Climate education and research at University of Twente

final report

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TwynstraGudde

Impact op morgen.

Executive summary

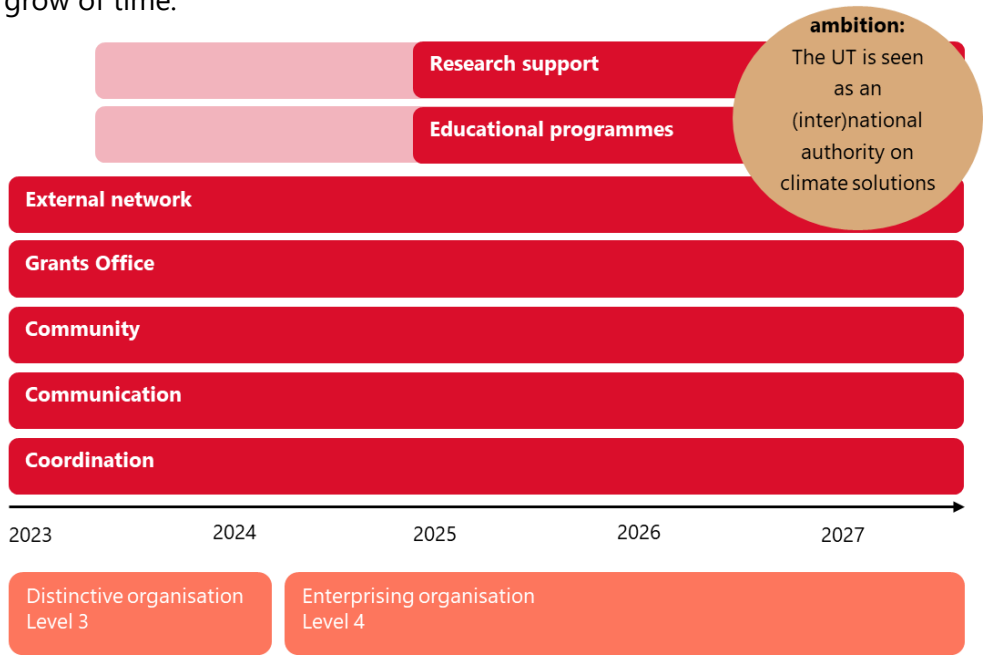
Shaping Expert Group Sustainability
The Shaping Expert Group on Sustainability (SEG) sees that the topic of Climate is important for much of the sustainability research and education currently being undertaken at the UT. As such the SEG would like to propose actions that can be taken to support the further development of these activities.

TwynstraGudde aided the SEG in identifying the possible thematic focus of the initiative and the possible types of organisation. TwynstraGudde conducted 15 interviews and organised 3 focus group sessions to draw up the conclusions summarized in this report.

Thematic focus
In all interviews and focus groups it was confirmed that UT's unique selling point is the combination of expertise in the technical sciences, the geosciences and the social sciences. This puts the University of Twente in a leading position to contribute to solutions to climate change. There are seven societal challenges identified as extra relevant for the UT, on which the UT can organise sub-communities to stimulate transdisciplinary research.

Type of organisation
We have identified seven 'building blocks' that can structure the organisation of the initiative. If UT is serious about its ambition to become a international, national and regional authority on climate solutions, our advice is to apply all seven. The question is not whether these building blocks should be applied, but in what order, and in which pace.

Scenario 2 is the best fit
We propose three different scenario's of organisation types, that differ in intensity and impact over time. From our perspective scenario 2 is the best fit for the UT. The organisation is agile in the beginning, and gets the chance to grow of time.



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1. Introduction & Background

Why climate action is important

Climate change is one of the biggest, if not *the* biggest, challenges of the 21st century. Human action has put the system earth under unprecedented pressure, with irreversible consequences as a result. To prevent dangerous climate change from happening a societal transition must take place, in which universities have an important role to play.

Climate change as a wicked problem

Climate change can be seen as a wicked problem; the causes of climate change are multiple and complex, the impact of climate change is uncertain and interrelated, and the potential solutions of climate change may create new problems. For a long time climate change was solely a topic climatologists and geographers focused on. However, seeing the complexity of its causes, impacts and potential solutions, many scientific disciplines are essential in preventing dangerous climate change from happening and preparing the global society for the climate change that is likely to take place.

Transdisciplinary approach

The complexity of climate change makes that universities have an unique position is contributing to its solutions. Climate change asks not only for a interdisciplinary approach, in which disciplinary boundaries are crossed to focus on a common goal, but for a *transdisciplinary* approach, in which sectorial boundaries are also crossed.[1] The value of transdisciplinary research for complex societal challenges, such as sustainable development, is also stressed by the OECD.[2] Only this way will it be possible to develop integrated knowledge for science and society.

Society's demand

In order to empower society to apply sustainable solutions found by science, and to develop integrated knowledge *with* society, it is necessary that the university is found on the topics it excels on. It is for this reason that society calls for clear positioning of the UT on the topic of climate change.

The time is now

At the moment of writing climate action is more urgent than it is has ever been. In November 2022 the Netherlands Environmental Assessment Agency calculated that, even if the Dutch government implements all climate plans, it will not be enough to reduce greenhouse gas emissions by 55% in 2030.[3] Urgent action by all stakeholders in society to contribute to solutions, including universities, is necessary.

Sources:

1. Utrecht University (2022): 'What is Interdisciplinary research?'
2. OECD (2020), "Addressing societal challenges using transdisciplinary research", *OECD Science, Technology and Industry Policy Papers*, No. 88, OECD Publishing, Paris,
3. NRC (2022) "PBL: Zelfs als het kabinet álle klimaatplannen uitvoert, is dat nog niet genoeg"

Shaping Expert Group S

Shaping 2030

Shaping2030 is the university's mission, vision and strategy for 2020-2030. Within this strategy, the UT has expressed sustainability to be a precondition for everything the organisation does.

Shaping Expert Group on Sustainability

The Shaping Expert Group on Sustainability (SEG) sees that the topic of Climate is important for much of the sustainability research and education currently being undertaken at the UT. As such the SEG would like to propose actions that can be taken to support the further development of these activities. According to the SEG's first impressions these activities are currently dispersed widely across faculties, centres, institutes and programs. This makes it difficult to specify how exactly to support this broad group of researchers and educators.

Benefits for the UT

By defining the focus of the UT within climate education and research, the UT will be able to:

- communicate commitment and expertise on the topic to prospective and current students;
- showcase the UT's capacity to contribute to the climate programs of the national government, different funding agencies as well as regional and local programs;
- make informed strategic choices on how to allocate scarce resources to increase the societal and academic impact of this group of researches and educators;
- facilitate and recognize efforts to work in cross-faculty manner and to strategically couple educational and research activities.

This report

In order to increase the impact of climate education and research the SEG reached out to TwynstraGudde to investigate type of collaboration would be suited, including:

- How can these organizational forms develop in the coming five years;
- How can these organizational forms help to achieve the Shaping 2030 goals.

Our approach

In order to answer the question posed by the UT, we as TwynstraGudde centred our approach along the following, for us essential, elements:

1. Tight process for solid content, with sufficient support

The challenge for us was not only deliver substantive content, but also to organize sufficient support within the organisation. The latter is a specific challenge in academic environments, due to the extensive amount of knowledge and experience there is present on such an important topic of sustainability. The aim was, of course, to include and represent as many people as possible. In the first phase we chose to conduct 15 interviews with UT employees. This way we collected us much input as possible. We consciously included representatives of existing initiatives within the UT, such as the centre for disaster resilience, the centre for energy innovation, etc. In addition, we also observed initiatives at other Dutch universities.
In the second phase we presented our findings in three different focus groups, during which we collectively reflected on the findings from the interviews, and further developed the content.

2. Structure follows strategy

A collaborative organization for sustainability is not an end in itself, but a means to strengthen the impact of the University of Twente in the field of sustainability. The organisation must match the thematic demarcation of “climate” or “sustainability research and education at UT. For that reason the thematic demarcation was an important topic during the interviews and focus groups.

