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	Wendy van der Horst
Student number	
Telephone number	
Private e-mail address	

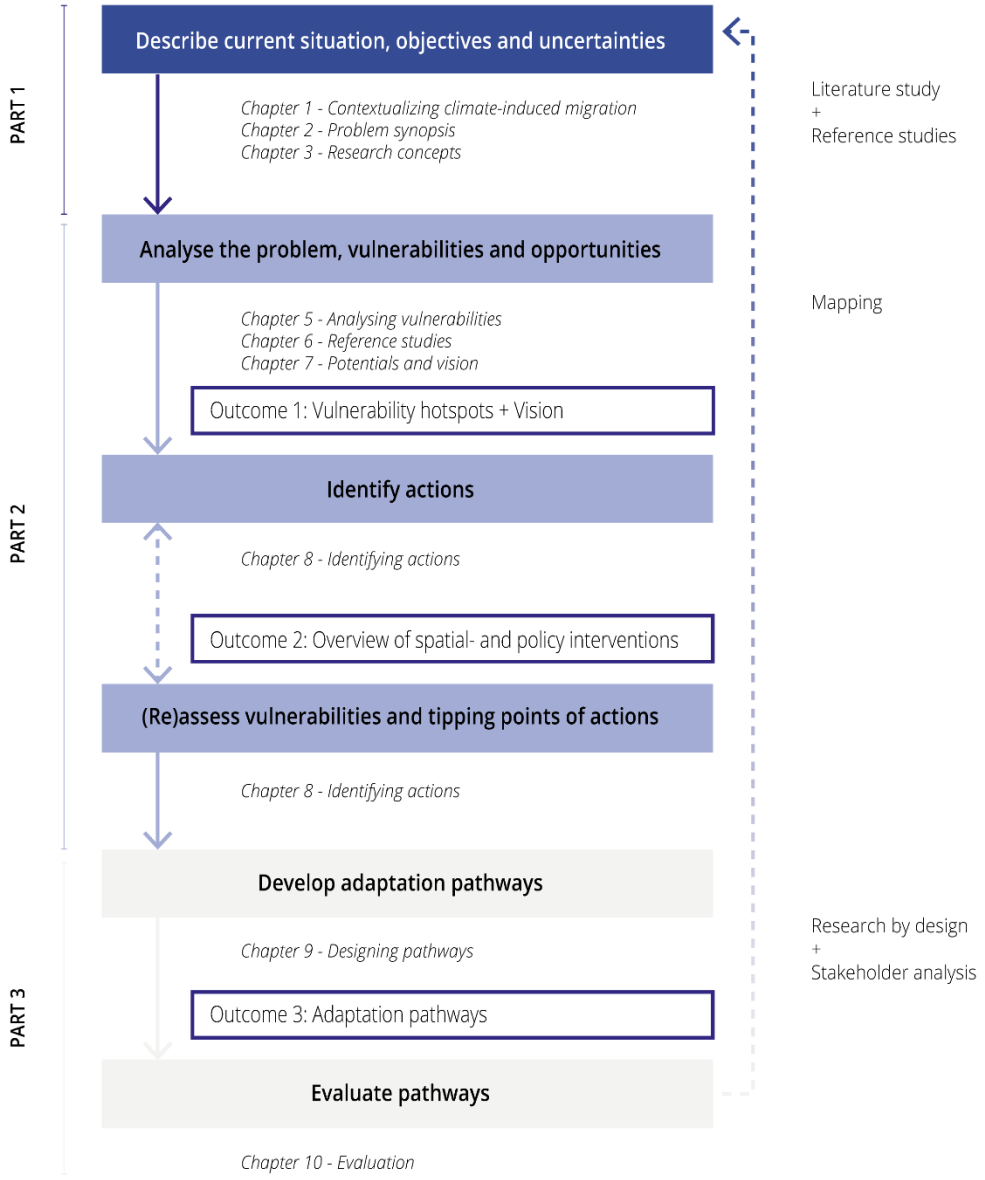
Studio		
Name / Theme	Planning Complex Cities	
Main mentor	Dr. Caroline Newton	Planning Complex Cities
Second mentor	Dr. Alexander Wandl	Urban Metabolism
Argumentation of choice of the studio	My topic deals with spatial planning in relation to climate change effects and migration. This graduation project will explore and attempt to redefine the governance structure as well as spatial organization that currently may trigger vulnerabilities that could evoke climate-induced migration under conditions posed by slow-onset climate change. This redefinition aims to improve the response of the governance structure in order to steer spatial development more justly.	

