

Dutch Climate Research Initiative (KIN)

Advisory report for the Executive Boards
of NWO and KNAW



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Climate Research Task Force
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Foreword

Climate change is one of the greatest challenges facing our society. The implications of climate change are becoming increasingly evident, also in the Netherlands. Science can play a crucial role in devising strategies to mitigate climate change and improve society's preparedness for tackling its consequences. We were therefore delighted when the Royal Academy of Arts and Sciences (KNAW) and the Dutch Research Council (NWO) asked us to draft a report with advice on the design of a Dutch Climate Research Initiative.

Climate change is a fact. It is quite clear what its consequences will be and how we can mitigate the risks of climate change. In its most recent assessment report ([AR6](#)), the UN's Intergovernmental Panel on Climate Change (IPCC) could no longer ignore the fact that climate change is irrefutably caused by human activities. And although some aspects of climate change are not yet fully understood – for example, the relationship between periods of drought in the Netherlands and climate change or the chance of climate tipping points being reached – the real challenge is to link what we know about the climate to our knowledge of societal changes and technological developments. This would enable us to achieve the necessary transitions quickly enough to bring us closer to a climate-neutral and climate-resilient society before it is too late.

Climate neutral

A considerable amount of climate research is conducted in the Netherlands. The existing knowledge is sufficient to meet the targets for emissions and for adaptation up to 2030 (see the policy note from Minister for Climate and Energy Policy Rob Jetten on 2 June 2022). However, it is essential to learn more about how we can create a climate-neutral society by around 2050, during a period when the climate could be changing even more rapidly. The purpose of this advisory report is to survey how we can develop that knowledge.

Above all, we need to learn more about how we can accelerate system transitions. The IPCC has concluded that urgent action is needed in numerous areas and by practically every actor to mitigate the risks of climate change. We also know that this calls for an integral approach, with scientists in all of the relevant disciplines developing and testing strategies together with partners with practical expertise. We can only accomplish this by concentrating our strengths in an unprecedented manner. The speed of action that is required makes it essential to join forces in this way. There is no time to lose if we are to realise the necessary transitions in the coming decades. This report describes how the Dutch Climate Research Initiative (KIN) can achieve these ambitions.

International

System transitions are needed worldwide. They will represent a far greater challenge for developing countries, with their very limited research capacity, than for us, while climate change will generally have a greater impact on those countries. We witness the enormous constraints faced by colleagues in developing countries every day, for example from their contributions to IPCC reports. It was resolved in the Paris Agreement (and in earlier climate agreements) that wealthy countries would help poor countries by collaborating with them in the field of research and technology and with capacity building. In our view, the KIN also has a role to perform in that regard.

The KIN is not a regular research programme, and there is a reason for that. To achieve the ambitions of the KIN, science itself has to change. To be relevant, science must be more supportive of society and deliver results far more quickly. This means that rather than focusing mainly on producing scientifically interesting results, what is crucial is the impact that the research has for society. This conclusion forms the basis of this report and has important implications for how the research should be carried out. For example, although competition in science can improve the quality of research, it can also slow the pace of knowledge creation. In a competitive environment, a lot of research that is urgently needed to advance a system transition will not be funded. The urgency of climate change leaves us with too little time to perfect the selection of research proposals. We have to make an immediate start with the abundance of high-class research that the Netherlands has to offer. What is required is intensive collaboration rather than competition.

Unity

The enormous unity and speed with which the members of the Climate Research Task Force (including its sub-task forces)¹ wrote this report are testimony to the level of support for this form of collaboration and the shared sense of urgency. We are grateful to NWO and KNAW for their professional and dedicated support for the drafting of this report.

We can still avert the most serious irreversible effects of climate change, but only if we join forces and scientists and relevant actors in society collaborate intensively in realising system transitions. A Dutch Climate Research Initiative is essential in that respect.

*Heleen de Coninck, Gerard van der Steenhoven and Linda Steg
(Chairpersons, Climate Research Task Force)*

¹ See appendix 2 for the composition and the working methods of the task force and the three sub-task forces



Summary

The consequences of climate change are already being felt and will only become worse in the future, but some can still be prevented. According to the UN's Intergovernmental Panel on Climate Change (IPCC), accelerated transitions in our economic and societal systems (such as food, energy and cities) are needed to limit global warming to a 'safe' margin of 1.5°C, to adapt society to the inevitable consequences of climate change and to remain within the planetary boundaries.

