

# Balancing act in Thai Island Paradises

## Addressing Overtourism, Water Scarcity and Tradition

AR3E100 Research Plan | 07.11.2023 | Else Wintermans

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### Studio

Name of studio AR3AE100 Architectural Engineering Graduation Studio (2023/24 Q1)  
Research domain Flow  
Design tutor Thomas Offermans  
Research tutor Jos de Krieger

### Graduation Project

Project title Balancing act in Thai Island Paradises  
Essence of project The project aims to develop sustainable water-management strategies to address fresh water shortage and groundwater contamination on tourist islands in Southern Thailand, promoting a balance between local needs and tourism industry sustainability.

Keywords Islands, Overtourism, Sustainable Tourism, Water Shortage, Thailand

### Argumentations of choice of the studio

The studio offers a unique opportunity to engage with pressing global challenges. Climate change, resource depletion, and pandemics are issues that affect us all. As an architect, you can be part of the solution by understanding how architectural design can directly impact these challenges. I find the studio's focus on addressing environmental and social issues through technology particularly intriguing. Furthermore, this studio allows for a significant degree of flexibility, enabling you to select your own subject and context based on your personal interests.

### Overtourism

Global tourism was considered to be one of the world's biggest industries before the coronavirus outbreak interrupted the steady growth of international mobility (World Travel & Tourism Council, 2020). The World Tourism Organization announced that yearly growth rates were exceeding most other sectors, with 2020 being expected to set another record (World Tourism Organisation, 2020). The growth of tourism has been accompanied by the concentration of tourist flows to specific areas, causing crowding and problems with carrying capacity (Butowski, 2019). Additionally, there are governance issues with respect to the resources of destination countries, relationships with airlines (primarily low-cost carriers), and technological developments, accompanied by environmental issues, with regards to increasing waste generation, water problems, and air pollution (Koens et al., 2018). The unlimited tourism growth for decades caused serious negative effects to the environment and put pressure on local populations (Peeters et al., 2018). This phenomenon became known as 'overtourism'.

With visitor numbers around the world increasing towards pre-pandemic levels, the issue of overtourism is reappearing. It is predicted that overtourism will not only return to pre-pandemic levels this year, but that numbers may even be surpassed in the future (UNWTO, 2020). Concern for sustainability, and for the environmental management processes that contribute to it, is of critical importance for the future growth of tourism. Resolution of environmental issues will demand far-reaching changes in the way the industry operates.

### Islands

Islands have long been considered popular tourist destinations and some islands rank amongst the most visited places in the world. Yet their size and geographical isolation have also often contributed to a lack of control over many issues that affect them (Butler & Dodds, 2022). Most islands are on one hand heavily dependent on tourism, because of their small land area, and have limited opportunity to engage in alternative economic activities (Alberts et al., 2017). Consequently islands are vulnerable to overtourism. On the other hand, islands systems are among the most vulnerable to climate change, which is predicted to induce shifts in temperature, rainfall and sea levels (Veron et al., 2019). Overtourism is a significant driver of climate change, which definitely worsens climate change. Besides islands are often heavily subject to external controls, both economic and political, thus suggesting that islands could be considered more vulnerable than most other tourist destinations to experience excessive development and tourist numbers far beyond their capacity to control and manage (Butler & Dodds, 2022).

Butler and Dodds (2022) conclude that overtourism in islands is often a result of a combination of political, geographical, cultural and physical characteristics. This can make islands, particularly small islands, vulnerable to the pressures from excessive tourism development when they are relatively poorly equipped to prevent or limit such pressures. Figure 1 summarizes the factors that affect the vulnerability of overtourism on islands.

### Thailand

A study from MoneyTransfers.com (2023) compares the number of visitors with the local population of famous tourist destinations. The research compiled a list of the most overcrowded destinations in the world, along with the number of travelers per resident. The top 3 of the list consists of only Thai destinations, with the Thai island of Phuket (118,5 tourists per inhabitant) on top. Followed by Pattaya (98,7 tourists per inhabitant) and Krabi (72,2 tourists per inhabitant).