3. Combination of expertise in the fields of sustainability and organisational science

Last but not least, we put together a team consisting of members with experience and expertise in the field of sustainability and organizational science. In addition, we paid special attention to select team members with extensive experience in an academic context. TwynstraGudde is a consultancy that is active in the field of major social transition issues, including sustainability. One of our core competencies is organizing partnerships, between and within organisations.

The next slide gives an overview of the process we followed, including the different phases.

Proces

August | September | October | November

Phase 1:
Kick-off with repre-sentatives of the SEG

Phase 2:
15 interviews UT employees: mostly researchers and management.

- Maarten van Aalst
- Tanya Bondarouk
- Geert Dewulf
- Jennifer Herek
- Suzanne Hulscher
- Jos Keurentjes
- Joost Kok
- Bart Koopman
- Freek van der Meer
- Diana Reckien
- Machteld Roos
- Gerard van der Steenhoven
- Tom Veldkamp
- Marielle Winkler
- Sabine Wildevuur

Phase 3:
Three focus group sessions, to reflect on and further develop the findings from the interviews

Focus group 1:
- Tanya Bondarouk
- Freek van der Meer
- Bart Koopman

Focus group 2:
- Suzanne Hulscher
- Geert Dewulf
- Marielle Winkler

Focus group 3*:
- Diana Reckien
- Suzanne Hulscher
- Tanya Bondarouk
- Marielle Winkler

* Because we felt we were able to include the input provided by the members of focus group 3 in earlier focus groups, the focus group did not come together. Members were nonetheless consulted for written input on the reports.

Phase 4:
Delivery of the **report,** which forms the basis for UT's decision-making proces.

During the process we held bi-weekly meetings with representatives of the SEG sustainability and support staff, to share insights and discuss developments.
- Cheryl de Boer (SEG)
- Albert van den Berg (SEG)
- Vincent Hövels (support staff)
- Miriam Luizink (support staff)

2. General findings

General findings from the interviews

Interviews focused on two main areas:

1. Thematic focus - What are the strengths of the University of Twente in relation to climate related topics, and what are the societal challenges that the University of Twente can contribute to?
2. Type of organisation - What type of organisation is successful within the university to stimulate collaboration?

General findings on thematic focus (question 1)

- The interviewees see a clear role for the UT in solving climate related challenges for society. They support the UT's ambition to become an (inter)national authority on the topic of climate change. The UT already accomplished this position in several societal challenges related to climate change and – in other cases- can grow to become one.
- Interviewees all recognize UT's combination of expertise in the technical sciences, social sciences and geosciences to be the core of UT's contribution to solving climate related challenges.

The findings on thematic focus are summarized in chapter 3, and focus on UT's unique combination of expertise in the technical sciences, social sciences and geosciences in relation to climate change challenges.

General findings on type of organisation (question 2)

- The consensus among interviewees is that uniting the many different climate initiatives at UT is of added value. Collaboration with existing initiatives, such as the Centre for Disaster Resilience and Centre for Energy Innovation is favourable.
- In order to live up to the ambition institutionalization, including representation at the strategic level of the university (strategisch beraad), is necessary. At this moment only institutes are represented at this level, besides the faculties.
- Many interviewees see the opportunity of a 'growth' model, in which a clear ambitious goal is set in the beginning, and the initiative can grow in (activities, finances, fte) over time.
- Opinions differ on the types of leadership the initiative needs: some call for leadership from younger scientists, some from accomplished scientist with an established reputation. Interviewees share the need for representation of the different disciplines/faculties within the initiatives.

The findings on type of organisation are summarized in chapter 4, and focus on what we refer to as 'building blocks:'

- Education
- Research
- Grants office
- External network
- Communication
- Coordination
- Community building

In chapter 5 we have developed three organizational scenario's based on these building blocks.

Examples of other universities

Climate Action Programme at TU Delft

In 2019 TU Delft published its vision document outlining the needs for far-reaching action on climate. The Climate Action programme features plans for research, education, campus development and collaboration with politics and industry. For the next 10 years TU Delft allocate 22 million euros to set up and further shape the programme.

Research
The research component is based on four themes: Climate science, Climate change mitigation, Climate change adaption, Climate change governance

Education
Development of lifelong learning programmes and a Climate Action minor.

Campus
Prof. Andy van den Dobbelsteen was appointed as TU Delft's sustainability coordinator. Together with the various TU Delft divisions he is developing a sustainability vision and programme for the campus.

Climate Action Hub
This public debate needs to be based on facts and knowledge and needs to account for the important societal and ethical issues of responsibility and justice. TU Delft has have the goal to develop a 'Climate Action Hub', with the aim to support global and national leaders, policy makers and industry in planning for and responding to climate change.

Pathways to Sustainability at Utrecht University

Utrecht University focuses its research on four strategic themes, of which Pathways to Sustainability is one. Within this theme, researches with different expertise are joining with societal partners to ponder research questions and strategies on tackling key societal challenges.

Within the Pathways to Sustainability programme, the UU has set up communities. These communities drive and deepen the inter- and transdisciplinary exchange and collaboration on key issues related to societally relevant and recognizable sustainability issues. The following thematic communities focus on different aspects of sustainability:

- Energy in Transition
- Future Food Utrecht
- Transforming Cities
- Sustainable Ocean
- Towards a Circular Economy
- Water, Climate and Future Deltas

Next to the communities above, the UU builds on the following communities to further the goals of the programme:

- Critical Pathways
- Science for Sustainability
- Sustainability Education and Engagement