System transitions of this nature demand joint action by governments, citizens, companies and a wide range of other societal actors. More targeted research is needed to learn how we can improve the current and prospective actions of those parties. System transitions are complex and require integral knowledge development and close collaboration between knowledge institutions, governments and other stakeholders in society, but the linkage between these parties is currently limited.

The mission of the Dutch Climate Research Initiative (KIN) is to connect, deepen and expand climate-related research in the Netherlands with a view to accelerating system transitions, in collaboration with societal actors. That also requires a system change in research itself. The KIN will therefore be a mission-driven, non-competitive programme as part of wider societal change. The programme will follow three pathways:

1 A national programme of integral climate research

The KIN Programme will link and integrate the research in relevant branches of science at Dutch research institutions and will pursue four lines of research designed to accelerate system transitions: (a) collaboration with societal actors in 'living labs' on various scales; (b) research initiated bottom-up by societal and/or scientific actors; (c) interdisciplinary, cross-system research initiated top-down: analyses designed to help find answers for urgent policy issues on different scales; and (d) international collaboration with developing countries for capacity building in relation to policy, research and technology.

2 A national pact for climate research (the KIN Pact)

A national pact for climate research (the KIN Pact) to highlight the activities of the principal Dutch actors in the field of climate and in which they will jointly generate new climate-related knowledge and applications of that knowledge to accelerate the necessary system transitions. The KIN Pact will embrace knowledge institutions and

societal partners, such as government bodies, NGOs, companies and foundations, who will raise relevant issues for which science can provide answers and ensure that knowledge flows better and faster into practice and policy.

3 **A national centre**

The KIN Centre will coordinate and provide support for the KIN Programme and the KIN Pact. The KIN Centre will bring together researchers, stakeholders and the results of the KIN Programme, for example by organising symposia, workshops and discussion evenings for members of the KIN Pact, and ensure that the ideas expressed at those events are picked up by researchers.

This report recommends further elaboration of the structure of the KIN, seeking approval and financing from the relevant ministries, holding further consultations with the managements of the knowledge institutions and other stakeholders, and, given the urgency of the system transitions, starting first and without delay with the implementation of the KIN Programme.



1

Background, pretext and embedding

Climate change is one of the biggest threats to the health and well-being of humans and the natural balance of our planet. Sea levels are rising; heat waves occur more frequently and are hotter; and droughts and flooding are more extreme than in the pre-industrial age. Examples of these phenomena include unprecedented heat waves in India and Canada and the extreme rainfall, widespread and over a lengthy period, which had dramatic consequences in Germany and Belgium, and to a lesser extent in the province of Limburg in the Netherlands, in the summer of 2021. In addition, future food security and access to fresh water are increasingly threatened worldwide. Adaptation and mitigation measures are being taken, but at a pace and on a scale that is far from sufficient to properly address the climate crisis. A swifter response, with more radical measures that lead to system changes, is needed to limit climate change and to implement adaptation measures in time.

Interconnectedness

In addition to climate change, we are also confronted with the loss of biodiversity and crises in agriculture and water supply, which are also largely a consequence of how we currently treat the earth and its natural resources. These are not isolated crises; they are interconnected and impact on each other. Consequently, solutions for one crisis can often lead to problems in other domains and sectors or to greater problems later on. It is therefore no longer enough to resolve a specific problem or to focus on the short term. We need to produce solutions that create the possibility of accelerating system transitions on the basis of the relationships between the sectors and domains. We have to find integral solutions for all of these urgent problems in both the short and the longer term.

Bringing about these societal changes calls for a new type of research that connects knowledge from different scientific disciplines and that is closely linked to practice. The KIN will define, implement and stimulate this mission-driven research, in association with all the knowledge institutions in the Netherlands and in close collaboration with stakeholders in the field.

Mission-driven research into system transitions – the need

Derk Loorbach
Professor of Socio-Economic Transitions

In many respects, Dutch society is not yet equipped to make a genuine transition. Whether it concerns agriculture, urban planning or mobility, society does not yet seem to fully grasp the need for fundamental change. For agriculture, it could mean having to use farmland differently, ending greenhouse horticulture and drastically reducing our meat consumption. The housing sector would have to terminate using concrete as a building material and switch to building with wood. It is no longer sustainable for everyone to own their own car, which will inevitably have consequences for the use of the public space. The government itself will also need to reconsider its policies, for example with a rethink of the tax system. In other words, planning for climate change will involve thinking about a new way of organising society.