Thailand has become known as a low-cost mass tourism destination, because of its attractions in combination with easy accessibility through relaxed visa regulations and its strategic marketing campaigns (Hess, 2019). The country (with a population of 71.3 million people) received almost 40 million visitors in 2019 (Statista, 2020). While the growth in tourism was economically benefitting and triggering infrastructure developments, the large numbers of visitors and the concentration of tourism at certain hotspots led to environmental damage and social conflict

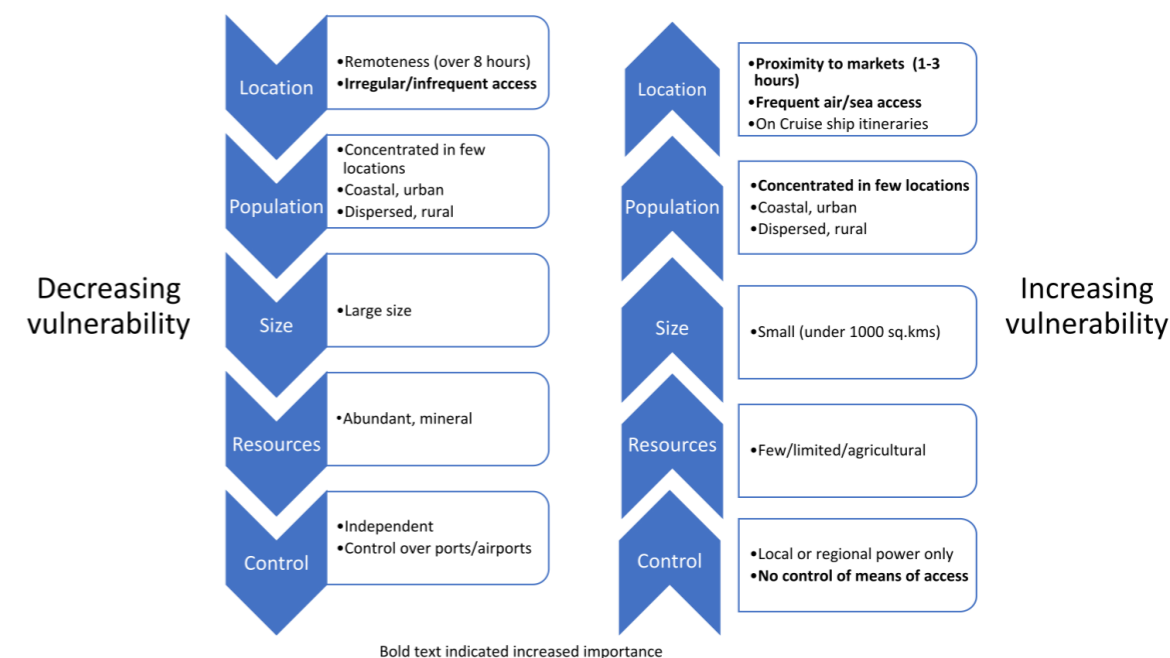


Figure 1: Factors increasing or reducing island vulnerability to overtourism (Butler & Dodds, 2022)

(Hess, 2019). This phenomenon of overtourism is visible on many islands in the southern region of Thailand. Some destinations have even taken measures to stop visitors coming in, like in Thailand's Krabi province on Phi Phi island. The executive decision was made to close the popular beach Maya Bay for over two years (2020-2022) to overcome problems of overtourism and vulnerability of the marine ecosystems (Koh & Fakfare, 2019).

While Thai islands facing overtourism get confronted with environmental issues like waste disposal, handling natural disasters, and managing water resources on one hand, they also grapple with social concerns such as the dissimilarity between local residents and tourists and the erosion of cultural heritage and architectural identity on the other hand. This thesis takes a broader perspective on the prevailing environmental issue of water scarcity affecting numerous Thai islands, while also addressing the social challenge of striking a balance that satisfies both local inhabitants and tourists.

### Water Shortage

Many islands in the southern region of Thailand, such as Phi Phi Don, Koh Samui, and Koh Tao, face a significant shortage of clean freshwater. The problem arises during a period of low rainfall coinciding with the peak tourist season and is worsened by improper wastewater management (Nitivattananon & Srinonil, 2019). During the driest part of the year these islands are flooded with tourists, leading to a surge in the demand for water. The limited freshwater supply drives up the cost of piped water, prompting businesses to drill wells to access groundwater. This leads to a decline in the water table. As the aquifer water levels decrease, seawater begins to intrude into the groundwater, causing saltwater contamination. Furthermore, the local water treatment plant on these islands is incapable of managing the volume of wastewater generated. As a result, excess untreated wastewater is discharged into the sea, contributing to the pollution of both the seawater and the groundwater.

### Social Challenge

In an ideal scenario, tourism should be a mutually beneficial situation in which both local residents and tourists gain advantages from it. The emphasis is on enhancing the quality of life for locals and creating more appealing destinations for tourists to enjoy. However, as the volume of tourists to a given destination increases substantially, there is a simultaneous decline in its intrinsic authenticity. Overtourism results in elevated local prices and a departure of native inhabitants from the area, leading to a cultural divide (Pratama & Mandaasari, 2020). Travelers, in the end, embark on their journeys in pursuit of novelty and a deeper understanding of diverse cultures. Nevertheless, overtourism is responsible for the gradual fading of the destination's unique authenticity and charm.