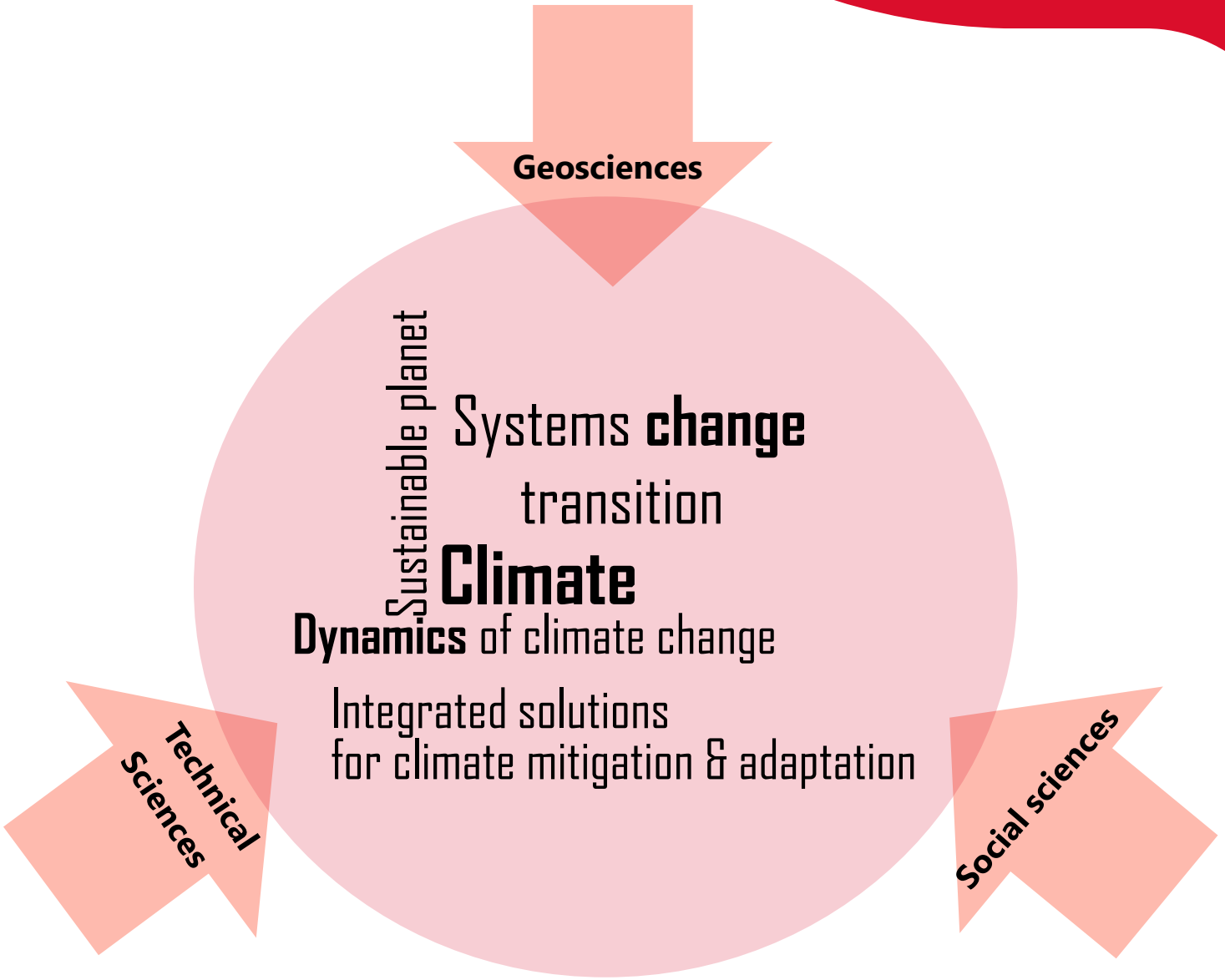
3. Thematic focus

Climate research at UT

In all interviews and focus groups it was confirmed that UT's unique selling point combination of expertise is the technical sciences, the geo-sciences and the social sciences. This puts the University of Twente in a leading position to contribute to solutions to climate change.

These contributions focus on preventing further climate change from happening (mitigation) and technological and societal adaptation to the climate change that will inevitably happen (adaptation).

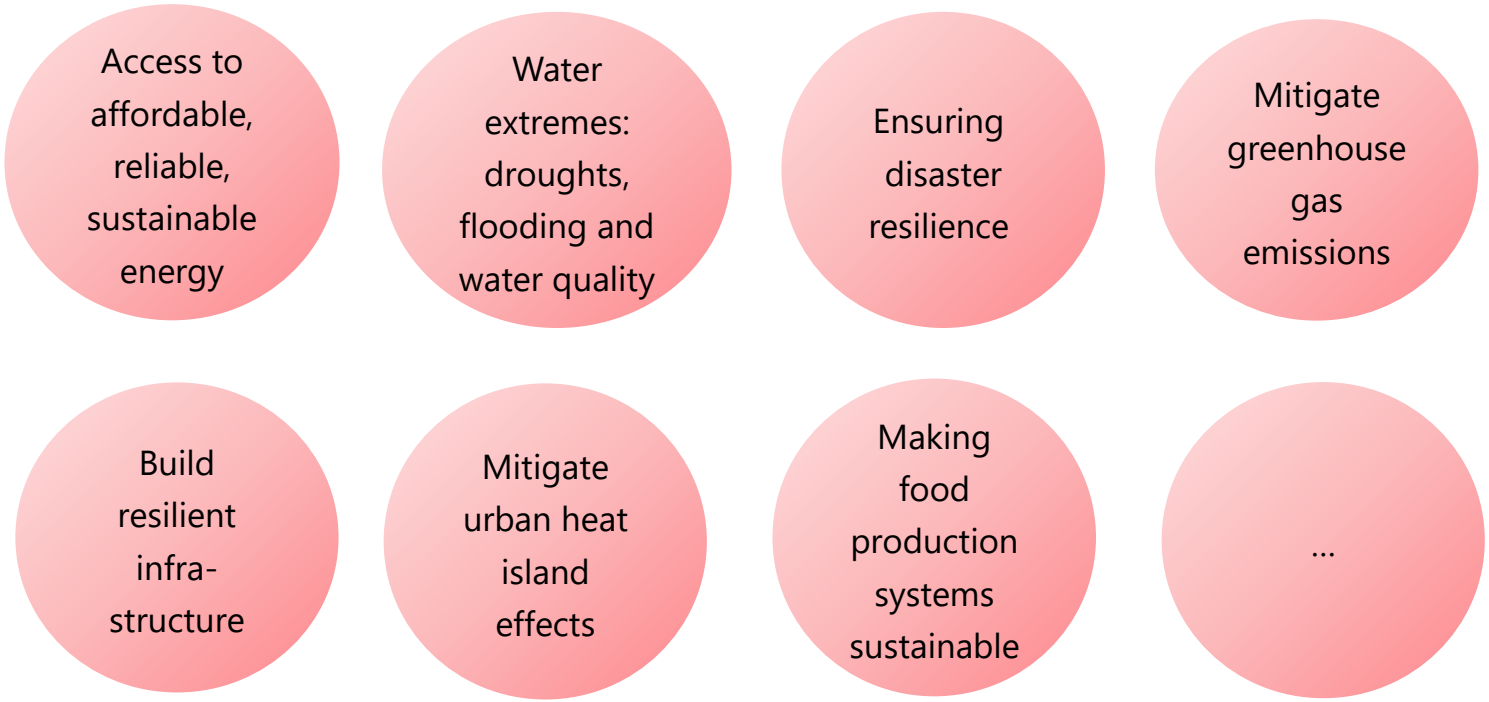
On the right is a visual display of the words and phases used by participants of the interviews and focus groups to describe the 'umbrella' initiative. The bigger the word, the more frequently it was used to describe the initiative by participants of the interviews and focus groups. We advice to use one of these terms or phrases, so the initiative is recognized in- and outside the university.



Societal challenges

At the University of Twente many researchers and educators contribute to solutions for climate change. The UT can form communities on the following societal challenges to stimulate trans- and interdisciplinary collaboration. The societal challenges are based on the UN Sustainable Development (sub)Goals. The next slide gives a brief description per theme.

We advise to select a few topics to create a clear profile of what the UT can be found on. This does not mean not working on the other topics at all, just choosing a clear starting point. Over time with feedback from what is relevant in the UT community the topics can change.



Societal challenges

This sheet gives a description of the social challenges that are potentially relevant for UT. The challenges presented here are based on Sustainable Development (sub)goals[1] that are relevant for fields that the UT is already active in. The numbers refer to the specific SDGs.

Access to affordable, reliable, sustainable energy (7)
We currently still rely on fossil fuels. This causes harm to the planet and means we need to change our ways of producing and consuming energy. To counter climate change we need solutions that can be implemented widely in a short period of time.

Build resilient infrastructure (9.1)
Our societies need functioning and resilient infrastructure as their basis. To function in a world of with changing climate our industries and infrastructure must be adapted. Innovative sustainable production technologies and infrastructure that is able to withstand extreme weather events are needed.

Water extremes: droughts, flooding and water quality (15.3, 11.5, 6.3, 6.6)
The planets ecosystem is severely damaged. It is a challenge to restore degraded land and find solutions to deal with lack of rainfall. Simultaneously, it is necessary to work on preventing deaths and the number of people affected and reducing economic losses caused by flooding, and to ensure water quality.

Mitigate urban heat island effect (11.5)
Intelligent urban planning that creates resilient cities with green living conditions are needed for us to prosper as humans. We need to reduce the number of deaths and affected people and reduce economic losses because of heat.

Ensuring disaster resilience (1.5)
Improving the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters.

Making food production systems sustainable (2.4)
Ensure sustainable food production systems that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality

Mitigate greenhouse gas emissions (13.2)
In order to remain well below the 1,5 degrees temperature rise, urgent climate action is necessary. Carbon dioxide removal is one of the techniques which could contribute to this goal.