A different type of research

The urgency of the problems and the radical solutions required in numerous domains not only demand a different type of research, but also a new research method: mission-driven climate research,² whose primary objective is to generate knowledge that contributes directly to accelerating the necessary transitions in society. The aim of this mission-driven climate research would be to deliver new insights for innovative action perspectives and to have an impact outside the academic world. It therefore calls for intensive collaboration among scientists and between scientists and various societal partners.

Climate research has already yielded considerable understanding of the climate system and the consequences of climate change and findings that help in identifying and developing solutions for mitigating or adapting to the effects of climate change. Climate research is conducted at numerous locations in the Netherlands, and also often in an international context in broad consortia. Up to now, however, the research has usually focused on a single aspect of climate-related problems (a particular sector or region, for example), has often been conducted by scientists with little input from societal actors, and has generally failed to take account of relationships with other societal issues (such as the nitrogen crisis, biodiversity, well-being and justice).

² By climate research we mean climate-related research in the widest sense, including research into the climate, the consequences of climate change and measures to mitigate the risks of climate change, for example through changes in standards, values, behaviour, financial and economic systems, regulations, institutions, infrastructure and technology.

Systemically embedded

There is still not enough of a systemic approach, in which the various aspects of the climate challenge are studied in relation to each other and taking account of the challenges faced by developing countries. There have also been few recent initiatives at the international level.³ The climate crisis has to be addressed with more integrated and systemically-embedded research that (a) focuses on accelerating system transitions towards a climate-neutral and climate-resilient society, (b) links various domains, disciplines and knowledge institutions, (c) further deepens and expands knowledge, and (d) is carried out in collaboration with societal partners.

Mission-driven research into system transitions – an example

Jan-Willem Erisman
Professor of Environmental Sustainability

The principles currently adopted to address the nitrogen problem will ultimately prove unsustainable. Of course nature has to be protected, also with a view to curbing climate change, but that will not be accomplished solely by buying up and reducing the value of land. A far better option would be to reform agriculture in such a way as to increase its added value for society. Since it is not immediately obvious precisely how that should be done, finding an answer will require various scientific disciplines working together and learning from how problems are tackled. What is needed, above all, is a systemic vision instead of a process of incident management. Only genuine collaboration between sectors and the spontaneous sharing of knowledge from various scientific disciplines can produce a structural and future-proof solution.

Time is pressing for 'next-level' climate research that consolidates, deepens and broadens all the climate-relevant knowledge in the Netherlands and identifies the system transitions that are needed and how they can be accelerated in collaboration with practical experts in the field: mission-driven research whose primary objective is to generate knowledge that makes a direct contribution to accelerating the necessary transitions. But where to start?

³ One example from Sweden is the '[Knowledge for Climate Transformation](#)' programme, the aim of which is to provide knowledge for a transformation of society that addresses climate challenges through rapid emission reductions, robust climate change adaptation and climate action that leads to long-term sustainable development for everyone.

Broad consultation

Accordingly, KNAW and NWO decided, after broad consultations with the academic world, to establish a Climate Research Task Force, consisting of 23 scientists from various backgrounds. The task force was asked to investigate how Dutch climate researchers in every discipline could join forces to pursue a joint agenda of integral climate research. The task force was also asked to explore how existing knowledge and expertise could be harnessed more effectively to tackle the climate crisis.

In writing its advice, the task force considered not only what climate-related research is needed (a research programme), but also how knowledge institutions and other stakeholders could be engaged in the research (a pact) and how the research could be coordinated (a centre). In other words, this report discusses the KIN in terms of three components:

- **KIN Programme**

A national programme of integral climate research designed to promote and facilitate the integration of relevant domains of science, policy and practice, resulting in innovative research with substantial societal impact (3.1).

- **KIN Pact**

A national pact for climate knowledge, designed to highlight the activities of the most important Dutch actors in the field of climate and to foster the joint development of new climate-related knowledge and applications of that knowledge with a view to accelerating the necessary system transitions (3.2).

- **KIN Centre**

A national centre of integrated climate research of international repute, where Dutch knowledge institutions and other organisations will combine their resources in relation to climate-related research (3.3).

This advisory report is the result of an intensive cycle of discussions conducted over a period of three months.

4 The term 'task force' in this report each time refers to all members of the task force, including members of the three sub-task forces (see appendix 2). The complete Terms of Reference in which the assignment for the task force are put down, is to be found in appendix 1.



