

THE FUTURE OF THE URBAN FOREST

exploring the systemic granularity of the urban green domain to navigate towards a new paradigm

APPENDICES

Appendix A - ORIGINAL PROJECT BRIEF

DESIGN
FOR OUR
future

IDE Master Graduation

Project team, Procedural checks and personal Project brief

This document contains the agreements made between student and supervisory team about the student's IDE Master Graduation Project. This document can also include the involvement of an external organisation, however, it does not cover any legal employment relationship that the student and the client (might) agree upon. Next to that, this document facilitates the required procedural checks. In this document:

- The student defines the team, what he/she is going to do/deliver and how that will come about.
- SSC E&SA (Shared Service Center, Education & Student Affairs) reports on the student's registration and study progress.
- IDE's Board of Examiners confirms if the student is allowed to start the Graduation Project.

USE ADOBE ACROBAT READER TO OPEN, EDIT AND SAVE THIS DOCUMENT
Download again and reopen in case you tried other software, such as Preview (Mac) or a webbrowser.

STUDENT DATA & MASTER PROGRAMME
Save this form according the format "IDE Master Graduation Project Brief_familyname_firstname_studentnumber_dd-mm-yyyy". Complete all blue parts of the form and include the approved Project Brief in your Graduation Report as Appendix 1 !

family name	<u>Keizer</u>	Your master programme (only select the options that apply to you):	
initials	<u>S.K.</u> given name <u>Sanne</u>	IDE master(s):	<input type="radio"/> IPD <input type="radio"/> Dfl <input checked="" type="radio"/> SPD
student number	<u>4531108</u>	2 nd non-IDE master:	_____
street & no.	_____	individual programme:	_____ (give date of approval)
zipcode & city	_____	honours programme:	<input type="radio"/> Honours Programme Master
country	_____	specialisation / annotation:	<input type="radio"/> Medisign
phone	_____		<input type="radio"/> Tech. in Sustainable Design
email	_____		<input type="radio"/> Entrepreneurship

SUPERVISORY TEAM **
Fill in the required data for the supervisory team members. Please check the instructions on the right !

** chair	<u>Dr. R. A. Price</u>	dept. / section:	<u>DOS</u>
** mentor	<u>Dr. J.R.T van der Velde</u>	dept. / section:	<u>Architecture</u>
2 nd mentor	_____		
	organisation: _____		
	city: _____		
comments (optional)	_____		

- ! Chair should request the IDE Board of Examiners for approval of a non-IDE mentor, including a motivation letter and c.v..
- ! Second mentor only applies in case the assignment is hosted by an external organisation.
- ! Ensure a heterogeneous team. In case you wish to include two team members from the same section, please explain why.

Procedural Checks - IDE Master Graduation



APPROVAL PROJECT BRIEF

To be filled in by the chair of the supervisory team.

chair Dr. R. A. Price date 13 - 09 - 2022 signature _____

CHECK STUDY PROGRESS

To be filled in by the SSC E&SA (Shared Service Center, Education & Student Affairs), after approval of the project brief by the Chair. The study progress will be checked for a 2nd time just before the green light meeting.

Master electives no. of EC accumulated in total: <u>27</u> EC	<input checked="" type="radio"/> YES all 1 st year master courses passed
Of which, taking the conditional requirements into account, can be part of the exam programme <u>18</u> EC	<input type="radio"/> NO missing 1 st year master courses are:
List of electives obtained before the third semester without approval of the BoE	

name C. van der Bunt date 19 - 09 - 2022 signature CB

FORMAL APPROVAL GRADUATION PROJECT

To be filled in by the Board of Examiners of IDE TU Delft. Please check the supervisory team and study the parts of the brief marked **. Next, please assess, (dis)approve and sign this Project Brief, by using the criteria below.

<ul style="list-style-type: none"> • Does the project fit within the (MSc)-programme of the student (taking into account, if described, the activities done next to the obligatory MSc specific courses)? • Is the level of the project challenging enough for a MSc IDE graduating student? • Is the project expected to be doable within 100 working days/20 weeks ? • Does the composition of the supervisory team comply with the regulations and fit the assignment ? 	<p>Content: <input checked="" type="radio"/> APPROVED <input type="radio"/> NOT APPROVED</p> <p>Procedure: <input checked="" type="radio"/> APPROVED <input type="radio"/> NOT APPROVED</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>- mentor architecture approved</p> </div> <p style="text-align: right;">comments</p>
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name Monique von Morgen date 20/9/2022 - signature MvM

The Future of the Urban Forest project title

Please state the title of your graduation project (above) and the start date and end date (below). Keep the title compact and simple. Do not use abbreviations. The remainder of this document allows you to define and clarify your graduation project.

start date 13 - 09 - 2022 end date 21 - 02 - 2023

INTRODUCTION **

Please describe, the context of your project, and address the main stakeholders (interests) within this context in a concise yet complete manner. Who are involved, what do they value and how do they currently operate within the given context? What are the main opportunities and limitations you are currently aware of (cultural- and social norms, resources (time, money,...), technology, ...).

The Future of the Urban Forest - how can we use the i-Tree technology in shaping Dutch climate resilient cities?

Rising global temperatures lead to a more frequent occurrence of heat waves. This natural phenomenon is a silent killer and becomes increasingly fatal. Considering the growing urbanization together with the urban heat island effect, our cities face an urgent challenge to adapt and become more climate resilient.

Green space, and most of all urban trees, are one of the most effective means to reduce peaks of urban heat cycles. Other than their cooling behavior, the urban forest provides benefits for water management, air quality, biodiversity, and the health and well-being of citizens. Despite their huge potential, the deployment of the urban forest to fight the climate battle remains limited due to a series of structural problems. Current (political) patterns of budget allocation, accounting, densification, and the predominant indifferent relation of society with trees dilute their essential contribution.