Graduation project	
Title of the graduation project	Rescaling climate-induced migration
Goal	
Location:	Californian-Mexican border region, United States of America
The posed problem,	Climate change effects, and the uncertainty with which they progress, produce new conditions for spatial development and spatial organization in California. Both gradual and sudden climate change effects permanently impact the environment, and consequently exacerbate vulnerabilities and affect livelihoods. They increase exposure to hazards, loss of ecosystem services such as land productivity, habitability, and food, energy and water security. Currently, governance in the Californian-Mexican border region is guided by planetarized urbanism: a dynamic of scales which favours global interrelations. It creates an extremely large, polynucleated metropolitan region that stretches from San Francisco to San Diego with urbanized interdependencies which expands towards

	ecologically sensitive areas. The intensity of agricultural land-use to produce for a global market further degrades ecological systems, and climate pressures may reverberate on the job market. The conditions posed by climate change effects and planetarized urbanism play as a negative feedback loop on the environmental, economic, demographic and political drivers of migration. Although environmental concerns are usually secondary in decision-making for migration, environmental stress exacerbates other identified drivers. This especially impacts the most vulnerable communities of the population who are less able to prepare for and respond to disaster or a multiplication of slow-onset effects. The accumulation of stresses on livelihoods with climate-induced migration as a possible response strategy, needs to be accounted for on appropriate spatial- and governance scales taking into account the temporal variability of these stresses, in order to imagine just spatial futures.
research questions and	The **main question** this thesis aims to answer is: *How can a scale- and temporal sensitive planning approach act towards preparedness in order to respond to the threat of climate-induced migration under conditions of climate change uncertainty in the California-Mexico border region?* SQ1 | 1) What are the driving forces of climate -induced migration? SQ2 | What are the cascading socio-spatial interrelations between climate change effects and migration in the California-Mexico border region? SQ3 | What are the socio-spatial potentials and synergies for development that accommodate different types of migrants and a more flexible and adaptive lifestyle under climate change uncertainty? SQ4 | How can a planning framework acknowledge the scalar- and temporal variability of climate change effects that trigger vulnerabilities and integrate preparedness and a mobile lifestyle in the current planning discourse of the region?
design assignment in which these result.	The main research aims of this thesis are: 1) to identify vulnerabilities and opportunities related to climate-induced migration as a result of slow-onset climate change; 2) to explore strategies that anticipate climate-induced migration and are able to mitigate the potential injustice of forced migration and considers migratory movement as an adaptation strategy;

	3) to explore a proactive and flexible planning framework that is able to adapt as the uncertain future unfolds, in order to strengthen preparedness for unjust and undesirable socio-ecological outcomes.

