

P5 REFLECTION REPORT

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Urbanism, Delta Interventions Studio

I. Relation between research, design and practice (Aspect 1)

This project is an exploratory research by design. There are three aspects in the process. The first is to analysis the risk impacts on shrinking port-cities from both environmental change and economic recession. The *DPSIR framework* offers an integrated pathway to support coastal zone management and urban design as a whole.

The second is to explore extreme scenario and collect local imagination. In *Design Fiction* method, a provocative story is designed, challenging the status quo to provoke readers, stakeholders' awareness and imagination. In the storyline, a catastrophic flood event is fabricated at 2053 (in memory of 1953 flood). The story setting is distinctly projected following plausible trends according to policy, environmental and socio-economic analysis. Yet, it is portrayed with provocative image to challenge the status quo with innovative interventions. By immersing readers, stakeholders in a fictional future, the objective is to raise awareness that provokes participation, as well as to incorporate local visions in future development. As a result, narrative collected from on-site interview also plays an important role in the following design objective. An imaginary future scenario is prospected as ultimate goal. How to proceed from reality to this vision draws the structure of the research. Possible spatial interventions toward this desirable future are illustrated through *the state-of-the-art Dutch coastal defense technique - Building with Nature projects*.

Lastly, a systematic design across both regional structure and local design is proposed to respond multiple risks and local visions. On regional scale, reorganized natural infrastructure aims to reduce flood damage through nature-based engineering. The approach to nourish local economy and preferable living qualities with the new system is further visualized in landscape and neighborhood scale.

In sum, the research, design and practice consistently correlated. Research provides nature-based hypothesis and local participating approach to address socioeconomic vulnerability. Building with Nature engineering practices with Royal Haskoning DHV provide solid support for the visions. Design, in this journey, is a persuasive and shared narrative to bridge these different aspects into an inspiring project.

II. Relation between Delta Interventions Studio and the subject, method and approach chosen in the project (Aspect 2,3)

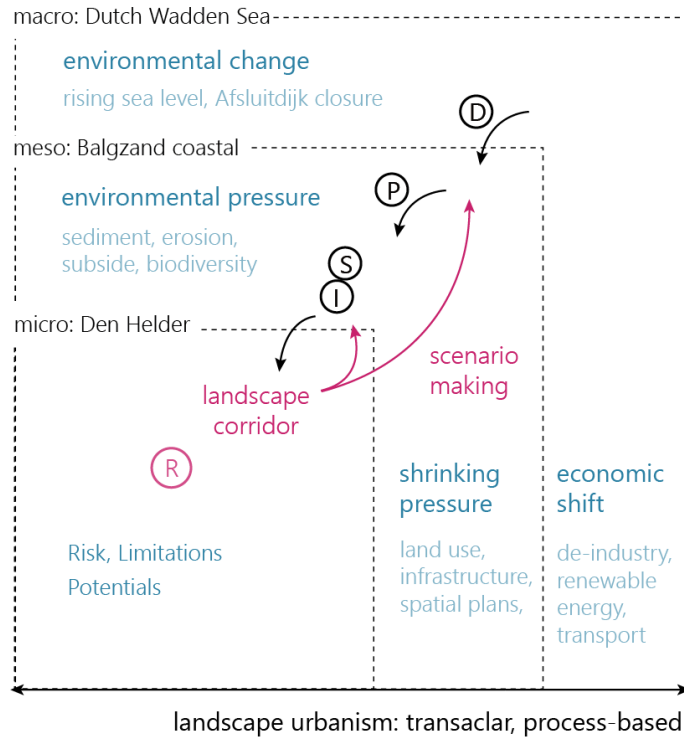
The project adopts the *'environmental and economic co-benefits'* principle of NBS to frame research questions, which aligns to the objective of Delta Urbanism in managing a balanced coexistence between economy, urbanization, environmental quality and safety in coastal areas. The hypothesis is that economic growth and environmental quality can be reciprocal and should be sustained simultaneously.

In the Delta Interventions (D-i) studio, complex social-environmental interactions, particularly the tension between environmental uncertainty and coastal squeeze, are addressed through transcalar and temporal aspect. 3x3x3 method of studio provides a framework to align interventions with environmental systems and processes. In research, dynamic systems can be organized into three layers (Meyer and Nijhuis, 2016): natural layer of ecology and environment (substratum), network layer of infrastructure, occupation layer of settlements and industry.