In the quest to make the benefits of trees more transparent and quantifiable a great advance in technology can be seen over the past years. One of these developments is the i-Tree software, a model with which ecosystem services of trees can be expressed in figures and money. The i-Tree suite originates from the USDA Forest Service and had to be adapted to the Dutch conditions to make it applicable here. This led to the launch of i-Tree NL version 1.0 in early 2019. In 2021, a consortium of knowledge institutes, municipalities, nurserymen, tree consultants and design offices started a follow-up project, i-Tree 2.0-NL, to map the contribution of trees to heat reduction more accurately across their lifecycle. A three-year-long project funded by CLICKNL and the consortium of 28 partners. The project centers around three work packages: focusing on the maximum cooling performances of tree species (WP1), the growth curves of trees (WP2) and the adoption of the tool by the different stakeholders (WP3).

My graduation project will be part of work package 3 and builds on the thesis of Deeksha Ramchandani who investigated the relationship between citizens and trees. Within my project, the members of the consortium will be closely involved. Together, they form the ecologies of stakeholders that work on greenspace (see Figure 1). These ecologies are location-specific and highly intertwined. There is an opportunity to unravel and map these greenspace processes and colliding interests and co-design possible next-generation i-Tree applications to facilitate and support stakeholders in the contexts of citizen resilience, greenspace management and spatial transformation.

To rewrite the relationship of society with their urban forests to a resilient one.

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introduction (continued): space for images

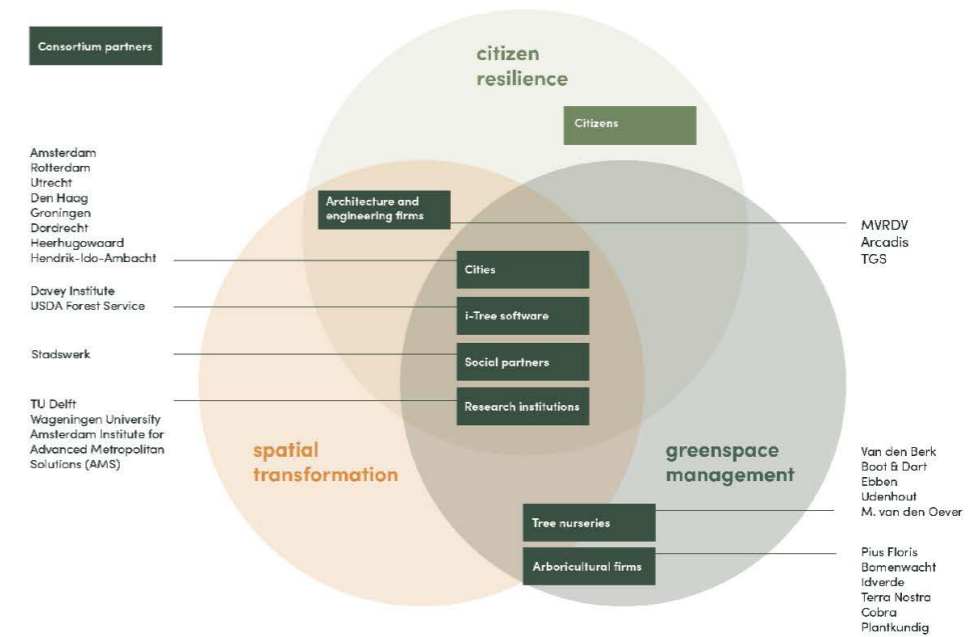


image / figure 1: Figure 1, stakeholder overview within three contexts of climate resilience

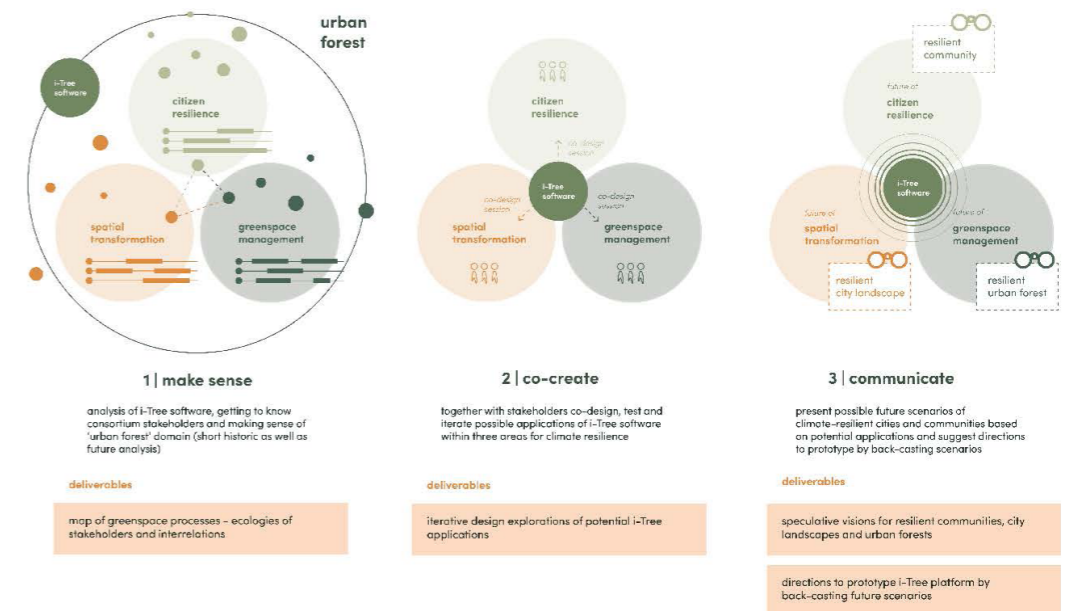


image / figure 2: Figure 2, project approach

PROBLEM DEFINITION **

Limit and define the scope and solution space of your project to one that is manageable within one Master Graduation Project of 30 EC (= 20 full time weeks or 100 working days) and clearly indicate what issue(s) should be addressed in this project.

