Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences

Graduation Plan: All tracks

Submit your Graduation Plan to the Board of Examiners (Examencommissie-BK@tudelft.nl), Mentors and Delegate of the Board of Examiners one week before P2 at the latest.

The graduation plan consists of at least the following data/segments:

Personal information	
Name	Houxuan Zhang
Student number	5818664

Studio		
Name / Theme	Circular Water Stories, Flowscapes	
Main mentor	Dr. Inge Bobbink	Landscape Architecture
Second mentor	Dr. Anne Baar	Water management
Argumentation of choice of the studio	The Circular Water Stories lab relates to water management, agricultural landscape and large-scale planning of any relevant site.	

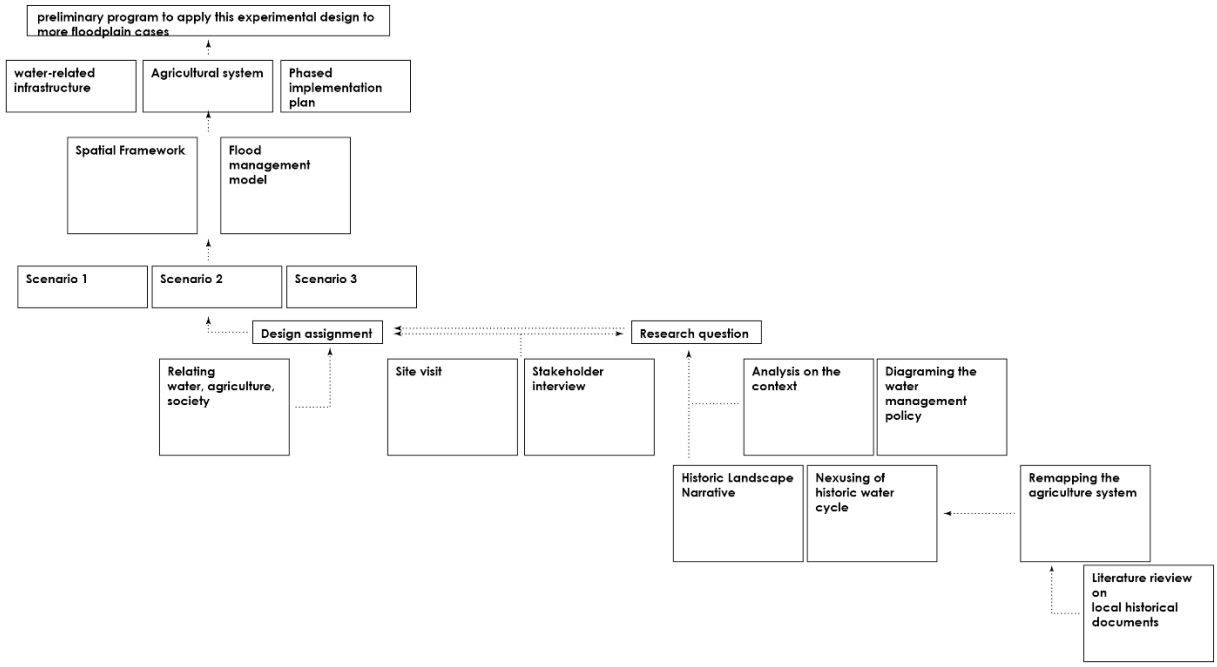
Graduation project	
Title of the graduation project	Cascading floodspace: Rebalancing flood prevention through spatial design interventions
Goal	
Location:	Jing River Flood Storage Area, Hubei Province, China
The posed problem,	The development of the Yangtze River Basin region has been exposed to serious flood risks since ancient times. 32 major floods have occurred since 1840, causing tragic losses to society (Su et al., 2006). In particular, the Jing River section of the Yangtze after the Three Gorges has been the most severely affected. Since 1950, the construction of a coordinated system of dikes, flood storage areas, and the upstream Three Gorges Dam has greatly reduced the risk of flooding. What does the flood storage area mean for the people living in the polder? Only two of the 40 flood storage areas in the Yangtze River's middle reaches have been used so far. The risk of flooding has a more profound impact on the local landscape and human-land relations than the floods themselves. Both agricultural planning and development are restricted under the requirements of flood storage planning, with agricultural production dependent on unmanaged, informal landscape spaces. On the other hand, the low frequency of flood storage further promotes the unregulated, uncontrolled development of local agriculture. Estimates of flood storage losses in 1998 were tens of times higher than

	in 1954, directly contributing to the decision not to open flood storage areas during the great flood of 1998, even though the water level exceeded the threshold for initiating flood storage. (Li, 2005) The current state of the flood storage area is not conducive to either flood storage or sustainable regional economic development. (Su et al., 2006) Non-tiered flood risk management model has also led to downgrading the ecological and spatial value of the local landscape. The ecological attributes of the area as a wetland have almost disappeared due to the lower-than-expected use of the flood storage area. (Cai, 2017) The number of fish species in the Jianghan Plain region has been reduced from more than a hundred species before the construction of the flood storage area to 74, and the original wintering sites for birds, such as wild geese and ducks, have been lost. (Yin, 2008) Due to the flood risk, the planning of the flood storage area requires that the town's recreation, service, and socializing places be designed in a centrally protected safety platform. (Wang, 2021) The land outside the safety platforms is focused on one use: agricultural development. The unregulated agricultural development focusing on economic benefits has resulted in severe agricultural pollution and the complete loss of the local agricultural landscape identity of 'Weiyuan', which historically represents the living symbiosis with water and cultivation. Other than production, the connection between people and the landscape space has been suppressed on this land. As a result, the local water management framework needs to be rebalanced into a system that enhances economic, ecological and spatial values. However, what spatial design tools will facilitate this balance, and will the existing local landscape structure allow this change to take place? These questions need to be urgently addressed and researched.
research questions and	**Main research question:** How can a design framework for a flood-adaptable landscape contribute to rebalancing the resilient triangle of flood prevention, mitigation, and recovery of agricultural, biodiversity, recreation and living spaces? **Sub research questions:** [1] How does the risk of flood storage shape the landscape and human-land relations in Jing River Storage Area, historically and currently?

