A nature-based perspective for the Netherlands in 2120

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This article elaborates on the method of "research through design" in spatial and landscape design. It includes a further explanation of the method in which three questions are central. At first theoretical backgrounds of research through design are highlighted: what is it? It is stated that he sequence of deduction and induction connected by making creative leaps are the most crucial elements. Second, the added value of the method is stressed. It maybe the only way to contribute to complex or 'wicked problems' that characterize present development of landscapes. Finally a working method for the use of research (through) design is proposed. The project "A nature-based perspective for the Netherlands in 2120" illustrates a potential outcome of this way of thinking and working.

INTRODUCTION

Climate change, urbanisation, biodiversity, rising sea levels, extreme weather and increasing food production: these are just a few of the factors that help shape the spatial planning of the Netherlands. There appears to be a need to look to the future. With these factors in mind, what will the Netherlands look like a century from now? Wageningen University & Research has drafted a vision on what it believes a future-proof Netherlands could look like in 2120[1]. The design is an integral vision in that it considers the spatial planning of the Netherlands in 2120 from various perspectives, such as agriculture, biodiversity, sustainable energy, water and the circular economy. The map is not a blueprint, but a projection. It shows the Netherlands as it could look in 2120 if nature-based solutions are prioritised.

Main point of the project was to put forth the discussion about the role of nature in the Netherlands through design. The use of designing ways of thinking and acting – as is apparent from a great deal of literature – is a method that has been widely described and applied in many fields and (scientific) disciplines. Underpinned by many applied studies that examine the nature and revenues of what we call "research (through) design"[2]. The field of Landscape Architecture can therefore stand on strong shoulders. Nevertheless, we can state that – specifically in design practice – the (scientific accountability) of design work can and may need to be improved.

RESEARCH THROUGH DESIGN

The sequence of deduction and induction is crucial for design research (abduction together)[3]; steps connected by making creative leaps (Kleefmann, 1984). These leaps imply the creative interpretation and integration of (existing or new) knowledge and insights, results of deduction, in order to formulate possible solutions for the issues at hand. Bridging the 'gap' between now and tomorrow – based on (different) normative starting points, Kleefmann called this. But also the way back: the 'testing' of possible solutions for desirability, feasibility, feasibility by putting these

1   Baptist et al., 2019
2   Van Buuren, 2022; Van den Brink et al., 2017; Schön, 1983
3   Schön, 1983

performances, as Kleefmann put it, 'on the anvil' of – social and/or scientific" criticism. The 'deductive' step. In this way, images arise of what we 'could like' or 'functioning prototypes of the landscape'.

An 'agile' search process then develops, in which better or more appropriate solutions are created through further insights into the nature and characteristics of the issue. Repetition of deduction, induction and new creative leaps between them is characteristic. The designer has a role in this as a 'bridge builder' ('boundary spanner').

The diagram that depicts the nature of research (through) design shows five crucial parts of design that follow each other in random order, criss-cross[4]. It concerns: formulating (for example of the problem or goal), synthesizing (possible solutions, visions, etc.), visualizing (literally: imagining ...), reflecting (more contemplating and thinking about formulated issues, possible solutions) and organizing (of the total work process, involvement of stakeholders, etc.). It is essential to realize that "a design process" can start with each of the components mentioned and that the components do not have to follow each other in a fixed order.

Before going into the added value of research by design, it is necessary to specify the 'object of study'. Precisely because – as indicated above – the design is a generic method that can be applied in many disciplines. In this contribution, referring to the Netherlands in 2120 perspective, that object is referred to as 'the landscape'. That explains the title of this paper on "research (through) landscape design".

The concept of landscape is interpreted broadly here. It concerns a physical whole, the spatial result of an interplay between processes of abiotic, biotic and anthropogenic nature. The nature and speed of these formative processes differ, which means that landscapes are always changing. At the same time, the landscape can be seen as a phenomenon, with – certainly – three dimensions. Referred to by Jacobs[5] as "matterscape, powerscape and mindscape" respectively. The multidimensional character of this landscape concept also refers to the three major scientific fields, those of the exact sciences, societal and human sciences respectively. Fields with their own 'types' of scientific mores and criteria, which can make it difficult to design landscapes in a scientifically responsible manner. It requires careful choices of methods, transparency and accountability.