2

System transitions call for a different type of science

The rapid pace of climate change we are currently experiencing is mainly the result of socio-economic activities based on the use of natural raw materials such as fossil fuels and minerals and land use. These patterns of fossil-based production and consumption are deeply rooted in the culture, structures, working practices and lifestyle of our society. The enormous uncertainties and risks ensuing from climate change can only be mitigated by halting greenhouse gas emissions as quickly as possible and, where possible, reversing the process of climate change by removing CO₂ from the atmosphere. At the same time, adaptation is needed, even with a relatively small increase in temperature of 1.5°C. Improvements to existing solutions and innovations alone will not be enough: we will have to realise system changes to forms of production and consumption that diminish the risks of climate change and promote nature restoration, health, broad welfare and well-being.

Dilemmas

System changes imply that we will have to look differently at the existing problems and solutions. To mention just a few examples: replacing cars that use fossil fuels with electric cars will reduce CO₂ emissions, but will increase demand for raw materials and sustain the pressure on the available space and maintain energy-intensive mobility. Solutions will therefore also have to be found for those problems, such as reducing motorised mobility and devising a new system of spatial planning that reduces the need for it. Employing carbon capture and storage (CCS) in existing industries will reduce CO₂ emissions, but could also slow the industrial transition. Increasing the sustainability of greenhouse horticulture will lead to fewer emissions and less consumption of natural gas, but would preserve an essentially energy-intensive

sector which owed its existence in this country to cheap natural gas. Buying out farmers will not lead to a climate-friendly and climate-resilient food system. Attempts to persuade consumers to buy sustainable products or make sustainable investments will prove ineffectual if no good and affordable sustainable alternatives are available.

Mission-driven research into system transitions – an example

Johan Mackenbach
Professor of Public Health

Many people are unaware that health care accounts for up to 5% of our ecological footprint worldwide. In the Netherlands, the figure is 7%. This refers to the use of buildings and travel, but also, for example, the development and use of medicines. When you look more deeply, it is clear that the indirect impact of health care on the environment in the Netherlands is far greater. Should we, for example, always be willing to perform medical procedures for everyone who requests them? Are we not unintentionally harming the environment by giving unwise nutritional advice? At present, we do not consider these problems in a systematic manner. But we must if we are going to find a solution that is also environmentally sustainable. In other words, we need a long-term vision for the entire sector rather than papering over the cracks with local ad-hoc solutions.

Overarching vision

A great many measures are already being taken to improve our understanding of climate change and its consequences and to prepare ourselves for the necessary transitions in a range of areas that are connected in complex ways. For example, knowledge institutions, governmental agencies, companies, NGOs and citizen initiatives are working hard on transitions in domains such as energy, mobility and agriculture, social innovation, circularity and sustainability, health issues, loss of biodiversity and climate scenarios in order to mitigate negative impacts on nature, humans and society.

What is missing, however, is a link between the various climate initiatives, the development of knowledge and action perspectives for accelerating system transitions and a vision of how we might create possible alternative futures beyond the current political-economic system and its established interests, expectations and needs. That link is needed to understand how we can initiate transitions in all of these areas simultaneously, while in the process ensuring that changes in the various domains will complement rather than conflict with each other.

A new way of thinking

Instigating a movement in which we as a society systematically discover the path to a sustainable and just future calls for a new form of knowledge development. One that focuses on co-creation and whereby we discover how to promote the necessary transitions even as

we are carrying them out. That in turn demands new ways of thinking and acting, also on the part of the knowledge community and its partners. The pooling of resources and the exploration of new forms of collaboration and transdisciplinary approaches to research are urgently needed.

A paradigm that prevents a genuinely systemic approach is the tendency to think in terms of sectors and disciplines, since that mindset conceals the enormous complexity of the dependencies between different transitions. For example, a systems approach recognises the connection between issues such as climate change, loss of biodiversity and environmental pollution and the impact these have on the quality of the biosphere and the health and well-being of humans, also in terms of political, social, and economic inequality. In a systems approach, these closely interrelated issues are fused and investigated, with input from the entire spectrum of disciplines, the broad knowledge field and societal partners, in search of solutions. It is not a static or incremental process, but transformative, dynamic and highly instructive. With this approach, relevant knowledge will be integrated far more effectively, and above all more quickly, into practice, policy and education and thus enhance society's action perspective, and new insights and questions from practice will be quickly addressed and guide the development of knowledge.