[1]Description of the themes presented adapted from: https://www.globalgoals.org/goals

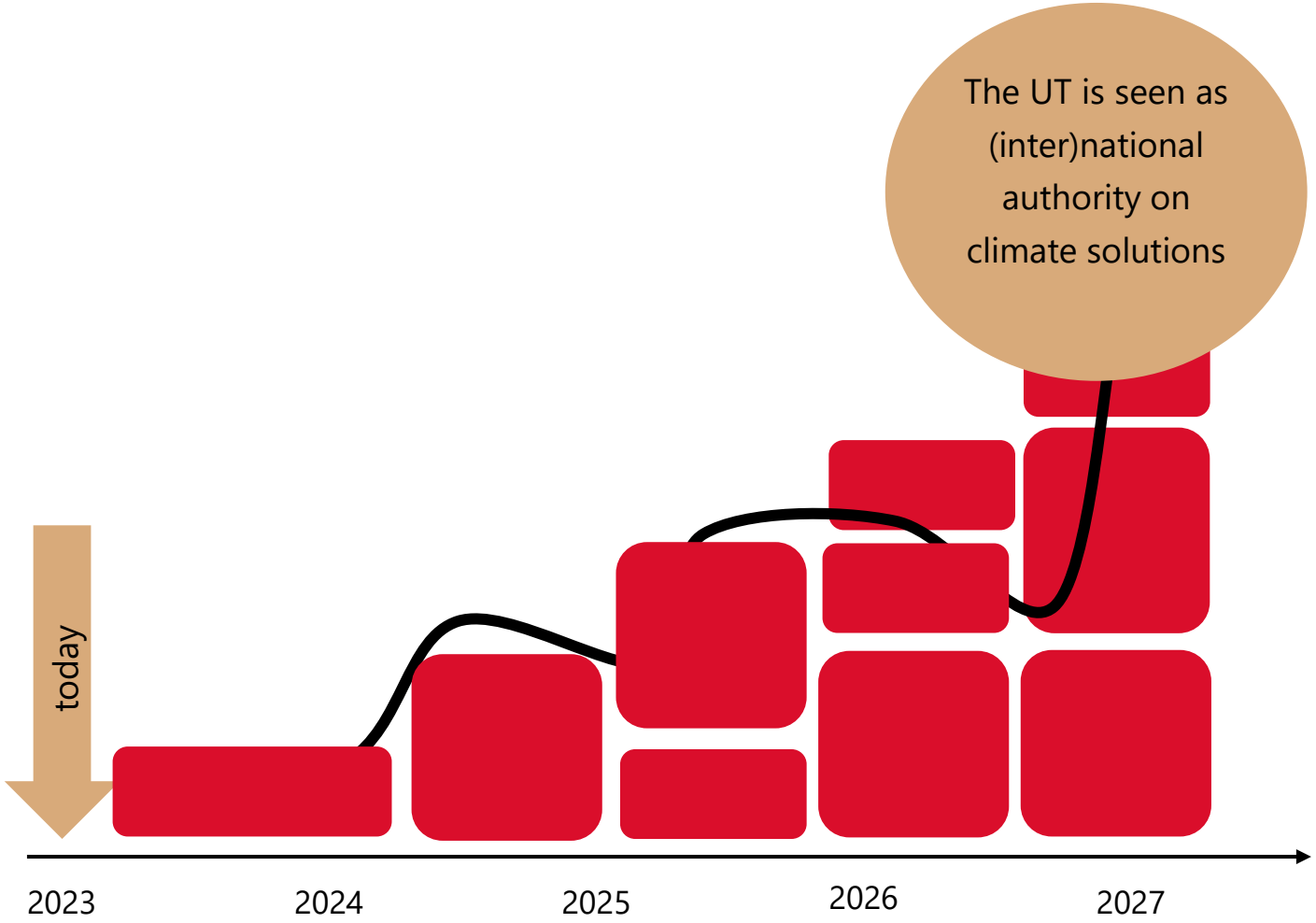
4. Building blocks

Building blocks to achieve UT's ambition

In the coming five years, the UT has the ambition to be seen as an international and national authority on solutions for climate change.

The question that lies ahead is how the UT can shape its organization so this ambition can be met. Based on the interviews, we have identified several 'building blocks.' These building blocks can be used to specify and prioritize what actions the UT should undertake to increase the impact of its climate education and research.

The next couple of slides provide more detail on the seven building blocks that we have identified, based on the interviews and focus groups.



Building blocks (1/4)

Educational programmes

Education on the topic of climate is of great value. Society is in need of professionals who can lead the energy and resource transition, and universities can educate the people who can. The topic attracts current and prospective students, and by investing in educational programmes the university remains its societal relevancy. It is a way not only to communicate expertise to students, but also commitment. An example of a master's programme is *Sustainable Energy Technology*, a two year programme focussing on the energy transition. Besides full-time programmes, there are also many examples of relevant courses on this topic, such as: *Technology, Globalisation and the Environment*, *Solar Energy* and *Sustainable Civil Engineering*.

There is more potential than is currently put to practice, however. During the interviews and focus groups participants mentioned the following methods of investing in climate related education:

- **Bachelor and master programmes:** Setting up new bachelor's and master's programmes, either based on existing courses from different, existing programmes or from scratch;
- **Minor programmes or certificates:** Setting up a climate minor or certificate for bachelor students;
- **Learning goals:** Integrating climate learning goals in all bachelor and master programmes;
- **Lifelong learning**: Setting up Lifelong Learning programmes, to reskill and upskill the workforce.

In addition, investing in educational programmes has two side-effects that are beneficial to the initiative:

- Interdisciplinary programmes bring colleagues from different disciplines together to collaborate. They get to know each other and each other's expertise, which can lead to collaboration in research proposals as well.
- Communicating about education programmes contributes to UT's profile externally. This attracts prospective students and colleagues who are interested in or have expertise on climate-related topics, strengthening the initiative within the organisation.

Building Blocks (2/4)

Research support

Besides the importance of strong monodisciplines, the topic of climate change asks for collaboration across faculties. In many cases this already takes place, researchers are able to find one another. However, the shared view is that there is unused potential. Participants of the interviews and focus groups mentioned the following methods to stimulate cross-faculty collaboration:

- **Seed money** for climate research in which multiple disciplines or faculties are involved in, such as PhD-projects;
- **Facilitating research proposals** by offering assistance in writing and coordinating;
- **Facilitating interdisciplinary research** by offering programme managers for large research projects that have been granted;

The shared view is that these interventions are **temporary** measures, with the aim of establishing a substantive network of climate researchers. Once these connections are made and strong coalitions are built, these collaborations are able to attract external funding without (financial) incentives from the UT.

Grants office

The UT is fortunate to have a Grant Office as part of the current organisation. The existing grant office can play an important role in further developing the climate initiative, internally and externally:

- Internally, by alerting researchers to opportunities for funding. This task must be clearly designated to the grants office, in combination with a clear overview of the relevant researchers. (Also see building block 'network')
- Externally, by representing the UT climate narrative towards international and national funding initiatives, such as Groeifonds and Klimaatonderzoek Initiatief Nederland.

Building blocks (3/4)

Communication

In the current situation there is already a lot of climate related education and research taking place at the UT. It is just not clearly visible.
By choosing for a thematic focus and consciously showing what the UT does in internal and external communication, the theme can be positioned more strongly.

Extra attention may be paid to the modesty of the UT. In many interviews it was stated that UT naturally takes on a 'serving' role instead of a leading one, and that this can hinder the UT's profile on climate. The UT does not have to be careful of its high ambitions; given the complexity of the multidisciplinary issues that the university works on in the field of climate, an outspoken high ambition is appropriate.

External network

As elaborated on the first chapter, climate change can be seen as wicked problem. The complexity makes that universities have a unique position in contributing to its solutions. Not only through a interdisciplinary approach, in which disciplinary boundaries are crossed. But in a transdisciplinary approach, in which sectorial boundaries are also crossed. Only this way it will be possible to develop integrated knowledge for science and society.

In order to develop this type of integrated knowledge, the university must be in touch with society. An extensive external network, existing of governmental organisations, entrepreneurs and other societal actors is vital. Regional, national and international actors are relevant for the UT. Existing collaborations, such as with VU Amsterdam and the region of Zwolle can be enhanced or expanded on through the Climate initiative.

Currently several research disciplines are well connected with the relevant societal actors. In many cases, however, it is very dependent on the personal relations of a specific person. The ideal leader(s) of the climate initiative at the UT, are people that have, or are able to build, an extensive external network.