Overall research approach



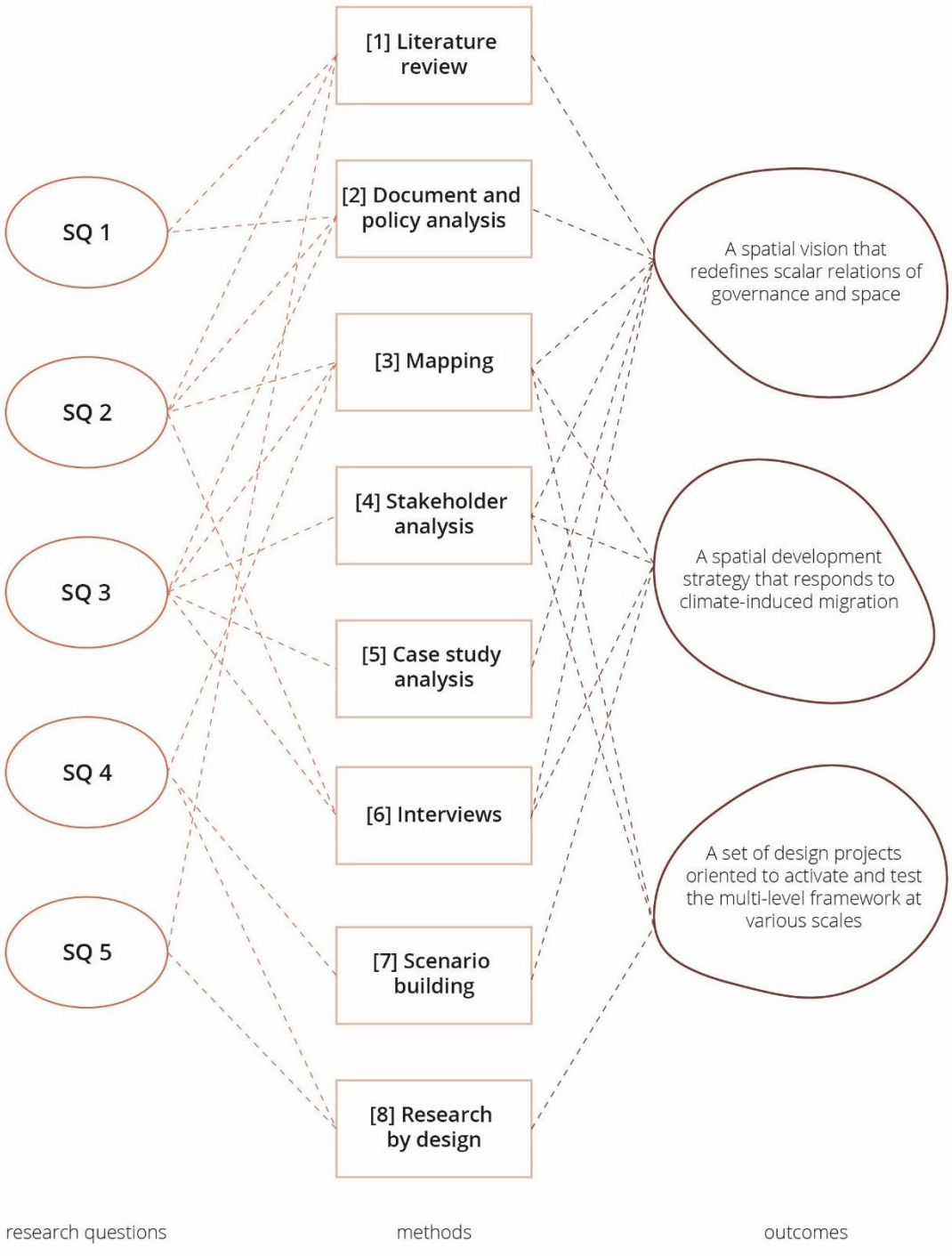
In order to explore a scale- and temporal planning framework that addresses vulnerability triggers for climate-induced migration, this project proposes a

methodological process that is based on the steps taken to define Dynamic Adaptive Policy Pathways (DAPP). The different steps are geared towards three main outcomes that build on each other and function in a feedback loop in order to devise pathways and evaluate them. The methods used to reach those outcomes, as well as their limitations, will be explained in this chapter. The first phase of this research concerned the setting of objectives and desired outcomes, and placing the project within a body of literature. Literature study and reference studies provided the project with relevant variables to analyse and work with in later phases.

The second phase of the project focuses on analysing the relevant variables in order to determine where vulnerabilities are located, in which timeframe they surface, and on which scales they have a cascading effect. This resulted in a map with vulnerability hotspots. The analysis also presented potentials for development and adaptation. These were written into a vision for the region. With a clearer understanding of the vulnerabilities and potentials, a set of spatial- and policy actions were created to address them. For each action, an adaptation tipping point (ATP) was determined for two IPCC Representative Concentration Pathways (RCP). The actions were then reassessed against the vulnerabilities and potentials they are meant to address. In the final phase of the research, the actions were assembled in pathway tube maps to show synergies and exclusions between the actions and to construct multiple narratives. These narratives were then illustrated on different decision crossroads to show their different potential spatial impact. The role of stakeholder preferences is also accounted for in this phase. Finally, the pathways were evaluated against the original objectives of the research to show their use and limitations.

Process

Method description



The following methods will be used in this graduation project:

[1] Literature review

This method is used to understand the theoretical constructs of climate-induced migration, resilience and scale and to hence build the theoretical framework. They

concern non-site specific theories that will help to frame the case study and reference projects to finally result in a spatial strategy and design.