Integral development

Transitions imply not only changes in human action and our methods of production, consumption, pricing, regulation and organisation, but also require a different way of practising science and developing and applying knowledge. Monodisciplinary research and technological development will still be necessary, but more is needed. Knowledge will also have to be created in a different, integral manner through collaboration between the various disciplines and together with societal actors, whereby science becomes a part of the changes in society. Transdisciplinarity requires that all of the parties work together in developing and testing solutions, learning from them and further improving them with a view to designing and implementing new, sustainable societal systems.

Destabilisation

At the same time, we have to recognise that this entire process could unfold in a context of growing destabilisation and fragmentation of society: societal transitions are relatively uncontrollable processes. They are intense and proceed in fits and starts, because varying interests, routines and structures prevent us from translating knowledge about sustainability into action. In that sense, the current societal crises are the fruits of years of inadequate steering and failure to properly convert knowledge into the necessary transitions: that is the fault of policy makers, politicians, the business community and the knowledge community itself.

In other words, transitions proceed haltingly, with (unexpected) resistance and setbacks, but they simultaneously offer the possibility of making very large and rapid paradigm shifts. How will we grasp the nitrogen crisis to accelerate the transition to a regenerative food system? How might the conflict in Ukraine lead to an acceleration of the energy transition? How can Covid-19 and the financial crisis in the health-care sector help to bring about the

transition to the concept of positive health? How can the housing crisis lead to a climate-resilient spatial planning system in the Netherlands that is good for biodiversity? And what about other countries that also have to carry out system transitions, in their own context and under their own conditions, but which have minimal research capacity for that purpose? It is essential for science to become more deeply involved, in a more enterprising manner, in designing and co-creating these transitions.

Virgin territory

There are few countries that have built a new national knowledge infrastructure for essential system transitions. On the other hand, there are numerous examples that show how transdisciplinary research can contribute directly to essential changes and how such research can be organised. It sometimes takes the form of applied processes, often with a local or regional character. Living labs, transition arenas, social learning processes, backcasting and reflexive monitoring are just a few examples of methods in which knowledge and research play a role in generating ideas and creating structures for the development of new future perspectives and agendas. At the same time, research can also help in establishing connections between societal actors and in creating a social learning process in which those parties jointly arrive at new ways of thinking and acting.

In the KIN, the principles and mechanisms of transdisciplinarity and co-production will be applied in a structural manner and on the larger scale appropriate for system transitions, and integrated with monodisciplinary and sectoral perspectives that can accelerate the necessary transitions. With the KIN, the task force is explicitly opting for a new approach, which is a crucial addition to existing research and education for accelerating transitions.

Climate neutral

The transition to a climate-neutral society is at the heart of the policy note that Minister for Climate and Energy Policy Rob Jetten sent to the Dutch House of Representatives at the beginning of June 2022. In addition to a number of specific measures aimed at reducing greenhouse gas emissions by 60% by 2030 compared with 1990, the document also refers to the major challenge of making the transition to a totally climate-neutral society in the decades after 2030. In his policy note, Jetten explicitly states that scientific research will be needed to make that transition possible. The KIN approach proposed here answers that need and envisages – as proposed in the policy note – conducting that research in such a way that the major transitions to a climate-neutral society in 2050 (and to a CO₂-neutral society well before that date) are not only technically, but also socially feasible.



Goals and structure of KIN

The KIN's mission is as follows: The KIN connects, deepens and broadens the entire spectrum of climate-related research in the Netherlands, with the aim of accelerating system transitions that mitigate climate change and which prepare society for the effects of climate change, as an element of fair global sustainable development.

This ambition also requires a system change in research itself. The climate research conducted in the Netherlands already encompasses many of the elements described in this report. Thankfully so, since otherwise it would be impossible to achieve the goals quickly enough.

The KIN will build on the existing research, but also add a number of crucial elements:

- the priority is to promote and accelerate the necessary system transitions; accordingly, the research will be expanded. For example, the KIN will not simply answer the question of how quickly sea levels will rise and what we can do about it, but also explicitly address the implications for society and policy. Focusing more closely on these questions in the research programmes will increase the chance of achieving the objective (and accelerating the pace of the transitions);
- there will be a fundamental change of course in the selection and execution of projects (or expansion of existing programmes). There will be no highly competitive calls with low success rates, a process that would lead to a lot of time and energy being wasted, which would in turn mean that a lot of essential research would not be carried out. Instead, the selection process will be based on broad collaboration. The contours and the priorities of this process will be elaborated in collaborative workshops. Quality will be guaranteed by a process of critical review;
- The research is mission-driven: the KIN will bring focus, coherence and connection to the national research on the basis of a single mission – to accelerate system transitions. The KIN will endeavour to facilitate the research projects and remove existing barriers to collaboration with societal partners as far as possible.