Building blocks (4/4)

Community

Organizing activities contributes to community building and internal leadership. This can take place on general or on specific topics. It makes people feel involved, the network comes to life. Simple interventions can make a great difference, such as:

- **Activities:** either related to the subject matter (such as conferences, symposia) or social activities (lunch meeting of drinks) can be a way for colleagues to get involved.
- **Information:** in the form of newsletters or items on the UT's intranet.

Coordination

Forming and maintaining a network takes time and attention. What researchers conduct relevant research for the theme, and does he/she know where to find other relevant researchers? There is a need for

- **A point of contact** where developments can come together, both externally and internally. This can be one or multiple people; liasons within faculties or sub-themes can be appointed.
- **Further development of the thematic focus.** Climate research at the UT is in development, and – especially with the interventions consisting of these building blocks – the theme will continue to evolve the coming years. The organisation needs to take charge of the thematic focus and to steer in the direction the UT wants to go.

From building blocks to type of organisation

The building blocks in the previous 4 slides can be seen as activities or interventions the UT can initiate to achieve its ambition. Depending on how ambitious an organisation is, more or fewer building blocks can be implemented.

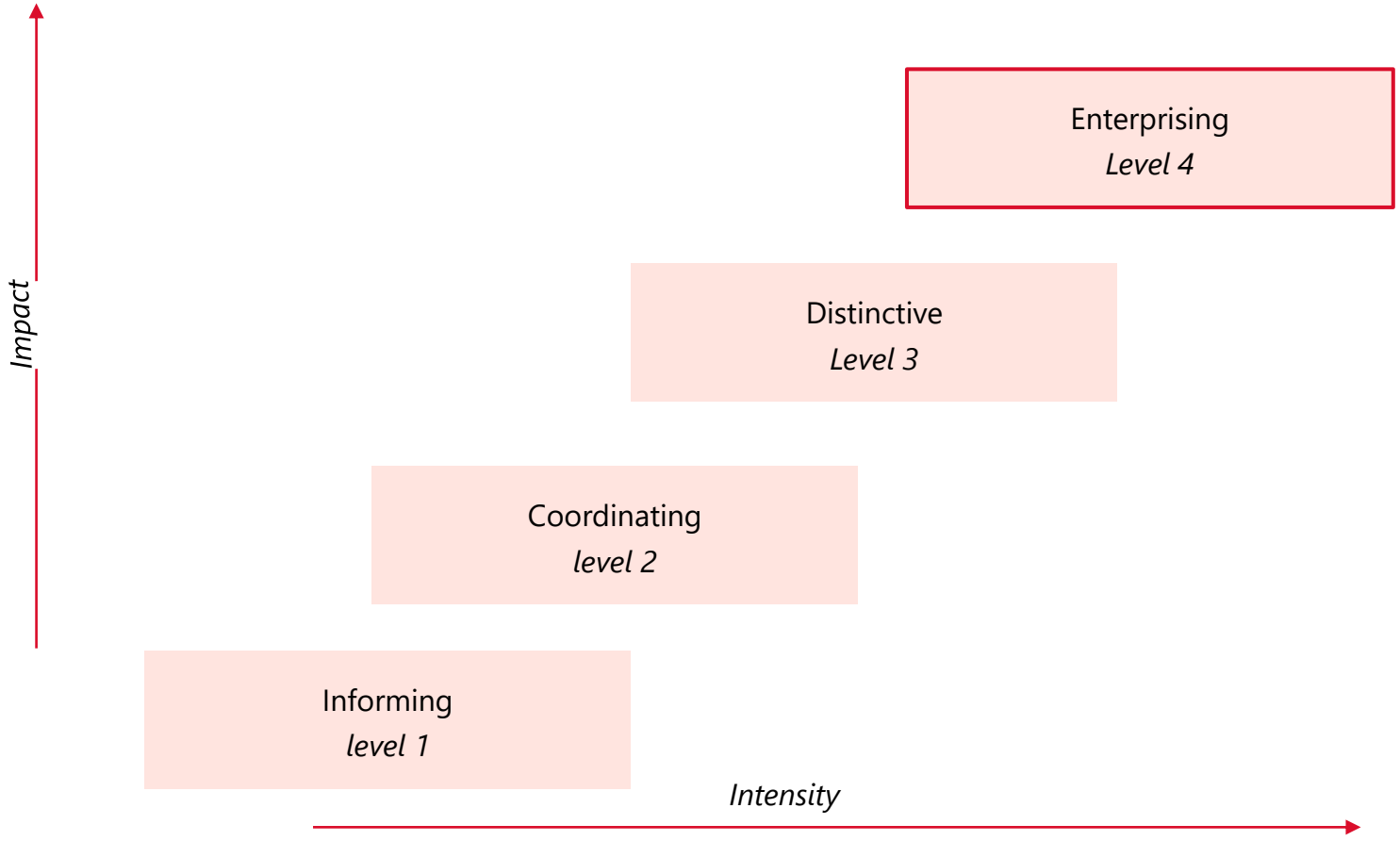
If the UT is serious about its ambition to become an international and national authority on climate solutions, we advice the UT to implement all seven building blocks. In the following chapter we explain why all seven building blocks are essential and what type of organisation is fitting for this ambition.

5. Types of organisation

Different types of organisations

Organisations can differ in various ways. One perspective to look at them is through a perspective of intensity and impact. The more intense an organisation is, the larger the impact ranging from an 'informing' organisation (level 1), to an 'enterprising' organisation (level 4).

We advice the UT to choose for an enterprising organisation. In the next couple of slides we argue why.



Types of organisation

Type of organisation	Ambition	Governance	Finance	Employed
Enterprising organisation *Level 4*	• Investments and risks are taken on collectively. • Positioning of UT is done collectively, and is of strategic importance: the UT is seen as an (inter)national authority on climate solutions. • Permanent implementation of mission and ambition	• Scientific director is part of strategic decision-making processes of UT. • Organisation is housed at the coordinating faculty.	• Financing for coordinating and support staff. • Scientific staff is employed by faculties. • Funding (seed money) is available for specific research- and educational programmes.	5-10 fte • Scientific director • Operational director • Community support • Business relation manager • Grant officer • Communication advisor • Financial controller
Distinctive organisation *Level 3*	• Positioning of UT is done collectively, and is of strategic importance: the UT is seen as an (inter)national authority on climate solutions. • Permanent implementation of mission and ambition	• No representation in strategic decision-making process • Organisation is housed at coordinating faculty or Strategic Business Development (SBD)	• Financing for coordinating and support staff. • Scientific staff is employed by faculties. • Option: Funding (seed money) is available for specific research- and educational programmes.	3-5 fte • Scientific director • Communication advisor • Financial controller
Coordinating organisation *Level 2*	• Visibility and coordination of existing initiatives. • Implementation of temporary mission and ambition.	• Temporary organisational structure (approximately 2 years), afterwards organisation is housed at faculty. • No representation in strategic decision-making process	• Similar to level 3	1-3 fte • Programme manager • Communication advisor
Informing organisation *Level 1*	• Coordination of existing initiatives.	• No formal organisational structure, participation is voluntary.	• None	• None