For Den Helder, flood risk and shrinking economy are the targeted issues. The project compiles interventions among 3 scales (setting objective in response to macro issue, further strategized in meso and implemented at micro scale), 3 periods (current, 2053 projective scenario, prospective scenario) and 3 layers (substratum, infrastructure, occupation) into a storyline. For the project, the model provides insights on interactions between changes in each layer through time. In design process, the Casco model further highlights their different dynamics, speed of evolution. Accordingly, a phasing roadmap with projects of different timespan can be drawn.

The general theoretical background of the project and the studio have a common root in Landscape Urbanism, that regards cities as urbanizing landscape where transcalar, process-oriented and imageability should be emphasized in design process. Yet, to reinforce transferability to coastal development, the theory is comprised into Driver-Pressure-State-Impact-Response (DPSIR) framework, which is often applied in Integrated Coastal Zone Management (ICZM) to adapt both environmental and socio-economic changes.

Chart 1. Environmental and economic integrated framework of DPSIR through different scales.



III. Elaboration on the relationship between the graduation project and the wider social, professional and scientific framework, touching upon the transferability of the project results (Aspect 4), ethical issues, dilemmas and potential applications of the results in practice (Aspect 5).

Adaptive transformation through Nature-based intervention is set as the hypothesis of this project. This is referred to current European Union 'Horizon 2020' research and innovation policy agenda (EC 2015), in which the concept 'Nature-Based Solutions' (NBS) is propagated and defined as approaches 'inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience'. Conservation of natural capital becomes a mean to address environmental and societal challenges simultaneously. In one of the identified goals: climate change mitigation and adaptation in urban areas, four principles are considered crucial. This project refers the design outcome to these indicators in order to enhance the relevance with current policy. In below framework, each indicator is interpreted by with the methods taken in this project

Chart 2. Reflection on relation between methodology and the four principle of NBS. Quoted from the EU NBS agenda on *climate change mitigation and adaptation in urban areas*.

Criteria	Description
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Integrated environmental performance	The DPSIR methodology framework ensure an integrated aspect for this project (natural hazard and economic recession) as two driving forces). The performances are described by ecosystem services, namely regulation in flood risk, provision in new nature-based industries and cultural value for urban renewal.
Human health and well-being	The benefits for human well-being are evaluated by four aspects of ecosystem services using the framework proposed by Millennium Ecosystem Assessment
Citizen involvement	Design fiction is a storytelling way of sharing research and stimulation results to the public. Semi-structured interview in the workshop further collected local visions and feedback.
Transferability	The design offers an Interdisciplinary synergy pathway (urban and landscape design, coastal management, coastal engineering) in reducing multiple risks

A unique part of the research is combined with internship in Royal Haskoning DHV, the construction and design consultancy company in charge of renewal work at Den Helder port. While working with water management experts, coastal engineers and locals, I found *risk reduction* as a common objective to facilitate cooperation. However, how risk is perceived and addressed is very different. The notion of flood risk as a mathematical function of the probability and consequences of an event is favored by engineers, as the probability can be reduced by strengthening the flood defense. On the other hand, from a more social perspective flood risk is often explained as a geographic overlay of (flood) hazard and vulnerability of the society. As an urban designer, I try to combine both environmental engineering and societal inputs in design. The principles of NBS and DPSIR are useful guidelines through the process.

However, since climate change is such unpredictable and coastal substratum is of high dynamics, perhaps what nature-based design should respond to is to prepare for hazards, instead of the most robust defense. Based on the history that storm surge is a recurring natural event, flooding can also be designed as transforming point to regions if it is anticipated. Thus, I fabricate a catastrophic flood event to facilitate imagination of a desirable nature-based future, challenging the business-as-usual agenda and engineering solutions. I also try to empower local visions in this adaptation process. Indubitably, the disaster cycle remains incomplete without manifested enquiry into local environmental concerns and subsequent incorporation while ushering in the goal of urban risk reduction and societal resiliency.

Successful BwN cases build up supportive practical knowledge in my project to address risks with ecosystem services (ES)- flood regulation service of marsh and blue infrastructure in particular. However, what I aim to research through the design process isn't only the performance of ES as a solution to environmental threat, but also the *values that can be created to strengthen socio-economic resiliency. This focus is a shift from BwN, ES, to Nature-based solutions. Design is experimented as a method to co-illustrate the qualities with multi-parties that can be supported by ecosystem services.*

To achieve this, the multidisciplinary objective significantly deeper the complexity of the project. It is hard to define to what extent should a good design response to each aspect involving spatial quality, engineering, ecology, socio-economy, management and so on. I reflect on the role of an urbanist and identify *the ability to strike 'balance' among interdisciplinary collaboration as the critical task I want to explore.* Despite a solid spatial design, the project contributes more on *exploring an interdisciplinary transformation pathway towards desirable future scenarios.*