	[2] How is the triangle of flood prevention, mitigation, and recovery structured based on the policy of flood management and the current spatial structure of the Jing River Flood Storage Area? [3] How does the non-tiered flood risk management model downgrade the economic, ecological, and spatial values of local landscapes? [4] How can a flood-adapted landscape be developed based on the new development flood management model and spatial structure, contributing to adapting flood storage areas to current flood patterns? [5] How can we achieve ecological and spatial values in the new flood-adapted landscape to form a more harmonious symbiotic relationship between people, water, and agriculture?
design assignment in which these result.	A framework of a flood-adapted diverse landscape in an experimental design area to [1] enhance the awareness of flood risks on the nexus between spatial planning, adaptive building management, and water management, thus stimulating the potential of local individual-level mitigation [2] create tiered flood storage space to establish better links with the flood prevention strategy and ex post compensation mechanisms, allowing a "middle step" to happen, [3] explore the possibility of agricultural production during the flood period and the spatial system of agriculture that corresponds to it. The framework will consist of the following components: [1] An adaptive spatial framework of the experimental design area [2] A new flood management model based on spatial design [3] A new vocabulary system of water-related infrastructure [4] An agricultural system compatible with the new spatial structure and flood storage patterns [5] A phased implementation plan based on future changes in flooding

Process

Method description



Literature and general practical references

Books:

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Duan, Y. X. (2022). Study on the landscape of weir-field areas in the Jianghan Plain (Master's thesis, Beijing Forestry University). https://doi.org/10.26949/d.cnki.gblyu.2022.000717

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compensation provide for a resilient triangle? Ecology and Society, 21(4). https://www.jstor.org/stable/26269992

Tang, Y. C. (2022). Landscape study of the Hanbei weir-field area in the Jianghan Plain (Master's thesis, Beijing Forestry University). https://doi.org/10.26949/d.cnki.gblyu.2022.000790

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Reflection

1. What is the relation between your graduation (project) topic, the studio topic (if applicable), your master track (A,U,BT,LA,MBE), and your master programme (MSc AUBS)?

The relevance of my graduation topic to the studio topic is reflected in the fact that the main aim of the studio is to build on the knowledge of traditional water management systems which were often quite inclusive to redesign today's technology-driven water management systems into resilient, multifunctional spaces. My design attempts to design future flood resilience policies and landscape structures for flood storage areas based on studying local flood resilience policies and spatial structures over time. The 'traditional water management system knowledge' is the design direction referred to, the 'technology-driven water management system' is the current situation that needs to be reflected upon, and the 'resilient multifunctional space' is the goal.

This project explores how landscapes relate to and influence each other on water management topics, how a flexible landscape can be adapted to the inherent hydrological dynamics, and how it will function as an important infrastructure in relation to water management.

2. What is the relevance of your graduation work in the larger social, professional and scientific framework.

It is common for landscape architecture to be described as a vague and ambiguous discipline. The role played by the landscape architect is often dictated by the project and generally strays far from the tongue-in-cheek imagery of the non-practitioner—a pompous New Age gardener. One possible misconception is that landscape architecture is an artful discipline purely concerned with physical space itself. However, this incomplete understanding is being supplemented by many academic initiatives.

An often-discussed idea is that the contributions of modern landscape architects must change as interdisciplinary efforts (Gülgün et al., 2014) and contribute to blurring the boundary between different disciplines, policy objectives, and values (such as water safety, spatial quality, and economic development). (Van Den Brink et al., 2019). Moreover, in the context of the waterscapes discussed in this paper, landscape architects may be able to find interventions in the reflections of water managers, a role that tends to be more concerned with science and quantification. Barnes (2014) in his study highlights the fact that when designing a water system, the interpretation of the water cycle should recognize each storage component and flow as moderated by social, political, economic, and cultural relations - relations that, in turn, are shaped in part by the flow of water. This can be seen as a call for disciplinary crossover (hydrology, water management, and sociology). Moreover, the discipline of landscape architecture may have an inherent advantage in bridging the disciplinary gap.

In discussions at the 2023 IFLA World Council in Nairobi, landscape architecture was described as the articulator par excellence, since it incorporates the visions from the natural to the social and allows the defence, recovery and improvement of the conditions of life, which contemplate from the habitat to the identity. (IFLA, 2023) Moreover, in a study more focused on practical projects, Van Den Brink et al. (2019) analyze the responsibilities of landscape architects in the Dutch integrated water management project 'Room for the River.' Landscape architects can perform both content-related and process-related tasks under specific conditional factors and contribute simultaneously to assessing spatial values, constructing narrative lines, and coordinating tasks, thereby initiating discussions about these alternative futures, making hidden or invisible ecological processes visible, raising consciousness, and to reconcile people with a 'new vision of the landscape.'

Another possible dimension of this project, beyond the design of water spaces, is to understand the water cycle and the long history of the evolution of water landscapes, where the landscape architect is more closely aligned with the role of a narrator. This process of narrative understanding also has the potential to inform future alternatives.