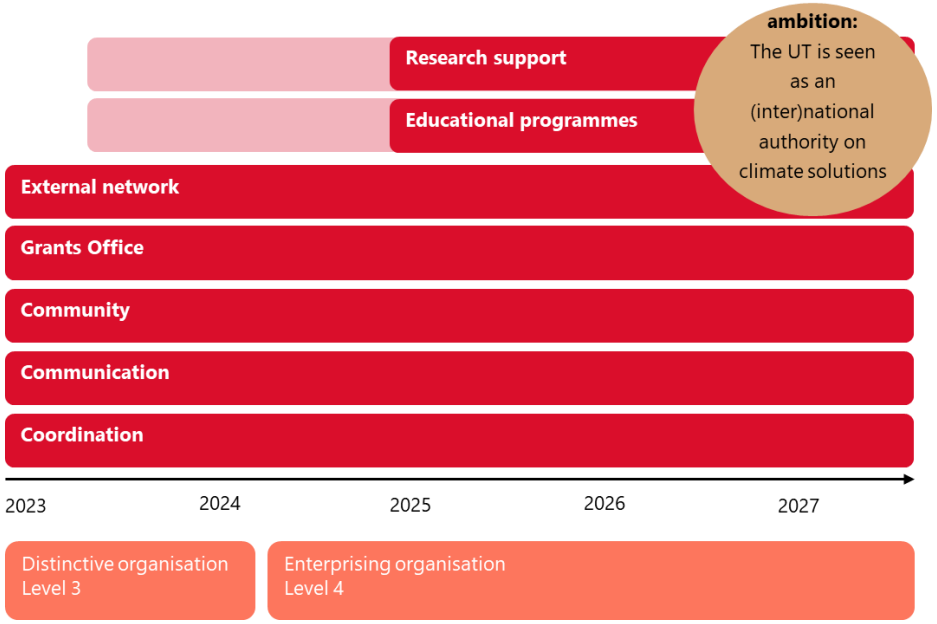
Enterprising organisation would fit UT's ambition

Enterprising organisation
Considering the large impact the UT wishes to make with this initiative, the initiative needs to be matched by an organisation in intensity. *If* the UT is serious about its ambition to become an international and national authority on climate solutions, an enterprising organisation (level 4) would be fitting, and necessary to achieve this aim.

Collective positioning and strategic representation
The reason is that the ambition set by the UT asks for collective positioning of the UT on the topic of climate. In addition, it also asks for representation at the strategic decision-making level. While the first (collective positioning) is also done within a distinctive organisation (level 3), the latter (strategic representation) is *only* accomplished in a an enterprising organisation.

All seven building blocks are necessary
An enterprising organisation is high in impact, and also relatively high in intensity. It is for this reason that we argue all seven building blocks are necessary blocks. The questions is not so much whether a building block should be put to use, the question is in what order you want to apply them. In the following slides we present three possible scenarios.

Scenario 2 most favourable
In the next three slides we give an overview of three different scenarios. From our perspective scenario 2 is the best fit scenario for the UT. The organisation is agile in the beginning, and gets the chance to grow of time.



Scenario 1

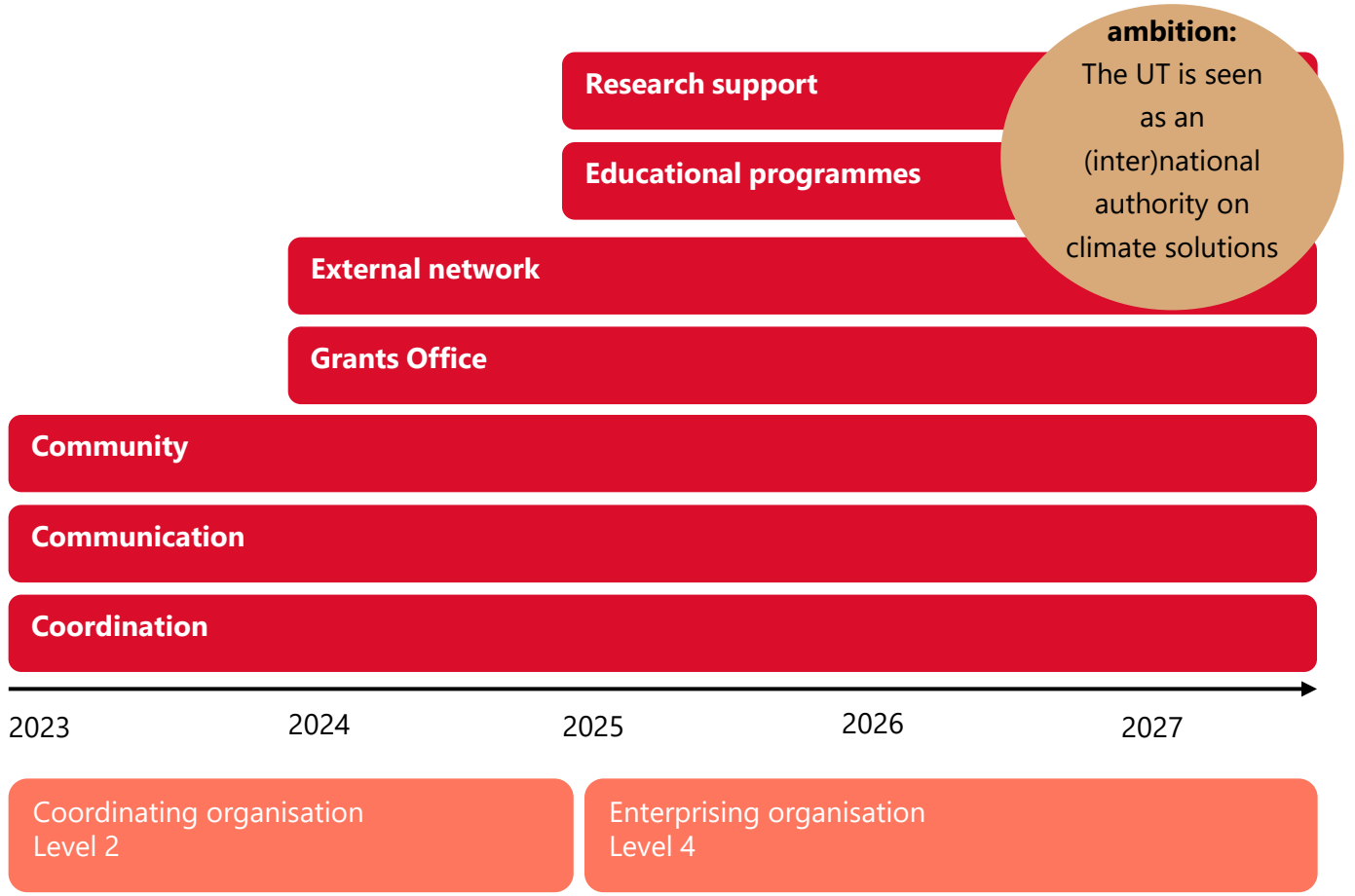
In the first scenario building blocks are applied over time; the organisation grows. It consolidates several tasks first, before it takes on new tasks. The organisation starts off with about 1-3 fte in the first two years, and grows to an organisation with around 5-10 fte in two years.

Advantages:

- Organisation gets the chance to grow over time and prove itself.
- Community, coordination, and communication are relatively easy interventions with a relatively large impact. This so called 'low hanging fruit' is started first. The more complex interventions follow later.

Disadvantages:

- Compared to the other scenario's it takes a relatively long time build the collaboration.
- The start might be interpreted as hesitant, and can be confused with lack of ambition.