[2] Document and policy analysis
The objective of this method is to collect, analyze and synthesize the main policy instruments of planning at various scales that can be used to address climate-induced migration in the context of climate change disruptions. The overall analysis needs to consider the main governance structures, gaps and hurdles that influence spatial development at various scales. In addition, it needs to reveal the governance discourse underpinning these policies and structures in order to guide redefinition or reconfiguration under the concepts studied and valued through the theoretical framework. Finally, this analysis produces a guide of potentialities and limitations of governance structures to address climate-induced migration in the face of climate change disruptions.

[3] Mapping
This method aims to spatialize the problem in order to map potentials and conflicts related to it. Analysis of the problem - through other methods provided in this subchapter - constructs the main units of analysis for this method: systemic disruptions related to main climate change effects (drought, freshwater scarcity and sea-level rise), socio-economic spatial structure, land-use variation and ownership, urban expansion and shrinkage, migration networks, political variation, job opportunities and spatial seasonality effects.

Data is obtained through official sources of geo information:
+ California State Geoportal
+ GIS and Spatial Datasets of Humboldt, University, UC Davis and University of Berkeley
+ GIS Open Data of the Department of Water Resources CA
+ Los Angeles Geo Data Hub

[4] Stakeholder analysis
This method is used to identify the main actors and power relations that intervene in spatial development. These stakeholders are understood as institutions, companies or public agents that operate at various scales within the governance framework. This method will result in an overview of the main relationships, interdependencies and areas of influence in order to identify the potentials and limitations for the spatial strategy and design. The result should also redefine critical aspects of stakeholder interrelations that could facilitate a more scale- and temporality sensitive spatial response to climate-induced migration.

[5] Case study analysis
This thesis uses California as the main case study for the research design. However, this thesis will referentially explore cross-border planning through the analysis of other case studies. Their applicability to the Californian case is critically discussed in order to decide how the case studies may inform the Californian case and contribute to the proposal of a spatial strategy and design.

Cross-border planning
+ EU Water Framework Directive
+ International Boundary and Water Commission (IBWC) U.S.A. and Mexico

[6] Interviews
Semi-structured interviews are used to identify the different issues that researchers and professionals recognize in relation to the problem field with the aim to expand an understanding of the problem and potentials. Starting point will be researchers from UC Davis Agriculture and Environmental Sciences, Global Migration Studies and UCLA Urban Planning and Climate Change department. Relevant actors from the public sector need yet to be selected.