A second complexity concerns the fact that this broad conception of the landscape concept makes every (spatial) issue a "wicked problem". Characteristic of such issues are the incomplete, contradictory and at the same time constantly changing conditions, which frustrates looking for potential solutions in a 'simple' or linear way; in fact that kind of separate, partial solutions stand in the way of offering fundamental ways of overcoming or dealing with wicked problems. This is due to the many interdependencies; a partial solution often raises new problems. Several authors[6] advocate a design approach as an adequate way to tackle these unstructured issues. Making "creative leaps" and the "cyclical and agile design process" form the basis for this. Or, as Vroom[7] put it: "design is about investigating situations that are not yet known". The Netherlands in 2120 project and the good and broad social reception is a good example of the added value of landscape research by design. With a designing attitude and the agile process, you get to know the landscape – in the specific context and at the relevant scale levels – and their 'users' better and better. A way of

4   Lawson and Dorst, 2009
5   Jacobs, 2006
6   Cross, 1982; Buchanan, 1992; De Jonge, 2009; Leifner et al. 2014; De Zwart, 2015
7   Vroom. 2006

thinking that does justice to the fact that working on the future is a process in which (new) choices can or must be made time and again. Our society and culture is dynamic, with varying likes and dislikes, wishes, desires, norms and values. There are always different 'transition paths' ahead. The Netherlands is never 'finished'; panta rhei.

Finally, the role of the designer as "boundary spanners"[8]. Designers are trained and educated to connect different fields of knowledge and assignments, to bridge differences between organizations and stakeholders with their (visual) representations of future situations and to realize cooperation. Crucial elements in research (through) landscape design are the development of 'spatial concepts' or (strategic) solutions, the development of 'design principles' and the implementation of 'design workshops'.

8   Van den Brink et al., 2019 and Kempenaar et al., 2021
9   Van Buuren, 2022

01   The nature of research (through) design (Van Buuren, 2022)

01

THE FRAMEWORK

The framework that is outlined for a concrete approach to a research (through) landscape design (figure 2) serves as a guideline for actually deploying this way of working[9]. It is a 'framework' because each design process or project requires its own tailor-made approach to do justice to the physical and cultural situation on site, the specific task(s) and administrative context. The various phases distinguished in the figure are:

1) Inventory and analysis: This phase is about getting to know the area in question and the existing tasks and their coherence. Inventory refers to the collection of (existing) knowledge and insights in this regard. Analysis implies an 'assessment' of it: what do we think of it. Ultimately resulting in a problem definition, in which the most relevant (design) assignment(s) is (are) formulated.

2) Solution directions: The phase of searching for – and choosing – one or more solution directions starts with a problem definition or with a formulation of (a) design assignment(s). These follow, for example, from an inventory and analysis phase carried out earlier in the same project. But can also come from another 'external' source (an earlier project). Working on the solution direction can then be the starting point of the project in question. It is even conceivable that a planning process from one of the 'design phases' did not lead to a satisfactory outcome. And other or new solutions are conceivable.