Scenario 2

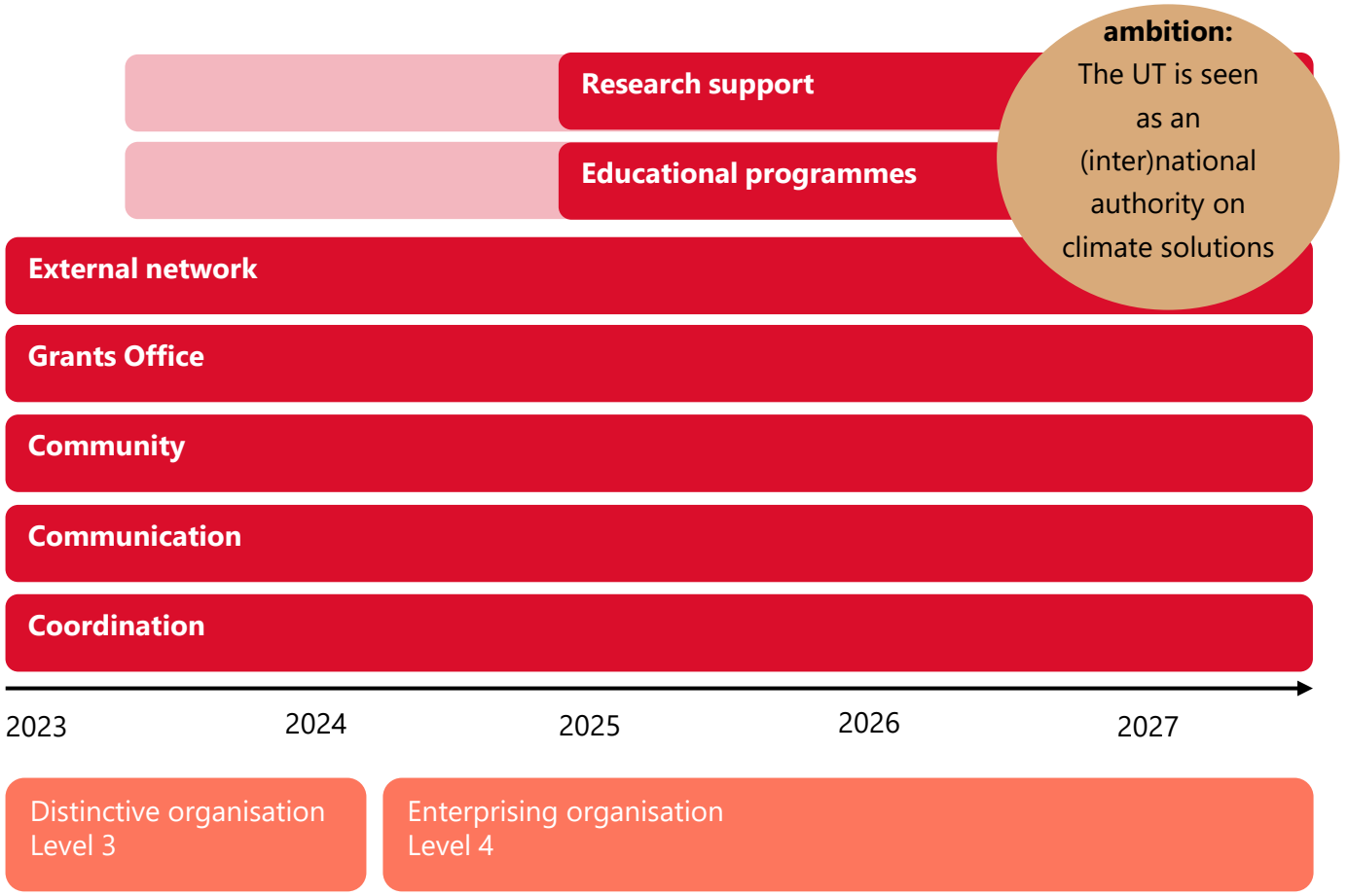
The second scenario takes on more tasks from the beginning, but still focusses on the relatively 'easy' tasks in the from the start. Activities concerning research support and educational programmes are *initiated* in the first 6-12 months, so that the programmes are *actually running* after the second year. We see this as the scenario that fits the current context of the UT best.

Advantages:

- Organisation is agile and flexible from the beginning because there are more 'building blocks' from the beginning. The organisation can 'ride the waves' that give most energy.
- Organisation still gets the chance to grow over time and prove itself.
- Community, coordination, and communication are relatively easy interventions with large relatively large impact. This so called 'low hanging fruit' is started first.
- Facilitating activities in the primary tasks of the university (research and education) are implemented earlier.

Disadvantages:

- A more intense organisation can achieve more impact, but also asks for more resources during the beginning.



Scenario 3

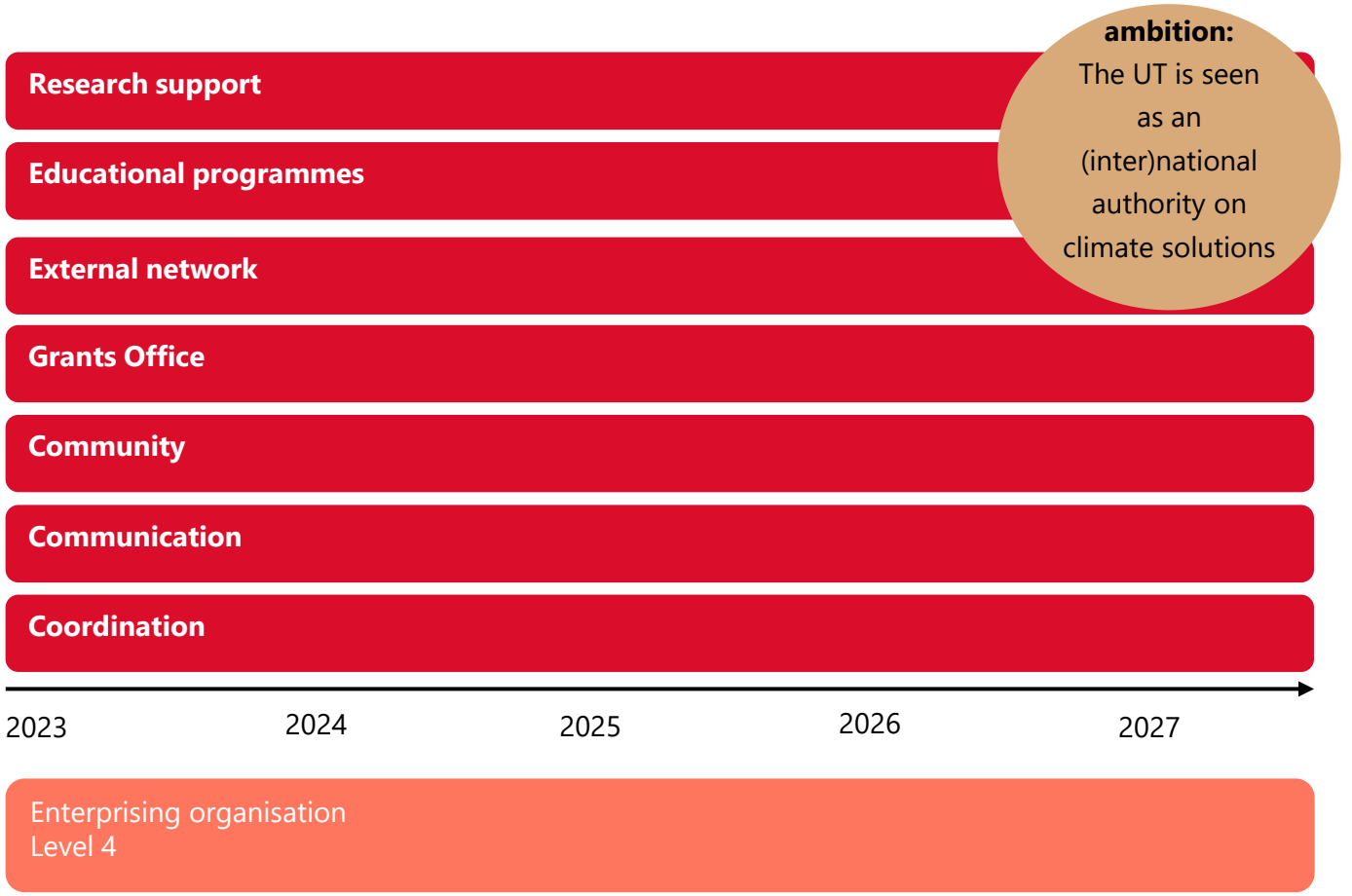
In the third scenario all building blocks are applied from the start on.

Advantages:

- The organisation and commitment speaks for itself; the university is clear on its ambition.

Disadvantages:

- All activities are started from the beginning, while some are more effective if others are established first (e.g. research support is more effective when there is a clear community, that can be reached through communication)
- Compared to the other two scenario's, more financial investments are necessary straight from the start.
- In the current labour market it might be challenging to find enough staff members in a short period of time.



Appendix

Annex A: Exposure of other Dutch universities on climate change (1)

In the table on the next slides an overview is given of publicly financed universities in the Netherlands and their exposure/expertise on the topic of climate change. This is based on a scan of their websites, with a greater focus on the technical universities. The University of Twente itself is excluded and so are the theological universities and university of humanistic studies.