**Overall Design Objective**

The primary design objective is to establish a balanced and sustainable coexistence that harmonizes the needs and aspirations of both local communities and tourists, while reducing the adverse ecological repercussions of excessive tourist activities on Thai islands. The core focus of the design focuses around water, as it aims to play a pivotal role in addressing water scarcity issues. Moreover, water serves as the unifying element in crafting a space where tourists and local residents can seamlessly coexist, harmoniously embracing the inherent wonders of the island's natural environment.

Additionally, the project aims to preserve the cultural and architectural identity of the island, which overtourism has affected. This preservation will be achieved by incorporating architectural elements reflecting the island's rich heritage, including traditional materials, construction techniques, and architectural styles. Research and consultations with local communities will be included to understand the cultural values, traditions, and symbols that are meaningful to them.

The design challenge involves the creation of a natural swimming pond that facilitates localized water purification while offering a recreational space for both local residents and tourists. The layout of the surrounding area will depend on the specific context but could include options such as configuring it as a flexible pavilion for gatherings like cooking classes or yoga sessions. Alternatively, the surrounding space may be developed into an innovative and sustainable Airbnb concept, fostering harmonious coexistence and mutual advantages for both local residents and tourists. The specific context will depend on the thematic research and will be determined based on which of the 5 selected islands from the thematic research can apply the most measures to address the water shortage. This strategy enables the design to incorporate a wide range of water scarcity measures and make contributions across multiple scales.

**Overall Design Question**

“How can architectural design incorporate water as a central element to create a space for water purification and foster mutually beneficial interactions between local communities and tourists on a Thai island facing overtourism?”

The successive sub questions per theme can serve as support to outline the design task:

**Water Management and Sustainability**

1. How can water management strategies be integrated into the design to address water scarcity effectively?
2. What sustainable water purification methods can be incorporated into the natural swimming pond?

**Cultural Preservation**

3. How can architectural elements reflecting the island's heritage be integrated into the design?
4. In what ways can traditional materials, construction techniques, and architectural styles be used to preserve cultural identity?

**Ecological Impact Mitigation**

5. What eco-friendly features and measures can be included to reduce the adverse ecological repercussions of tourism?
6. How can the design minimize resource overuse and ecological impact while promoting environmental sustainability?

**Enhancing Coexistence between Local Communities and Tourists**

7. How can the design create an environment where tourists and local residents can seamlessly

coexist?

8. What innovative elements can be introduced to provide a unique and appealing experience for both tourists and locals?

**Relevance**

The research is relevant due to its multi-faceted approach to addressing significant challenges and opportunities in the context of overtourism on Thai islands. It offers value to society and users through the following facets:

**Balanced and Sustainable Coexistence**

The primary design objective seeks to establish a balanced and sustainable coexistence between local communities and tourists. This is relevant as it addresses and mitigates the tensions and conflicts often associated with overtourism, contributing to a more harmonious environment. This is beneficial for both the local population and tourists.

**Ecological Preservation**

The research focuses on reducing the adverse ecological repercussions of excessive tourist activities. This is of importance for society as it contributes to the long-term preservation of natural environments, benefiting not only the current generation but also future ones.

**Cultural Heritage Preservation**

The aim of preserving the cultural and architectural identity of the island is of significance to society. Overtourism can affect cultural heritage, which holds substantial value in terms of historical and societal identity. This preservation fosters a sense of pride, continuity, and cultural enrichment.

**Innovative Solutions**

The innovative design challenge provides societal value by offering creative ways to address water scarcity and promote sustainable tourism. This can lead to a more diverse and appealing range of experiences for both tourists and locals, making the destination more attractive and enriching the lives of the local population.

In summary, the research's societal relevance lies in its potential to address the multifaceted challenges of overtourism, while simultaneously preserving ecological, cultural, and societal aspects. It aims to create a harmonious and sustainable environment that benefits both local communities and tourists, contributing to a more balanced coexistence.

**Thematic Research Objective**

The objective of the thematic research is to develop and implement sustainable water resource management strategies to effectively address the challenges of fresh water shortage and groundwater contamination on popular tourist island destinations in the southern region of Thailand. These strategies aim to achieve a balance between the water needs of the local community and the tourism industry while ensuring long-term environmental and socio-economic sustainability. Ultimately, a comprehensive set of solutions will be formulated, comprising measures that can be implemented on various islands to tackle the water shortage problem. The suitability of specific measures for resolving water scarcity will be determined based on the individual characteristics of each island, as deduced from the comprehensive set of solutions.