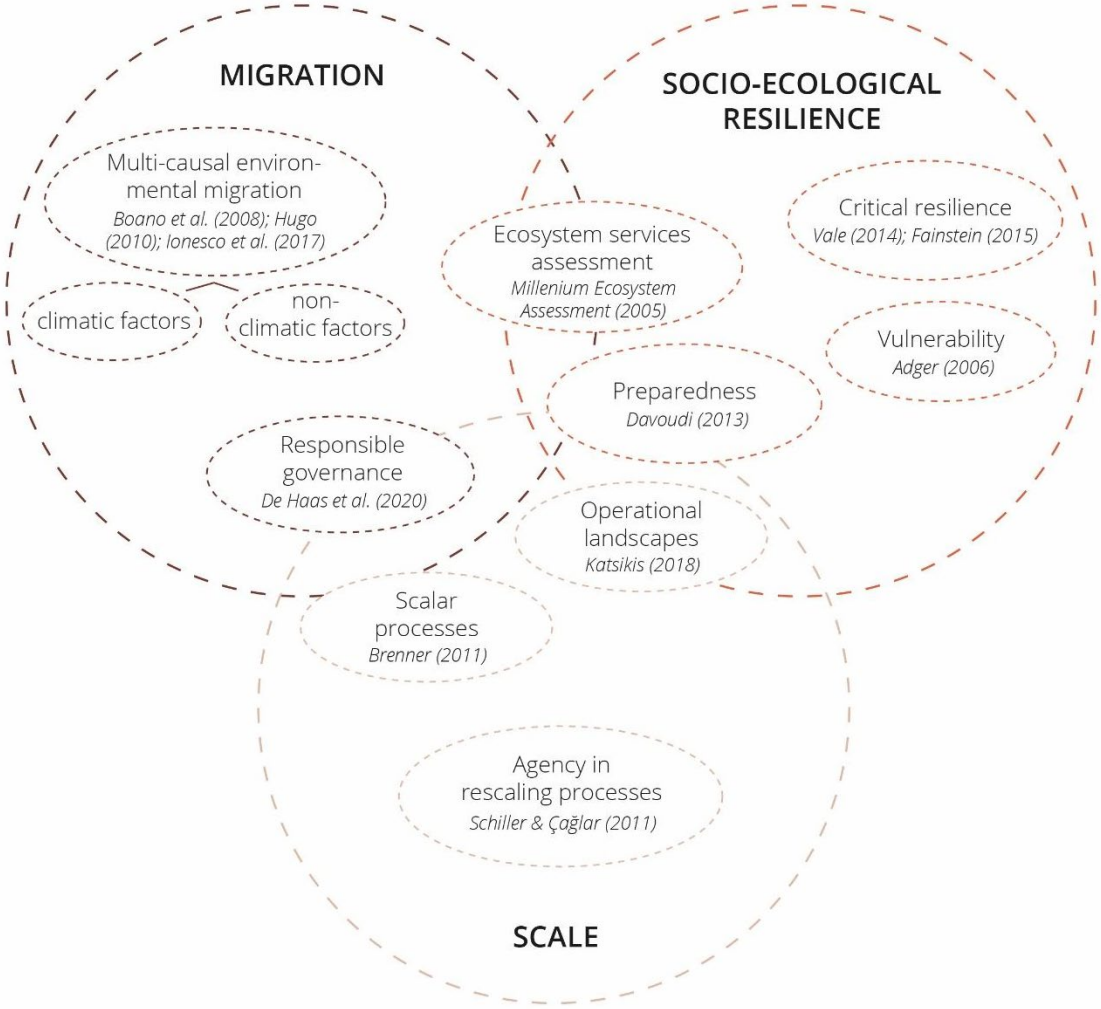
[7] Scenario building
In several types of planning, a single preferable future state/trend (e.g. population estimation) has been used as a standard to forecast future urban change. This approach works well when society and the environment are stable and predictable (Kim & Newman, 2020). However, high uncertainty and complexity due to climate change and population relocation dynamics can decrease accuracies in singular prediction approaches (ibid.). This method will help to understand the flexibility of the spatial vision.

Taking the spatial vision as a starting point (based on the redefined multi-level governance structure), three future migration scenarios can be set out (extreme, business-as-usual, resilience) that can be tested against three climate change effect scenarios (low impact, high impact, extreme impact). The tested spatial measures with positive impact can be configured in a spatial strategy. The criteria for selecting the scenarios and evaluating the scenarios need to be set out.

[8] Research by design
Concepts and ideas from the spatial vision and strategy can be tested through design studies on various scales to help understand what the strategey and vision could mean spatially. These design studies can be done through mapping, drawing conceptual schemes, collaging etc. After having investigated qualities and problems in the area through other analytical and empirical methods described above, this method allows to test their spatial potentials to produce new insights and knowledge.

Literature and general practical preference

Theoretical framework:



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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)?

This graduation project aims to employ knowledge of spatial planning and governance structures (referring to the studio topic), as well as methods of spatial design exploration (taught in the master) to answer the main research question. It will move through various scales in order to test and evaluate the viability of its outcome. The master track Urbanism has specifically focused on mixed-method research that moves towards self-defined just spatial futures. Working through different scales in order to test and explore proposals is indispensable. Researching the topic of climate-induced migration through the methods and skills taught in the Urbanism programme, allows me to explore both planning and governance as well as design to research a desirable possible future.

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

The scientific relevance of my problem field is to create an understanding and spatial solution of the problem of climate-induced migration for a country with a mature governance system. The majoraty of publications on this topic research the environment - migration nexus through case studies in areas that are already emblamatic of climate change: most notably developing states in West Africa and the Horn of Africa, South-East Asia and the Pacific. Evidence is yet very weak for more developed states in Europe, North America and Austrialia, despite frequent weather shocks affecting the population. This thesis will draw from knowledge gained through research into global south case studies, and will aim to project effects of climate-induced migration on a governance structure that favours the economic benefit of migration.

This is also where its social relevance comes in. The effects of climate change are predicted to most severely affect vulnerable population groups. This is not different for California, where a large number of non-legal migrants contribute to its economy but lack services, infrastructure and representation. This thesis aims to address in its proposal social justice and rethink distribution of services.