It seems that Delft University of Technology is especially focussed on branding itself as a university that works on climate change. There is climate change institute, experiments on campus, a special part of the website is contributed to the topic. Within setting up the cooperation and communication on climate change for the UT this is an interesting example to look at.

University	Findings
Delft University of Technology	TU Delft's mission is to contribute significantly to a sustainable society for the twenty-first century by conducting ground-breaking scientific and technological research. In their strategic priorities document they make strategical choices of scientific themes (amongst others Climate Action, Energy transition, Health & Care, Digital Society and Urbanizaton & Mobility) and living labs. A whole section of the website is focussed at sustainability. Their Rector Magnificus expressed his wish to make TU Delft the world's climate university. For this they use their own campus as a living lab. There is a specific Climate Institute with a vision on climate action and an action programme. Their research focusses on: • Climate Science (monitoring and modelling to identify what is happening with the climate) • Climate Change Mitigation (what action can we (still) take in order to combat climate change?) • Climate Change Adaptation (how can we adapt to a changing climate?) and • Climate Governance (what can we do to support politics and society in taking climate measures?). The university uses these overarching themes as the basis for their recruitment of additional academics to work on climate solutions as part of seven so-called flagship research programmes. This includes regional monitoring and modelling of climate change, climate engineering, negative emissions, circularity, tackling urban heat and flood protection. There is a team working on implementing sustainability in the different educational programme types. 'A TU Delft graduate is therefore competent to implement gained skills and knowledge into their engineering practices and subsequently contribute to climate action.' Furthermore they aim to set up a climate action hub to support leaders, policymakers and industry.

Annex A: Exposure of other Dutch universities on climate change (2)

The other technical universities also work on the topic. The way the University of Eindhoven is connected to the relevant industries is something that might be considered when looking into the network of the UT climate education and research. Furthermore the WUR very much highlights their focus on implementing nature based solutions. Taking a clear stance on focus topics helps to sharpen the profile.

University	Findings
Eindhoven University of Technology	The university educates students and advances knowledge in science & technology for the benefit of humanity. Their campus is in the centre of technology hub: Brainport Eindhoven. They mention they globally stand out when it comes to collaborating with advanced industries (forming an ecosystem). One third of their professors has a joint assignment in industry. Their aim is to improve quality of life through sustainable innovations. The University Fund has the ambition to contribute to the solutions for societal issues. Their strategic research areas are: Energy, Smart Mobility and Health. Their education is aimed at tackling social challenges through technical innovations through challenge based learning.
Wageningen University and Research	The research and education of WUR focuses on five themes: • Climate Change, • Biodiversity, • Feeding the World, • Circular Economy and • Healthy Food & Living. The (sixth) theme Artificial intelligence runs like a thread through all the themes. On the topic of climate change they focus on the impacts on society and ecosystems, and develop evidence-based, integrated solutions and technology: the Wageningen Climate Solutions. With Wageningen Climate Solutions WUR aims to co-create opportunities to improve the local quality of life. Their approach is an interdisciplinary way of tackling challenges and furthermore they have a strong focus on implementing Nature Based Solutions.

Annex A: Exposure of other Dutch universities on climate change (3)

Also the non-technical universities express interest in the topic of climate change or sustainability in general. For example the Utrecht university seems to also combine alpha and beta fields. For climate it takes up a specific focus on delta's.

University	Findings
Utrecht University	This university uses the motto: 'With open minds, open attitudes and open science, we join forces to create tomorrow's solutions.' Their strategic themes are: Dynamics of Youth, Institutions for Open Societies, Life Sciences and Pathways to Sustainability. In the last one researchers from the humanities, social and natural sciences work together with external partners to develop a more sustainable society. Specific focus areas relevant to climate change are (amongst others): • Energy in transition, • Transforming cities, • Sustainable ocean, • Critical pathways, circular • Economy and water, • Climate & future deltas. • In research and teaching the university wants to give direction to necessary transformations therefore focussing on contributing to the sustainable development goals.
University of Groningen	This university connects education and research with sustainable and economic processes within society. There are three spearheads: • Energy, • Healthy Ageing • Sustainable Society. The university develops a changing stream of projects in which academic knowledge is being developed, and used to improve policy development and decision making. Looking at climate change their focus is on examining (polar) climate change and its associated impacts by using state-of-the-art global climate models and earth system models as well as relevant observations. Their main focus is on understanding the processes and feedbacks that govern climate change that are related to mean changes as well as to climate variability and extremes.

Annex A: Exposure of other Dutch universities on climate change (4)

University	Findings
Tilburg University	Tilburg University focusses at studying and understanding society contributing to solving complex societal issues. They do so by using state-of-the-art knowledge in the disciplines of economics, business studies, and entrepreneurship, the social and behavioural sciences, law and public governance, the humanities and digital sciences, and theology. Although probably part of research and education there does not seem to be a specific focus on climate change.
Maastricht University	Maastricht University research is focused on three themes: Quality of Life, Learning and Innovation and Europe and a Globalising World. Climate change is one of the focus topics under these themes. There seems to be a focus on the legal aspects of climate change.
Radboud University	Combining various scientific disciplines allows this university to delve into multidisciplinary and interdisciplinary research. Their research is focused on the complex issues of today and tomorrow. One of their focus topics is sustainability. Here they look at how products, technology and human actions impact the natural world. Topics mentioned on the website are (amongst others) climate policy, ethics of sustainability, impact of humans on biodiversity, environmental law.
University of Amsterdam	The University of Amsterdam's research is oriented towards building a sustainable, fair, and healthy future through innovative research that examines complex societal challenges. There are interfaculty research priority areas. These have the aim of stimulating innovation at the UvA by bringing together various disciplines from across faculty boundaries. A priority related to climate change is: Energy transition through the lens of the SDGs.

Annex A: Exposure of other Dutch universities on climate change (5)

University	Findings
Erasmus University Rotterdam	The universities research focusses on initiatives around: Dynamics of Inclusive Prosperity, Smarter Choices for Better Health, Vital Cities and Citizens, Societal Impact of AI. When looking at climate change in education this focusses on critical social, economic and governance dimensions.
Leiden University	Sustainability is broadly implemented in education. Research-wise there is Liveable Planet – Sustainable Futures an interdisciplinary research programme that is dedicated to climate change. Their aim is moving towards a society in which energy and raw materials are used in a way that preserves natural capital and keeps the impact on health to a minimum. Research focusses on how natural and economic ecosystems function and their impact on health and natural capital. Furthermore they look at how social drivers affect the human ecosystem and explore new types of government policies and transition management for sustainability.
Open University	The research of the Open University is rooted within their six faculties. Apart from the disciplinary research programmes in eight academic fields, they have defined a multidisciplinary research programme: Innovating for Resilience. This consists of three research lines: Safety and Resiliency in Urban Environments, Learning and Innovation in Resilient Systems, Innovation in education. Focusing on climate change they do from both natural and social science perspectives. They study technical and policy options for mitigating and adapting to climate change.
VU University (Vrije Universiteit Amsterdam)	This university uses their expertise, open mindedness, enterprising spirit and multidisciplinary approach, thereby working on developing sustainable solutions that impact society. There are four profile themes: Connected World, Governance for Society, Human Health and Life Sciences, and Science for Sustainability. Under the last profile theme, scientists and students from VU Amsterdam are studying how they can create an ecologically healthy, socially just and economically viable world.

Bij TwynstraGudde werken adviseurs en managers aan veel van de grote en urgente thema's van deze tijd. Denk aan veiligheid, energie, klimaat, digitalisering, mobiliteit, duurzaamheid, financiën en gezondheid. We bieden onze opdrachtgevers binnen zowel de overheid als het bedrijfsleven unieke, werkbare oplossingen en brengen complexe projecten en programma's tot een goed einde. Iets creëren van blijvende waarde, daar gaan we voor. Daardoor hebben we een directe impact op (toekomstige) maatschappelijke en economische ontwikkelingen. En dus een grote impact op morgen.

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TwynstraGudde

Impact op morgen.