodia?
- What are the domains of sustainable building, that are relevant as criteria for sustainable buildings in Cambodia today and in future?
- How can sustainable building practice (design, construction and operation) contribute to urban quality of life without increasing the use of resources beyond the sustainable limits?
- How can sustainable design, construction and operation of buildings be introduced effectively into the Cambodian practice? Which technologies and which capacities need to be developed in this context?

OBJECTIVES

The WP “Sustainable Building” has a two-tier approach towards a sustainable building practice in Cambodia:

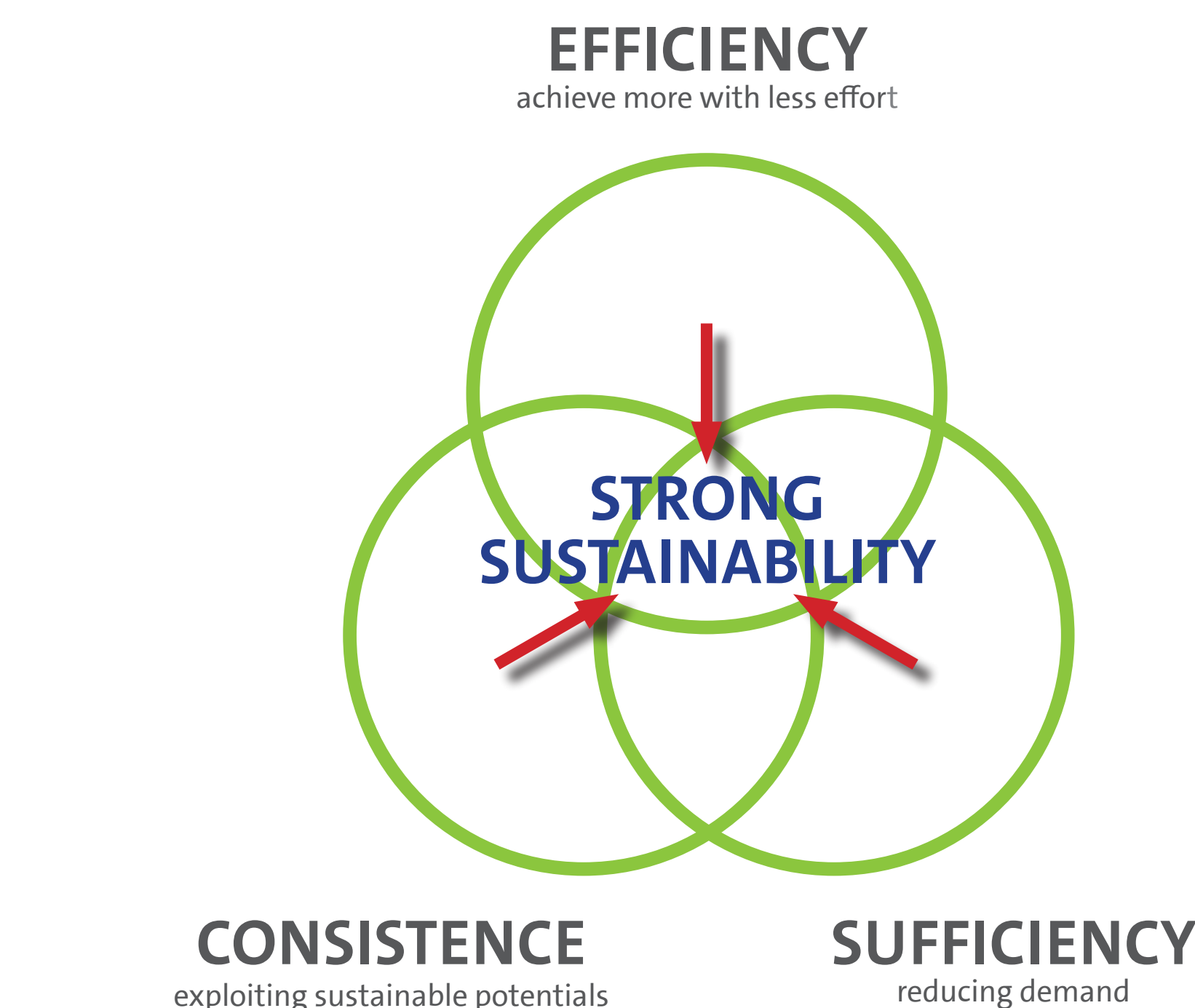
Analytical Level

- Understanding the concept of desired living conditions and the perception of “Quality of Life”.
- Analysis of modern traditional, current design, building and operation practice
- Conceptualisation of pathways towards sustainable building practice, including design, construction and operation.

Normative / Prescriptive Level

- Development of building standards for energy-efficient, resource-efficient and overall sustainable building.
- Support transformative change towards sustainable building and towards the realization of the SDGs, particular SDG3, 7, 11, 12.