By 2050, 80% of the people live in cities. Urban heatwaves are becoming more frequent and severe, thereby putting inhabitants at increasing risk. Green space is the most effective weapon to battle the heat and make cities more climate-adaptive, however, their potential remains currently restricted. There seem to be different reasons that sustain this limited role, and the problem space can be broken down into different levels:

- On a societal level, as Deeksha discovered, the current rather indifferent stance of the population toward green space is counterproductive
- On a technocratic level, factual evidence and sound scientific tools are missing to quantify the benefits of trees in the urban heat cycle
- On a political level, our current persistent models created boundaries in terms of accounting, regulating, funding, and managing trees for a more resilient city
- On an executive level, administrators, policymakers and designers lack appropriate tools and methodologies to integrate urban trees into their practice

With the development and optimization of i-Tree NL, (part of) the appropriate data and hardware is brought to the table to enable a more objective, informed and faster decision-making process. However, the software is currently bulky, for expert use only and still leaves a wide array of unexplored possibilities for cities in becoming climate resilient. It is essential to discover how the current structures and processes around the urban forest work within the domains of citizen resilience, greenspace management and spatial transformation to collaboratively discover potential applications of the software beyond current use.

ASSIGNMENT **

State in 2 or 3 sentences what you are going to research, design, create and / or generate, that will solve (part of) the issue(s) pointed out in "problem definition". Then illustrate this assignment by indicating what kind of solution you expect and / or aim to deliver, for instance: a product, a product-service combination, a strategy illustrated through product or product-service combination ideas, In case of a Specialisation and/or Annotation, make sure the assignment reflects this/these.

My project aims to unravel and map greenspace processes, co-design possible next-generation i-Tree applications to facilitate and support stakeholders in the contexts of citizen resilience, greenspace management and spatial transformation and communicate the resulting possible scenarios for resilient communities, city landscapes and urban forests as speculative visions and back-casted prototype directions (see Figure 2).

The project will be a combination of participatory design (co-design sessions with stakeholders), strategic design (moving i-Tree software in and out of stakeholder groups and discussions to discover potential applications) and ViP, vision in design (speculative visions of resilient cities and lens on initial domain analysis).

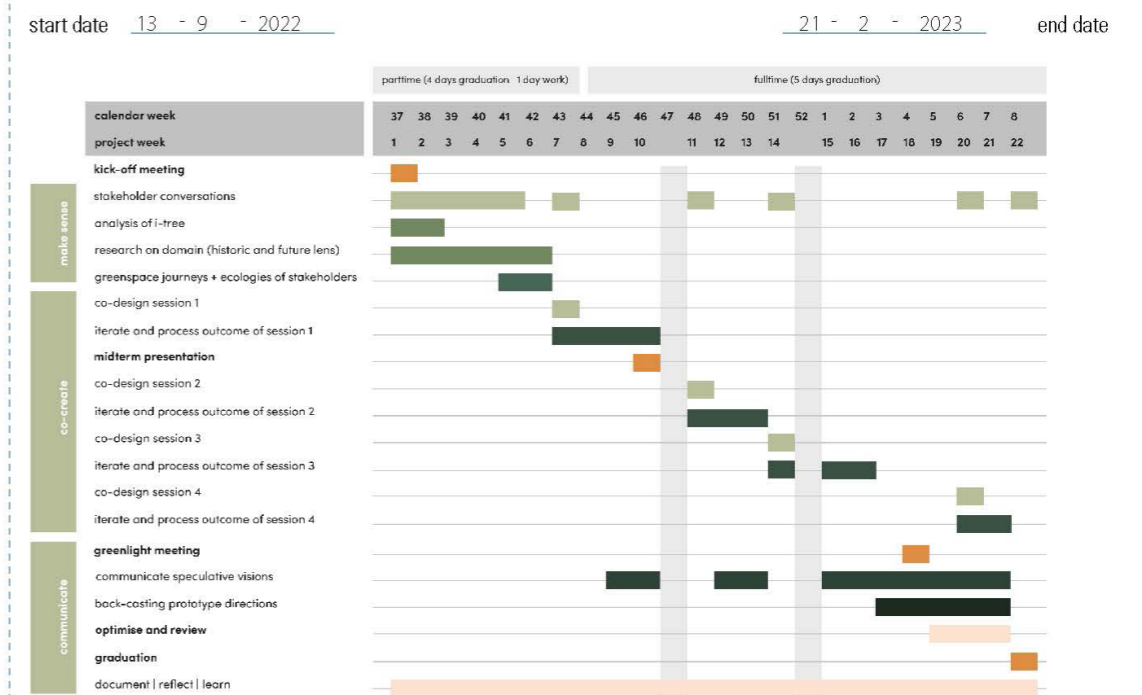
1 | make sense - Within this phase, I will start with making sense of the 'urban forest' domain and explore the three different contexts of climate resilience by getting to know the consortium partners. The current use and functionalities of the i-Tree software will be investigated. This phase will be concluded with a map of greenspace processes, colliding interests, and ecologies of stakeholders within the three contexts.

2 | co-create - Within the co-design sessions, possible applications of the software will be explored together with the stakeholders. Co-design sessions will be organized to collaboratively shape the optimal use cases of the software within the three contexts of climate resilience centered around an initial 'how do we ...'-question.

3 | communicate - These potential applications are then envisioned in use and presented in future scenarios from the perspective of, for example, a street, since this is the green typology where most interests converge. These visualizations are used in the final co-design session to discuss the overlap of the three contexts. If time allows, these scenarios are used for back-casting to concrete prototype directions for the next generation i-Tree software.

PLANNING AND APPROACH **

Include a Gantt Chart (replace the example below - more examples can be found in Manual 2) that shows the different phases of your project, deliverables you have in mind, meetings, and how you plan to spend your time. Please note that all activities should fit within the given net time of 30 EC = 20 full time weeks or 100 working days, and your planning should include a kick-off meeting, mid-term meeting, green light meeting and graduation ceremony. Illustrate your Gantt Chart by, for instance, explaining your approach, and please indicate periods of part-time activities and/or periods of not spending time on your graduation project, if any, for instance because of holidays or parallel activities.



The project is envisioned to have three parts, a part-time and a full-time phase, four co-design sessions, an ongoing document-reflect-learn loop, and the necessary meetings (see Figure 3).