3-7) Sketch design and beyond: 'working across the scales': The last four phases show great similarities in terms of sequence of activities. The main differences have to do with the level of detail and elaboration of the designs (or plans) that form the result. The scale of the designs will therefore vary from international to regional to local and in great detail. Often – but not necessarily – the area under consideration is also less and less extensive. Previously developed 'design principles' will be worked out step by step in a more concrete manner, matching the characteristics, qualities and opportunities of (the 'genius loci' of) the landscape in question.
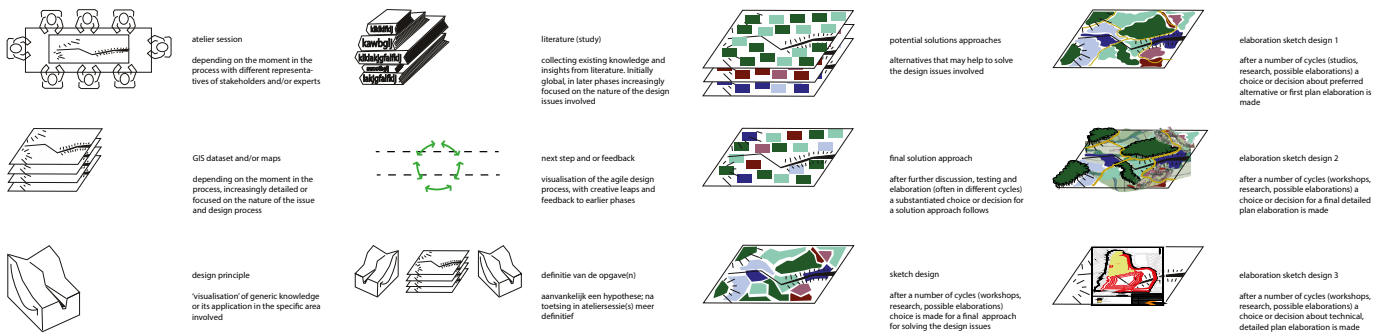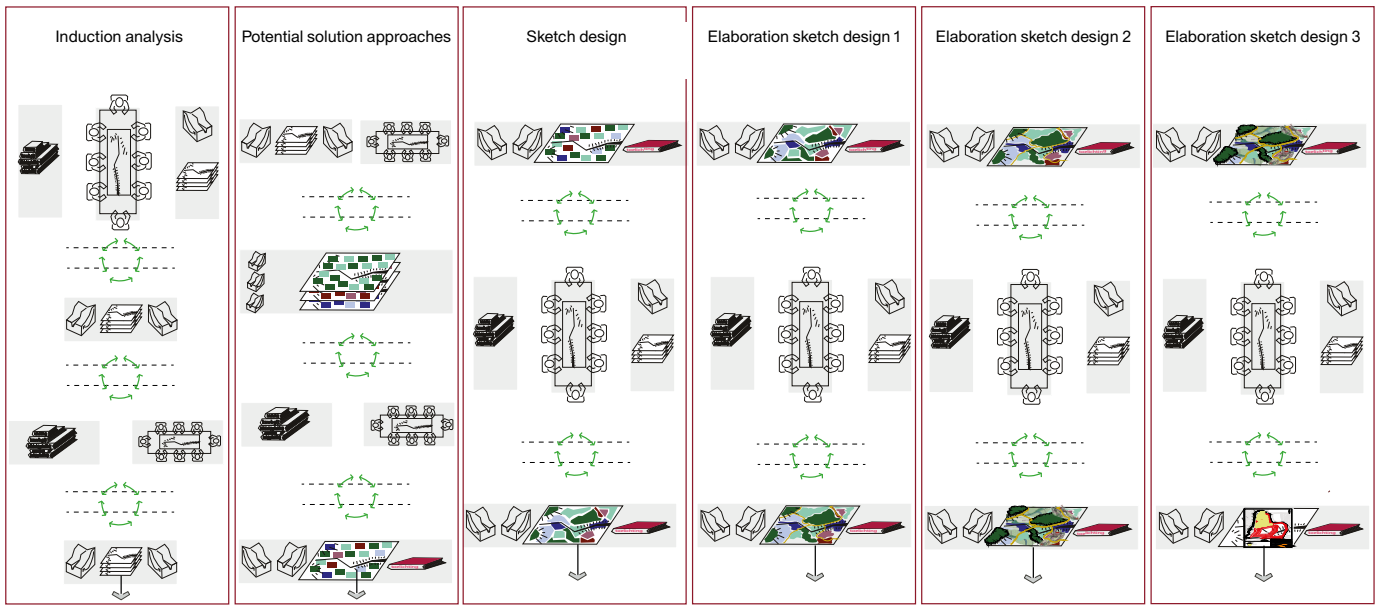
An essential element of the model for landscape design research is what we call "working through the scales". That is to say, in every design project – certainly the adjacent, 'higher and lower' spatial scale levels are always relevant. At the very least, you include them in inventories and analyses. Precisely in line with the many connections and relations between the (landscape) forming systems and processes of different nature.

It is also important to realize that an 'agile' design process can actually start at all of the phases distinguished in the framework shown. To then be rolled out further in random order, depending on the 'interim' insights and 'discoveries' of the ongoing process.