STRATEGIES TOWARDS SUSTAINABLE BUILDING



SOURCE: ADAPTED FROM: HEGGER ET. AL., 2013.

MILESTONES OF THE DEFINITION PHASE

- Conceptualisation of methods for the detailed building audit survey and Measurement of indoor environmental quality parameters in modern residential settings
- Baseline Report: Technologies and Systems for Sustainable Building – current and future applications in construction projects in Cambodia
- Baseline Report: Measuring urban quality of life from a sustainable building perspective
- Conceptualisation of pathways towards sustainable building practice in Cambodia, including design, construction and operation
- Contributions to the development of building standards by the General Department of Housing (GDH)
- Preparation of a solid theory-based proposal in regard to the RD-phase

LIFE-CYCLE PERSPECTIVE

life cycle phases for building assessment

building assessment information				
building life cycle information				supplementary information beyond the building life cycle
PRODUCT stage	CONSTRUCTION PROCESS stage	USE stage	END OF LIFE stage	benefits and loads beyond the systems boundaries
A1 Raw material supply	A4 Transport	B1 Use	C1 Deconstruction	D Reuse-Recovery-Recycling Potential
A2 Transport	A5 Construction Installation process	B2 Maintenance	C2 Waste Processing	
A3 Manufacturing		B3 Repair	C3 Transport	
		B4 Replacement	C4 Deposal	
		B5 Refurbishment		
		B6 operat. Energy Use		
		B7 operat. Water Use		

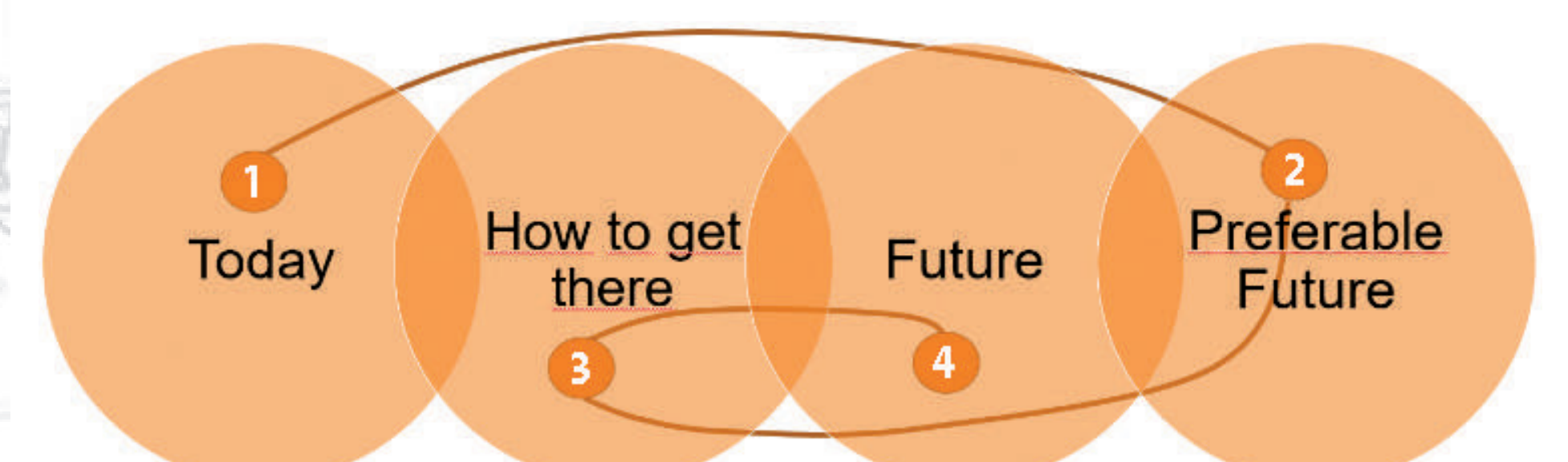
SOURCE: ADAPTED FROM: DIN EN 15804:2014-07.

OUTLOOK

Based on the preliminary analysis in the definition phase, we will consolidate the framework of sustainable building for the Cambodian context for today and will draw up a path for the future sustainable development towards a high level of quality of life in the built environment with a high degree of energy-efficiency, resource efficiency and life-cycle performance.

Thereby we will draw from the green building framework of the German Sustainable Building Council (DGNB) as well as from the life-cycle assessment approach (DIN EN 15804:2014-07) for environmental impact assessment and economic performance in the operation phase and the concept of strong sustainability in building (Hegger et al. 2013).

METHODOLOGY OF FUTURE & SCENARIO ANALYSIS



Research & Development Phase
of Build4People Project

SOURCE: KOSOW HANNAH; GASSNER ROBERT (2008).

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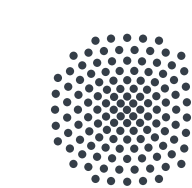
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List of references cited within this poster /
Further reading

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