- 1 | make sense
 - o The initial weeks will be spent on analyzing i-Tree, exploring the domain of the urban forest, and arranging introduction meetings with a wide cross-section of the consortium. These contacts and relationships with stakeholders are essential for conducting the co-design sessions in part 2.
- 2 | co-create
 - o This part will be utilized for four co-design sessions distributed over the three contexts of climate resilience: citizen resilience, spatial transformation, and green space management and a final session to combine the three lenses. Within the sessions, we will include different stakeholder groups fitting the area and together explore potential applications. The output will be processed, iterated, and prepared for speculative vision communication.
 - o My midterm presentation will be between sessions 1 and 2.
- 3 | communicate
 - o The final part of the project includes communication and back-casting. The desirable future scenarios, based on the applications created in part 2, will be communicated in a visual way to spark debate, trigger imagination, and emphasize possibilities. If possible, in terms of time, these future worldviews are then used for back-casting as a direction for the further development of the next generation i-Tree software.
 - o The greenlight meeting will be before the final co-design session. The graduation ceremony will be at the end of February.

MOTIVATION AND PERSONAL AMBITIONS

Explain why you set up this project, what competences you want to prove and learn. For example: acquired competences from your MSc programme, the elective semester, extra-curricular activities (etc.) and point out the competences you have yet developed. Optionally, describe which personal learning ambitions you explicitly want to address in this project, on top of the learning objectives of the Graduation Project, such as: in depth knowledge a on specific subject, broadening your competences or experimenting with a specific tool and/or methodology, Stick to no more than five ambitions.

I feel very lucky to conclude my university journey with this project as it offers a great mixture of my interests and summarizes my past study period, combining architecture, sustainability, cities, nature, complex systems, future visioning and above all, a lot of people.

Journey > destination

Enjoying the process and celebrating the outcome. Naturally, I am focused on the dot on the horizon, the final delivery. When almost near the end, I already put the next finish line further away. Within this project, I want to trust my experience, let the creativity flow, learn to better appreciate the way towards the result and let go of the need to immediately raise the bar again.

Strive for connection

Strengthening my role as 'connector'. The relationships and knowledge within the consortium are crucial for the success of i-Tree. I hope to connect the potential of the different parties as well as possible and shape the future narrative together.

Vision in Participation (ViP*)

Until now, I never had the chance to bring substantiated co-design collaboration and speculative visions together in tangible design. I am looking forward to exploring the potential of participatory design in combination with explorative future worldviews. To find a good balance between concrete manifestation and high-over vision, between practice and theory. To come up with a result that you can touch and has the necessary depth and substantiation. A generation of i-Tree that fits and facilitates the new needed societal story of the city and her green.

FINAL COMMENTS

In case your project brief needs final comments, please add any information you think is relevant.

Appendix B -

SEMI-STRUCTURED INTERVIEW GUIDES

ARCHITECTS - TOPICS TO TOUCH

Current role and design process

- What is your role within the firm?
- When will you be asked in the architectural process?
 - What role does landscape architecture play in relation to urban planning and architecture?
- What role does green play in your design process?
 - When are choices made? In which phase?
 - Does this belong to your specific firm or is this how most architects do it?
- What do you base the choices for certain types of green on? Tools? Knowledge?
 - Familiar with i-Tree?
- [Mention specific project from portfolio, interesting from a green perspective]
 - Can you tell more about that?
- What are the most important conflicting interests you encounter when integrating green into a design?
 - Does green management play a role in your choice?

Looking ahead and speculating

- What do you think will change in the field of urban green?
- What do you think we need to give trees a better position in the city?
 - What role does technology play in this?
- What should a tool offer? How would it help your work?
 - How would you like to use i-Tree?
 - In which phase?
 - What kind of information is needed?
- What are the main developments on which you base your design?

MUNICIPALITIES - TOPICS TO TOUCH

Current role and process

- What is your role within the municipality?
- What are the biggest challenges in greening the municipality? (transformation)
- What are the biggest challenges in keeping the municipality green? (maintenance)
- Which places in the municipality are you most concerned about? (resilience)
- What do you currently know about i-Tree?

Looking ahead and speculating

- What role do you hope i-Tree could play in the future?
 - What do you want to get out of the consortium?
- How to stimulate citizen participation?
- What would you like to get out of the session?
 - Could you come to Delft for the session? Or do you want it to be hybrid?

TREE CONSULTANTS - TOPICS TO TOUCH

Workflow and process

- What is your role within the consultancy?
- How does your consultancy compare to the others? Specialisation?
- How is your relationship with other stakeholders? Nurseries, architects, municipalities?

i-Tree software

- What do you use i-Tree for now?
 - Which i-Tree services? Canopy and Eco?
 - How does i-Tree Eco work? Which data is included and combined?
- 20 ecosystem services, but only measure 4? How do you supplement the argument for the tree?
- From monetary to functional focus? What do you think of that? Why did that happen?
- Where does i-Tree fall short at the moment?
- Connection with GIS data and other software? Plugin potential? Rhino, Grasshopper?
- What is i-Tree's business model? How does it make money?
- [Try to discover the limits of the next generation of the i-Tree software]

Future

- If you could dream, what do you hope i-Tree becomes?
 - What role will it play?
- If you look at my project, where is the potential? Scope on municipalities, architects, knowledge from tree consultants and nurseries?
 - Potential for integration in architect design process? Potential for municipalities, urban forestry master plans, policy and monitoring? Knowledge of nurseries and consultancy firms in tool, connection between the two? Translation tool to citizens?

Co-design session

- What are your expectations? What would you like to get out of?

TREE NURSERIES - TOPICS TO TOUCH

Workflow and process

- How does your process work, what is your workflow?
- For an average project (small or large), which parties are involved?
 - What input should those parties provide? How does that work in practice?
 - What knowledge and experience do you need to ensure that a realized project functions optimally? What sort of information/consultation do you provide municipalities and architects? How do architects, urban planners, municipalities benefit from your inventory and knowledge today? On which scale is your consultancy needed?
 - On what factors do you select tree species? How did this change over time? (pests, diseases, climate change, etc.)
 - Both public and private green, what is the ratio?
 - How do you measure health and quality of a tree? Which indicators are used for evaluation?
 - What is the early care that is needed for a tree? When do you know a tree is going to be planted somewhere else? Who contacts you at what time in the lifecycle?
 - How long does your responsibility for the planted trees last?
 - Do you do follow-ups, visit them later on?
 - Have you had experience in development projects? How do you fit into the area development process? [take journey A3]
 - What knowledge should be included in the area development process? What should be taken into account? What are some bad and good experiences you had in these kind of projects (maintenance and management)?
 - What should urban planners know?
 - What should municipalities know?
 - What should citizens know?
 - How would you like to see it?