It is also crucial to realize that each of the phases always contains inductive and deductive elements and methods. Although – almost always – a kind of 'beginning' arises through a phase of 'inventory and analysis', this is not a plea to try to start finding "all the information possible available" first. On the contrary: a good start also includes the "design" (synthesis) of a good problem statement followed by thorough reflection and testing the statement. This provides direction for further inventory and analysis (or follow-up research). In the same phase or in a next.
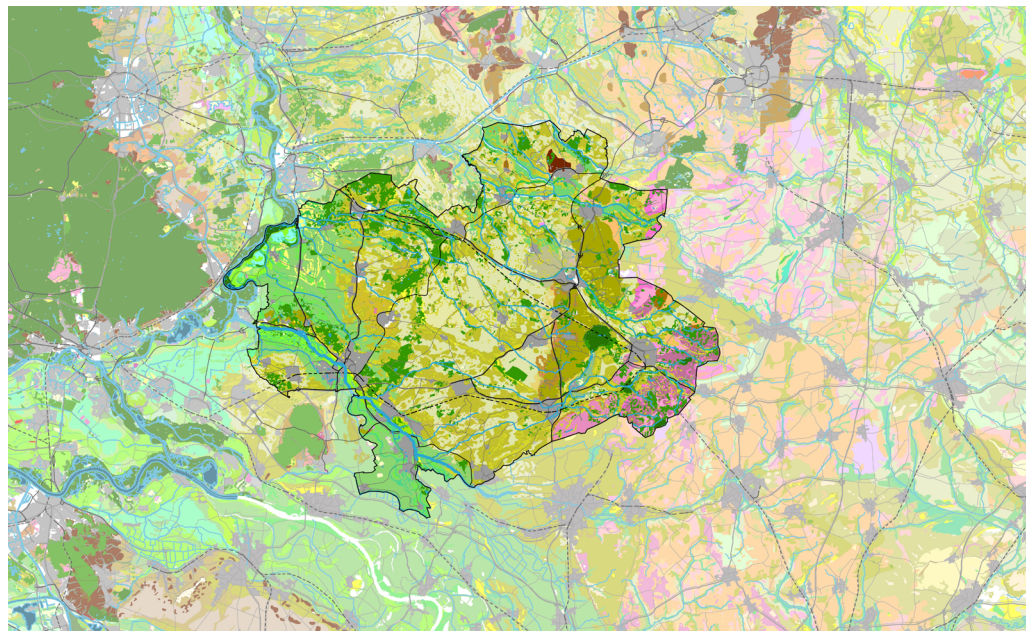
Here too, the Netherlands in 2120 – and in particular the various follow-up projects aimed at different spatial and temporal scales – is a good illustration. Incidentally, the start in 2019 can be qualified as a project in which the first, but especially the second phase of the framework are applied.

Design principles depicting nature based solutions for two landscape types from the Netherlands in 2120 perspective. Existing situation (Figure 3) and future situations (Figure 4). Pleistocene sandy areas (Figures 3 and 4); "wadden" coast (Figures 5 and 6).
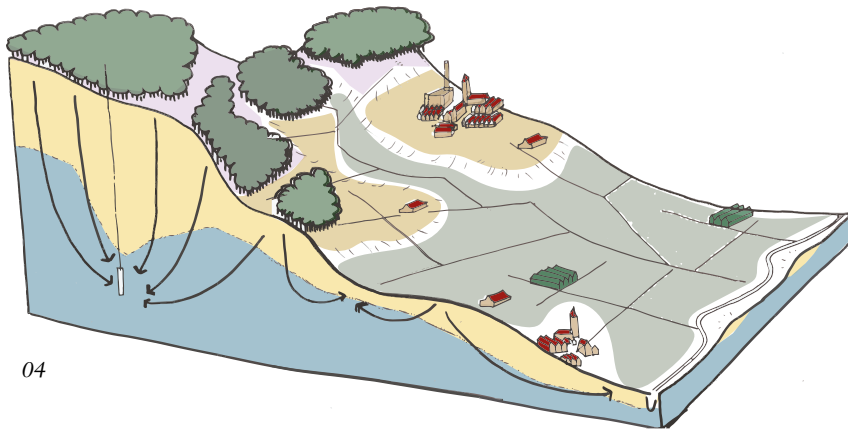
Induction analysis	Potential solution approaches	Sketch design	Elaboration sketch design 1	Elaboration sketch design 2	Elaboration sketch design 3