The thematic research objective is closely related to the design objective, as both aim to address the water scarcity issues and challenges on popular tourist islands in the southern region of Thailand. In essence, the thematic research provides the knowledge and strategies needed to inform the design process. It helps in identifying and implementing suitable water scarcity measures based on the individual characteristics of each island, aligning with the design objective's goal of creating a sustainable and harmonious coexistence while addressing water-related challenges.

**Thematic Research Question**

“How can sustainable water management strategies address freshwater shortages and groundwater contamination on popular Thai tourist islands, while ensuring a harmonious balance between the requirements of local communities and the tourism industry?”

**Sub Questions:**

PAST  
NOW  
PRESENT

1. How did the traditional water management techniques in Thailand function before the emergence of overtourism?
2. What is the existing balance between water supply and demand, particularly during peak tourist seasons?
3. Which methods and techniques can be (re)applied to improve the current water system and mitigate the challenges arising from overtourism?
4. How can these methods and technologies be integrated into the existing Thai water system to ensure sustainable water resource management in tourist destinations?

**Relevance**

The relevance of this research lies in its potential to address burning environmental and socio-economic challenges faced by popular tourist islands in the southern region of Thailand. These islands are struggling with issues related to water scarcity, groundwater contamination, and the negative impacts of overtourism.



**Environmental Sustainability**

The study focuses on sustainable water resource management strategies, which are essential for mitigating freshwater shortages and preventing groundwater contamination. By developing effective strategies, the research contributes to the preservation of the natural environment and marine ecosystems on these islands.



**Tourism Industry**

The tourism industry is a significant economic driver in the region. Sustainable water management can help maintain the appeal of these tourist destinations by ensuring a reliable water supply and reducing environmental deterioration. This is crucial for the long-term success of the tourism sector.



**Local Communities**

Balancing the water needs of local communities with those of the tourism industry is essential for the well-being of residents. The research seeks to address this challenge, ultimately enhancing the quality of life for the local population.



**Global Tourism Trends**

The issue of overtourism and its environmental impacts is not unique to Thailand; it's a global concern. Solutions developed in this research can serve as valuable case studies as examples other tourist destinations facing similar challenges.

In summary, this research is relevant because it addresses critical issues affecting the environment, the tourism industry and local communities in a popular tourist region. Its findings and solutions can have a positive impact not only in Thailand but also in the broader context of global tourism and environmental sustainability.

**Thematic Research Methodology**

To define the research scope, five Thai islands significantly affected by overtourism have been chosen. Data regarding to water supply, demand, quality, and the effectiveness of current water systems will be gathered from these selected islands. This data will be used to draw conclusions that can be applied to a wider range of islands.

The selected islands are as follows: Phuket, Koh Phi Phi Don, Koh Samui, Koh Pha-Ngan, and Koh Tao. The choice of these islands is based on the overarching issue of overtourism. Additionally, an effort was made to select islands with variations in factors such as size and location.

**Research Method**

**Research Questions**

**Literature Study**

Study of literature on traditional water management techniques in Thailand. Subsequently on new efficient methods and techniques that could be useful for Thai islands.

1, 3

**Material Flow Analysis (MFA)**

Understanding of the current water processes in touristic Thai islands by identifying and quantifying water flows. Subsequently incorporate the insights obtained from subquestion 3 regarding innovative and efficient methods into the existing Material Flow Analysis, obtained from subquestion 2, to establish balance between supply and demand.

2, 4

### Expected Results

The ultimate objective of the research is to create a diagram comprising a set of measures that can be effectively integrated into the existing situation to address the water shortage on Thai tourist islands. The applicability of these measures will vary from one island to another. Therefore this diagram can be customized for a specific island, to gain a better understanding of water management tailored to that particular island. Success in achieving the expected results of the thematic research can be measured by several key indicators and outcomes:

### Customization for Specific Islands

The extent to which the diagram of water management measures can be customized and tailored to the unique characteristics and challenges of specific Thai tourist islands will be a crucial measure of success. This customization demonstrates that the research has effectively identified and addressed the diverse needs of different islands.

### Applicability and Implementation

Success will also be determined by the extent to which the identified measures can be practically implemented on the chosen islands. If the measures are found to be applicable and can be integrated into the existing situation, this would signify a positive outcome. The ease of implementation and the potential for quick results will be key factors.

### Effectiveness in Addressing Water Scarcity

The success of the research will ultimately be substantiated by the impact of the water management measures on mitigating water scarcity on the selected Thai tourist islands. The extent to which these measures effectively address water shortage issues and improve water availability will be a critical measure.