Current challenges

- What are your current biggest challenges?
 - Challenges in growing/maintaining trees in desired shape and size? Challenges in reaching the optimal mature state and ecosystem service benefits?

- Dependent on politics?

Potential of and expectations for i-Tree

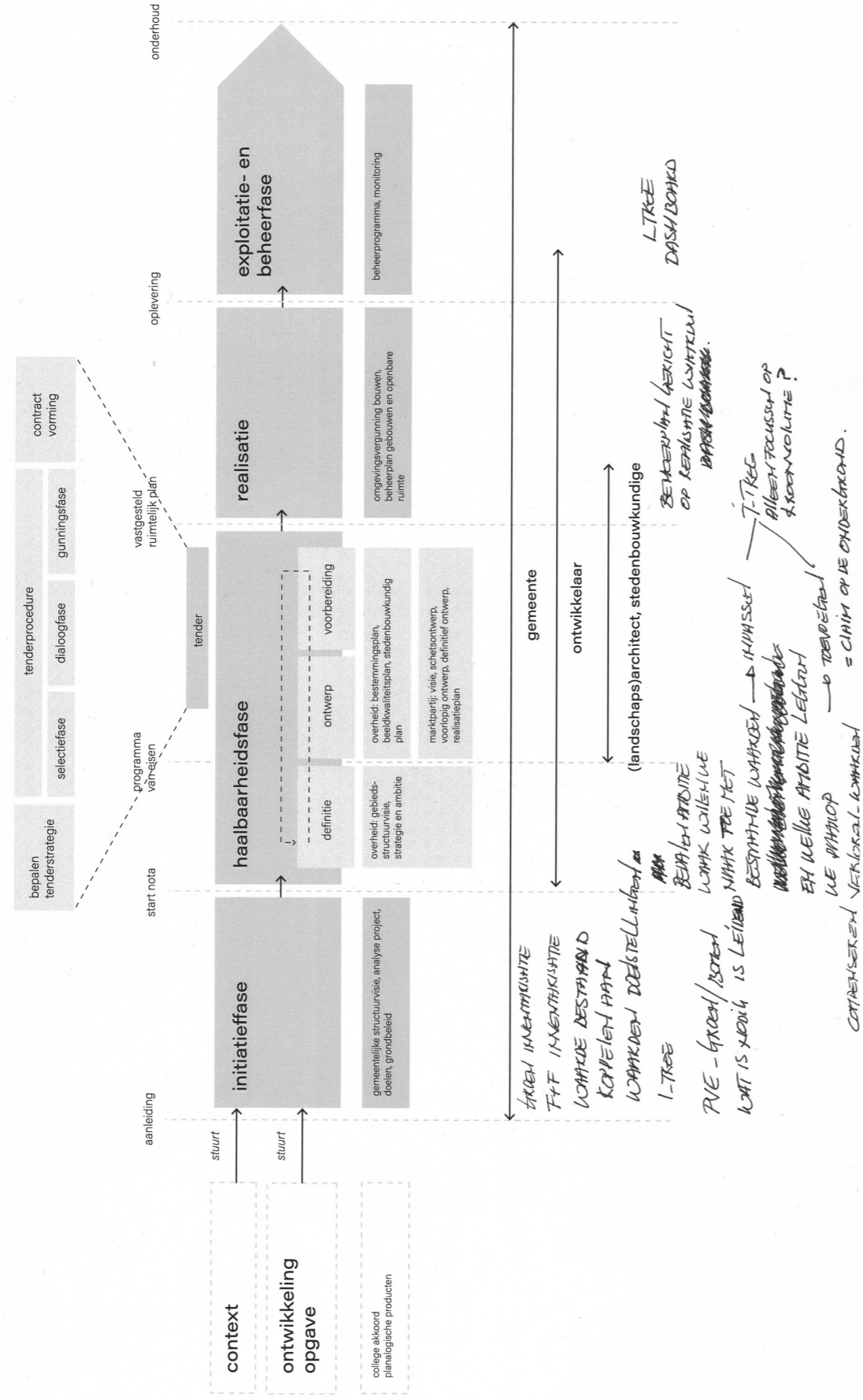
- What do you think of i-Tree? Quantification of the benefits of your 'product'?
 - Have you ever worked with it?
 - What do you want to get out of it? What would you like to see as an output of this project?
 - What role can you as a sector play in this tool?
- Do you have ecosystem targets in your workflow? If so, which ones do you prioritize and why?
 - What would happen if you provided trees for ecosystem service? Select by function of the tree?
 - You mention 'climate trees' on your website, does that include all ecosystem services of the trees? How do you decide on those species?