02

	atelier session		literature (study)		potential solutions approaches
	depending on the moment in the process with different representatives of stakeholders and/or experts		collecting existing knowledge and insights from literature. Initially global, in later phases increasingly focused on the nature of the design issues involved		alternatives that may help to solve the design issues involved
	GIS dataset and/or maps		next step and or feedback		final solution approach
	depending on the moment in the process, increasingly detailed or focused on the nature of the issue and design process		visualisation of the agile design process, with creative leaps and feedback to earlier phases		after further discussion, testing and elaboration (often in different cycles) a substantiated choice or decision for a solution approach follows
	design principle		definitie van de opgave(n)		sketch design
	'visualisation' of generic knowledge or its application in the specific area involved		aanvankelijk een hypothese; na toetsing in ateliersessie(s) meer definitief		after a number of cycles (workshops, research, possible elaborations) choice is made for a final approach for solving the design issues

	elaboration sketch design 1
	after a number of cycles (studios, research, possible elaborations) a choice or decision about preferred alternative or first plan elaboration is made
	elaboration sketch design 2
	after a number of cycles (workshops, research, possible elaborations) a choice or decision for a final detailed plan elaboration is made
	elaboration sketch design 3
	after a number of cycles (workshops, research, possible elaborations) a choice or decision about technical, detailed plan elaboration is made

02   The framework that is outlined for a concrete approach to a research (through) landscape design

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03   Map, showing the 'natural systems' as result of the inventory and analusis phase of the project "8terhoek" (the eastern part of the province of Gelderland) (De Rooij en Sluijsmans, 2021).

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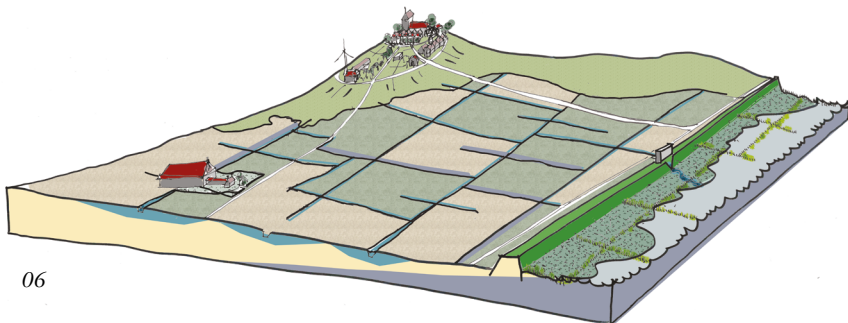04 Pleistocene sandy areas in the higher part of the Netherlands - Existing situation