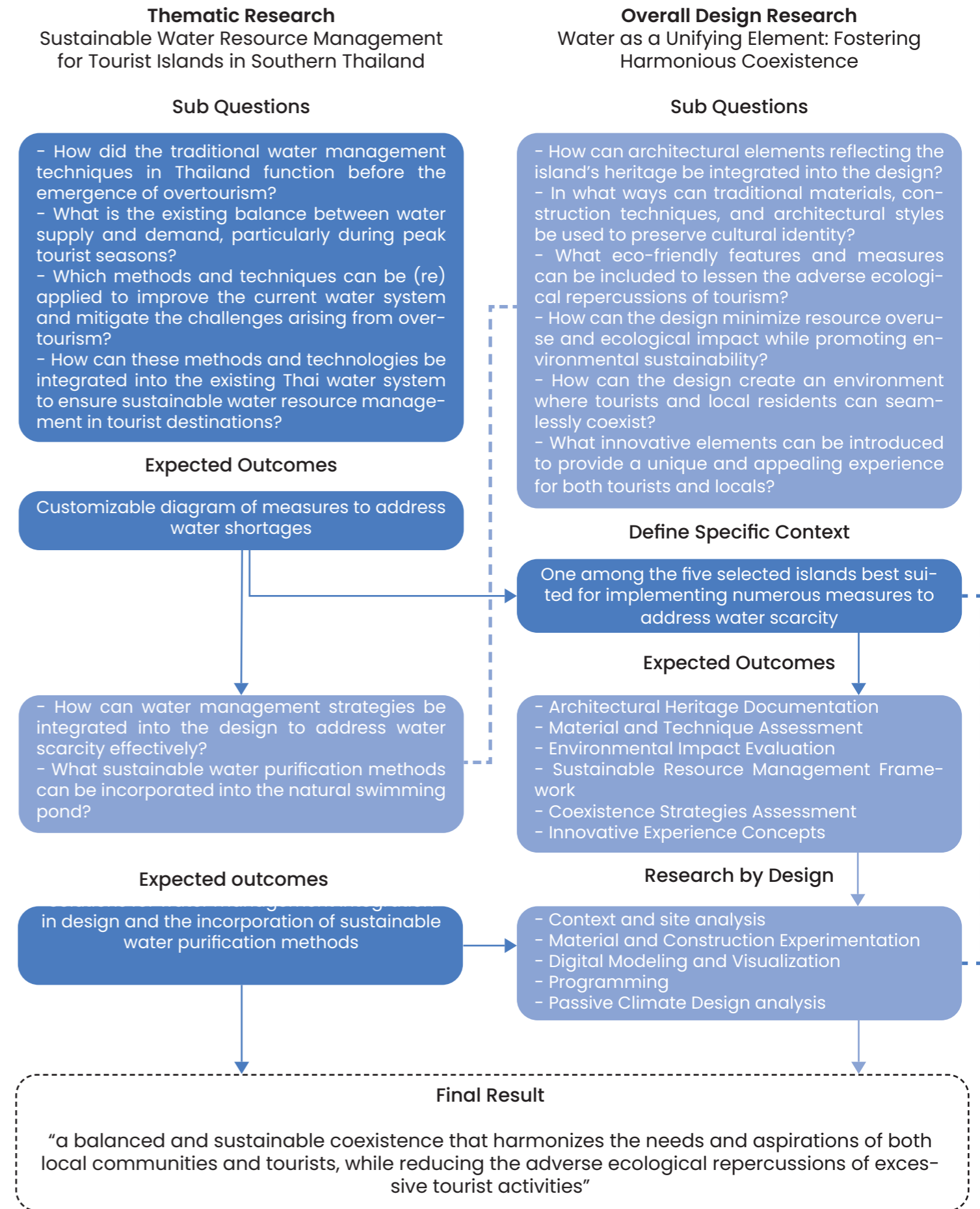
### Environmental and Socio-economic Impact

The research should measure the broader effects of implementing these measures, both environmentally and socio-economically. Reduced groundwater contamination, minimized environmental impact, and positive changes in the quality of life for local communities are important success indicators.

In summary, success in this research will be measured by the ability to customize and implement the identified water management measures, their effectiveness in addressing water scarcity, and the broader environmental and socio-economic impact. The research aims to provide practical and adaptable solutions that result in tangible improvements on the selected Thai tourist islands.

The research's primary focus on addressing water scarcity issues through water management measures aligns with the core focus of the design approach. The specific measures identified in the research can be incorporated into the design to ensure the efficient use of water resources and localized purification within the natural swimming pond.

## 04 Comprehensive Research Framework





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