Future

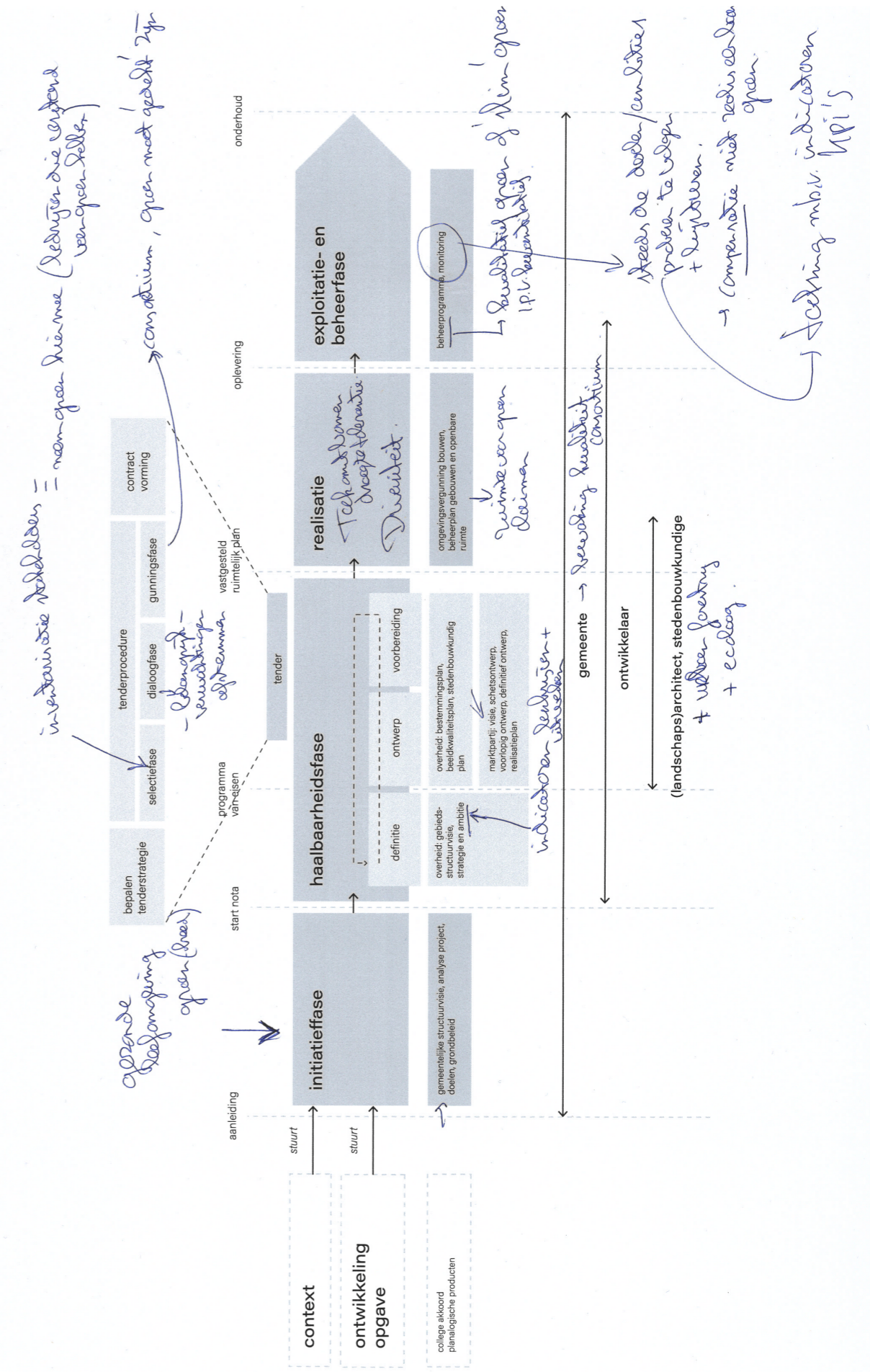
- Vision for the sector in the future?
 - Which changing demand (due to changing knowledge) do you have to respond to?
 - What do you notice about this change?
 - What can a revenue model be linked to? (temperature decrease, health benefits?)