Replacing coniferous forests by less water consuming vegetation

Recovery of groundwater systems and levels

New green "settlements" located at the rim of hilly areas

Space in brook valleys for retaining peak rainstorms and water supply

Parks and forests in and around towns

Agro-forestry

Drinking water production by shallow infiltration

05

05 Pleistocene sandy areas in the higher part of the Netherlands - Future situation

06

06 Clay polders in the north of the Netherlands - Existing situation

07

Circular agriculture on fertile clay soils

Separated water system: fresh water

Separated water system: salt water

Space in former creeks for retaining peak rainstorms and watersupply
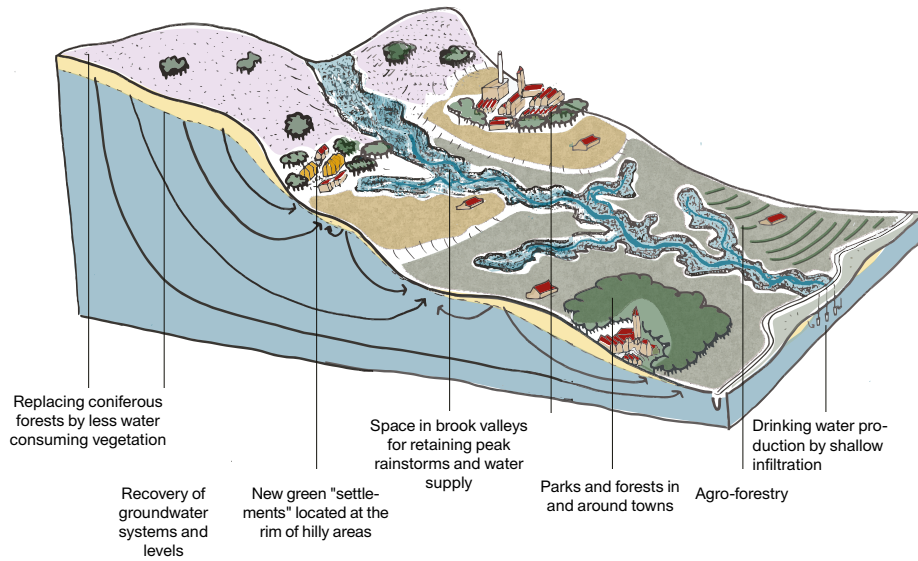
07 Clay polders in the north of the Netherlands - Future situation

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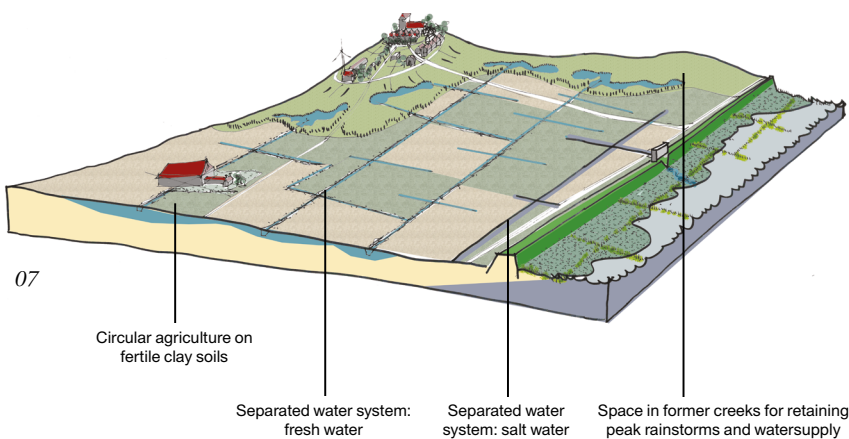
CONCLUSION

With this approach it has become clear that research (through) landscape design is a valuable addition to the methods and working methods for (applied) research. This provides scope for deploying (landscape) designers in the daily practice of institutions and institutes that operate at the interface between science and application in practice.

The added value of research (through) landscape design is that it offers an approach to deal with "wicked problems" of the future (spatial) development of the Netherlands and beyond. But also because of its strategic significance for scientific research and advice. Making designs, or the "working prototypes", necessitates bringing together ('integrating') very different (results of) scientific disciplines. Applying this – via design ateliers and design principles – immediately involves a "test" of the extent to which that knowledge actually offers realistic solutions. But it also contributes to formulating new research questions from practice, where existing knowledge does not yet appear to be adequate. And thus to knowledge gaps and follow-up research. Needless to say, the Netherlands in 2120 project already proves its (great) value here, illustrated by the many follow-up projects and initiatives.

SUMMARIZING PROPOSITIONS

1. Research (through) landscape design forms the basis of the perspective "A more natural future for the Netherlands in 2120". Further development requires a sharper scientific interpretation of the method. This report is a first step in that direction.

2. There are many scientific publications on research (through) design from many disciplines and fields of science. The most essential characteristic of design is the use of creativity to bring together, interpret and apply existing insights and knowledge about landscapes under fundamental changing conditions (in space or time) that create wicked problems as at present moment.

3. Making creative leaps from the 'existing' to the 'future' and vice versa – where induction and deduction alternate – is, in my opinion, the main added value of research by design as a method.

4. Research (through) landscape design is about investigating situations that are not yet known. In other words: to creating functional prototypes of the landscape of the future.

5. The focus on landscape means positioning systems, processes and functions in their spatial context, coherence and different time and spatial scales.

6. The alternation of the combination of inventory, analysis and synthesis (abduction) in all phases of the design process efficiently leads to the right match of existing knowledge, (possible) solutions and new research questions.

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