AREA TRANSFORMATION JOURNEYS CO-DESIGN SESSION 2

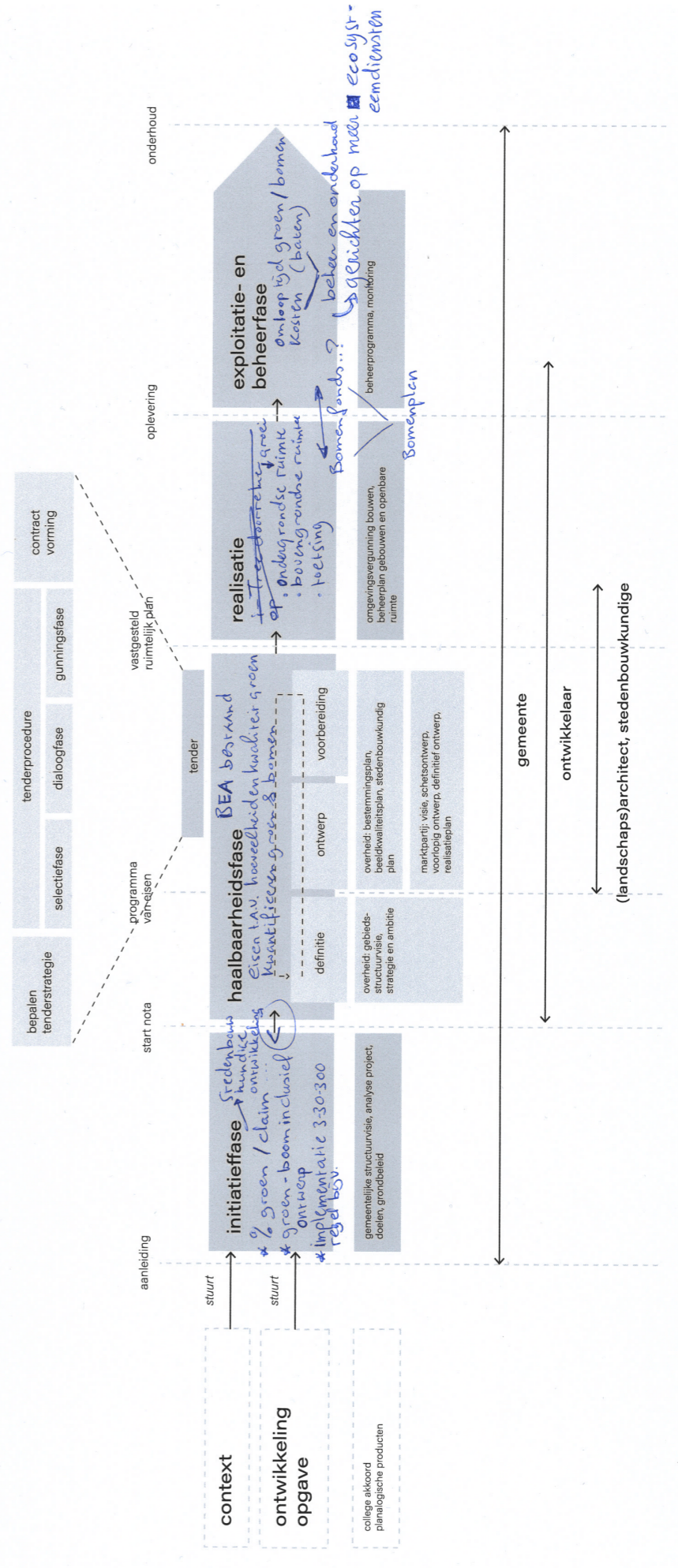
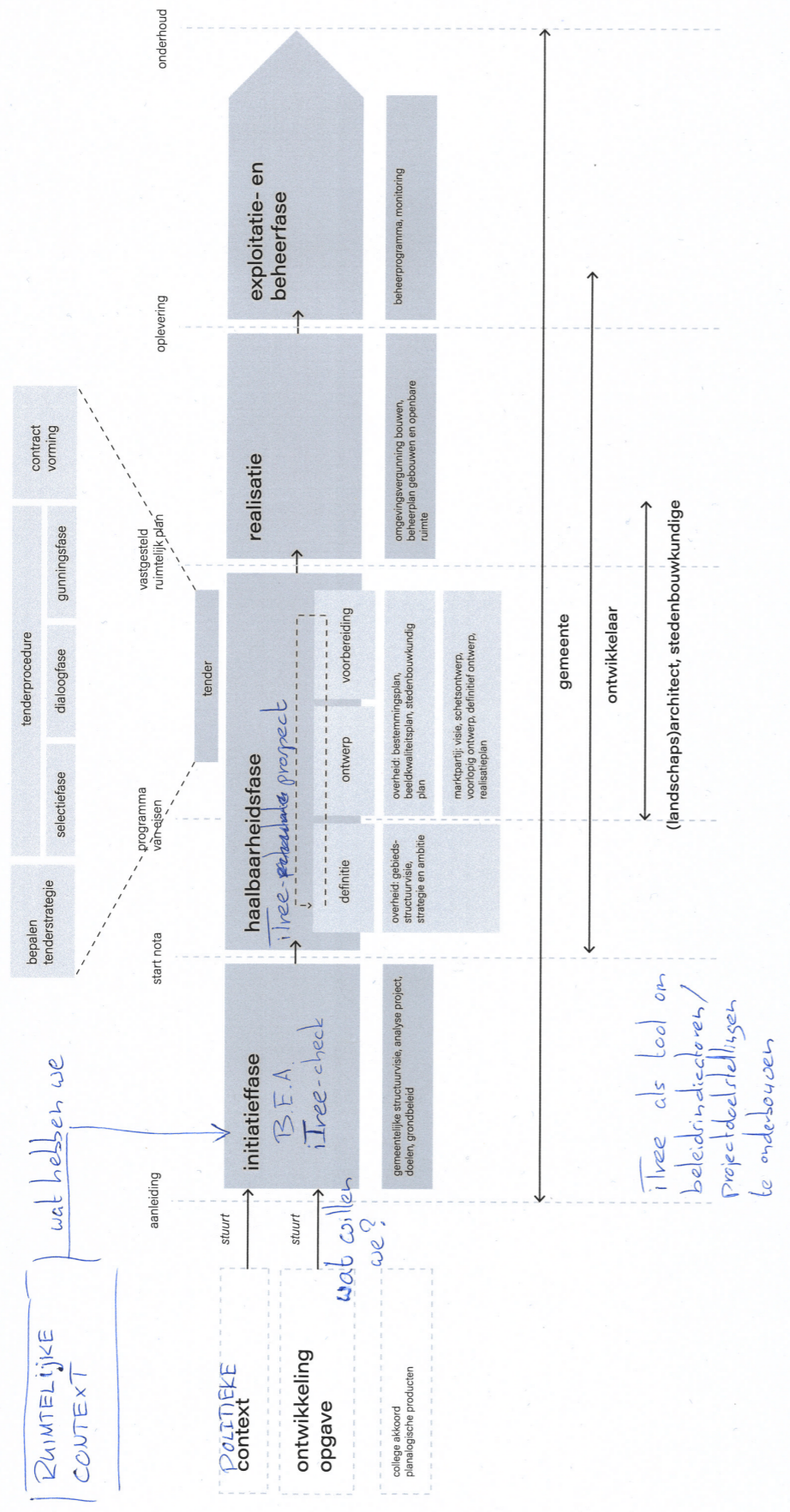
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FCO'S

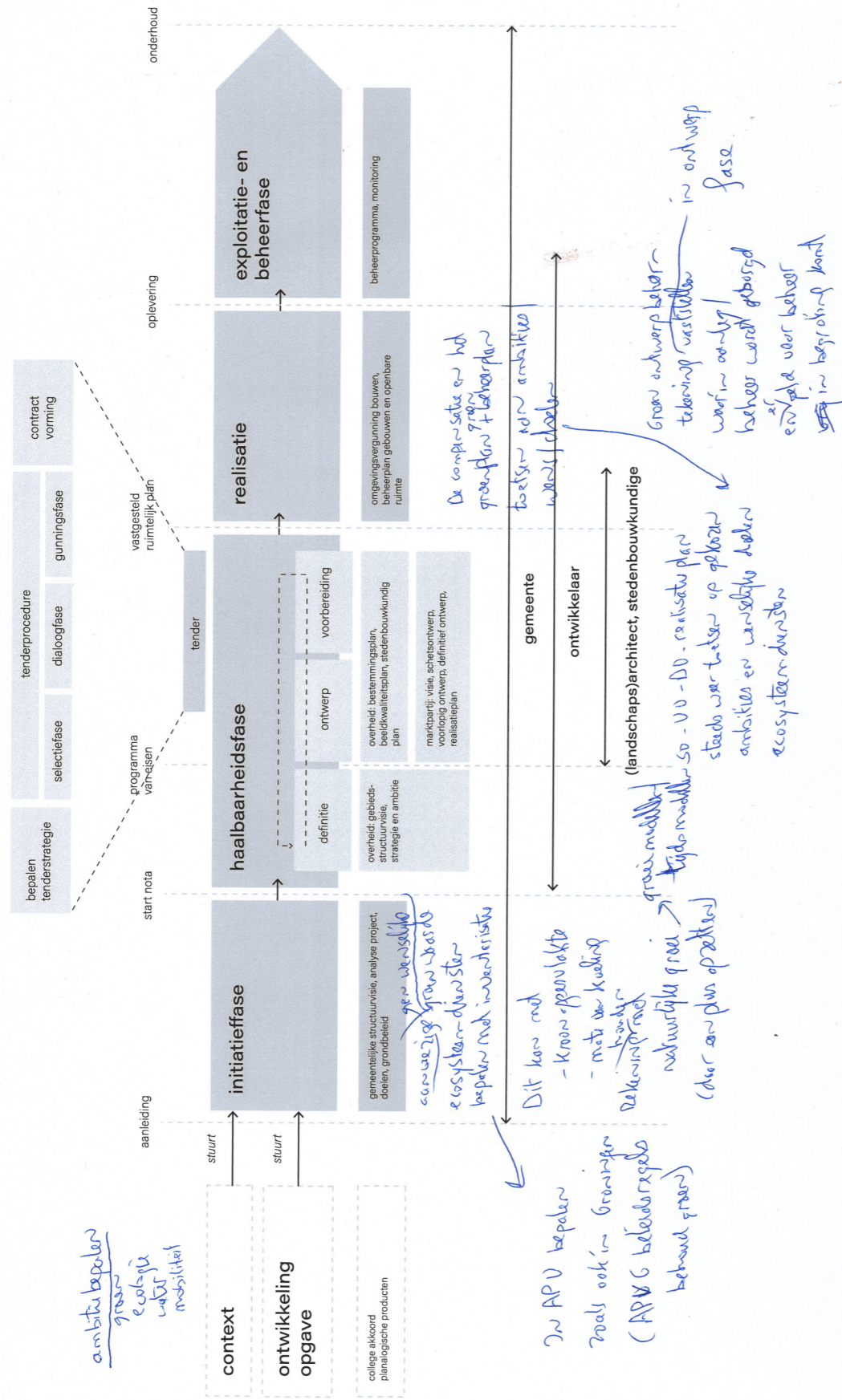


Rob Zeeckharst
gem. Dijk en Vaerd.

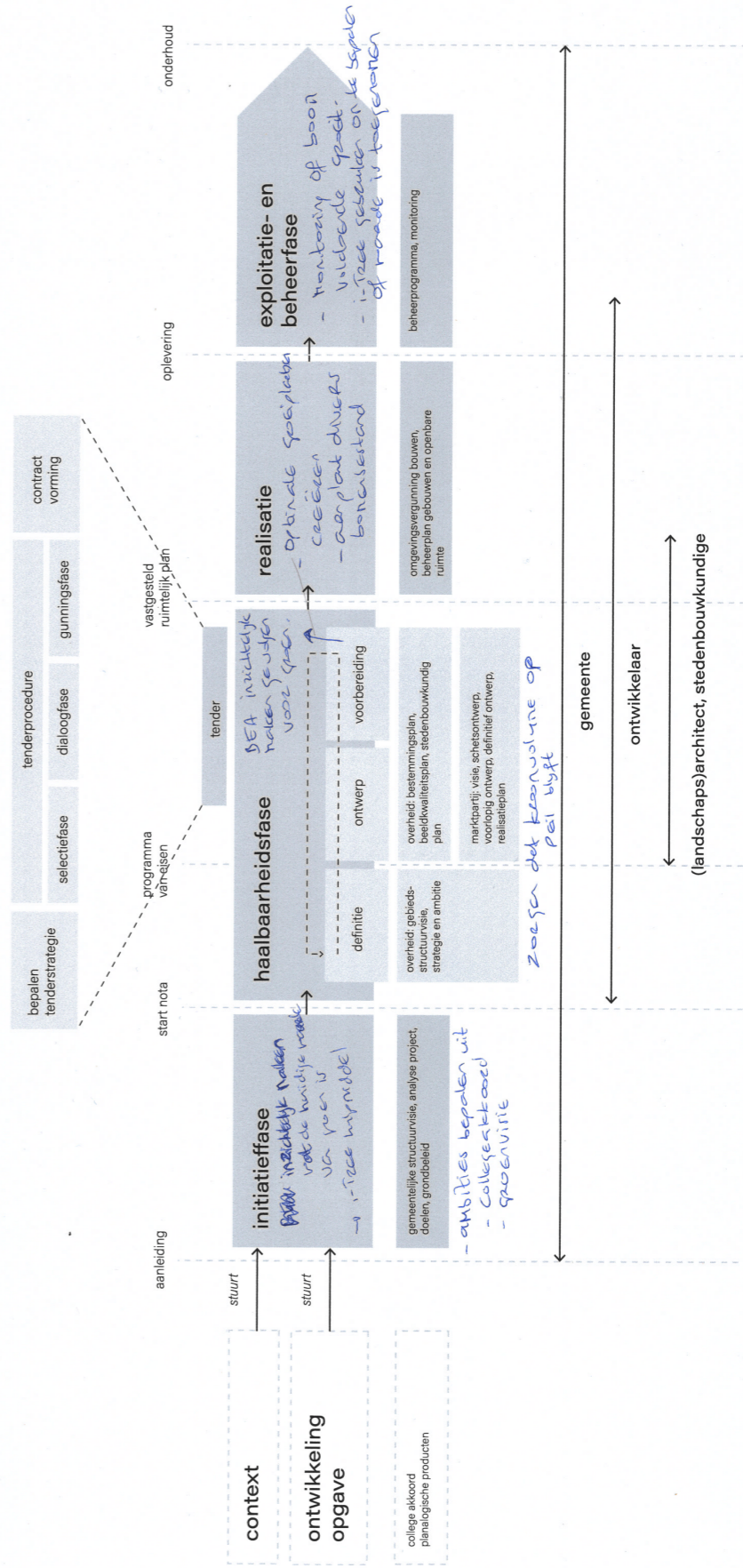


groen integratie in een proces

Heel belangrijk



Witteke



Process van Goalen