To this end, the KIN will follow three interconnected tracks:

- 1 A **national programme** of integral climate research, which will promote and facilitate the integration of relevant scientific disciplines (see section 3.1);
- 2 A **climate pact**, a national pact in which knowledge institutions and societal partners will actively endeavour to jointly develop, share and apply the knowledge required to accelerate the necessary system transitions (see section 3.2);
- 3 A **national centre**, to connect and coordinate the national climate research (see section 3.3).

The KIN Programme will form the basis of innovation in the research and serve as the cornerstone of climate-related research into system transitions. The KIN Programme will be closely connected with and rooted in the Dutch research institutions. The research will be directed from the KIN Centre, which will also link the research with national and international programmes. The KIN Pact will unite all of the parties engaged in climate research, not just research institutions but also societal stakeholders such as governmental agencies, NGOs, financial institutions and companies. The KIN Pact will promote communication between these parties, seek their input (what are the biggest existing problems or challenges and what can science do to address them?) and ensure that knowledge is shared and applied. The KIN Centre will play a crucial role in that respect by organising symposia, workshops, exploratory sessions, discussion evenings and other events for the signatories of the KIN Pact and ensure that ideas emerging from the KIN Pact are picked up by researchers. In other words, the KIN Centre will serve as a central hub, providing support for the KIN Pact and the KIN Programme, bringing together the researchers and stakeholders and consolidating the results of the programme.

This chapter describes the goal and structure of the KIN. After a general description of the various elements of the KIN, they are discussed in more detail in sections 3.1 to 3.3. The final section provides an indication of the necessary budget.

3.1 KIN Programme

A national programme of integral climate research

The aim of the transition to a sustainable society is to enhance human health and well-being and guarantee the survival of the planet. In that context, it will be necessary to implement crucial and far-reaching climate measures, with respect for ecological limits (planetary boundaries) and human well-being and justice (planetary health). If we are to achieve sustainability in the long term, climate, the environment, biodiversity, society and economy cannot be considered in isolation from each other.

Within this broad framework, the NRCI Programme will be a national programme for integral climate research. The research programme will be explicitly intertwined with practice and will focus on bringing about transforming society with a transition to climate-friendly and climate-resilient practices that contribute to a healthy, nature-positive, resilient and just society. A future with minimal use of new raw materials and space, with all energy generated from sustainable sources, based on democratic and equitable principles and with infrastructure and production and consumption systems that have a positive impact on the health of the planet and the well-being of humans. This calls for system transitions: radical transformations at system level leading to sustainable development in social, economic and ecological terms.

The focus of the NRCI Programme is on accelerating the system transitions needed to combat climate change and to adapt society to the consequences of a changing climate. Within those parameters, various research themes and projects will be defined. In addition to the focus on accelerating system transitions, each theme should foster transdisciplinary collaboration but also strengthen the necessary monodisciplinary research. The task force has identified a number of themes on which system transitions are required to create a climate-friendly and climate-resilient society:

- Cities and infrastructure;
- Nature, agriculture, food and water;
- Energy, industry and the economy.

These system transitions are linked and interact with one another. In the KIN Programme, this aspect will not only be taken into account but actually used to identify and design interventions. In that way, the system transitions might not only reinforce each other, but could also dismantle lock-in mechanisms ensuing from system interactions.

The aim of the research in the KIN Programme is to generate societal action perspectives for enhancing the health and well-being of both mankind and the planet. Research into the steering and acceleration of the linked system transitions will be characterised by a process of spelling out and testing societal action perspectives in the context of their complex relationships, dealing with opposition, adjusting and (jointly) exploring and learning. This will require a range of measures and changes in society to facilitate the system transitions.

The IPCC identifies six areas in which they will be needed in its Sixth Assessment Report (AR6):

- Innovation and technology
- Governance, steering and collaboration between all parties
- Policy instruments
- Behaviour, standards and values
- Financial systems
- Institutional and human capacity

Figure 1 illustrates the goal and the focus of the KIN.

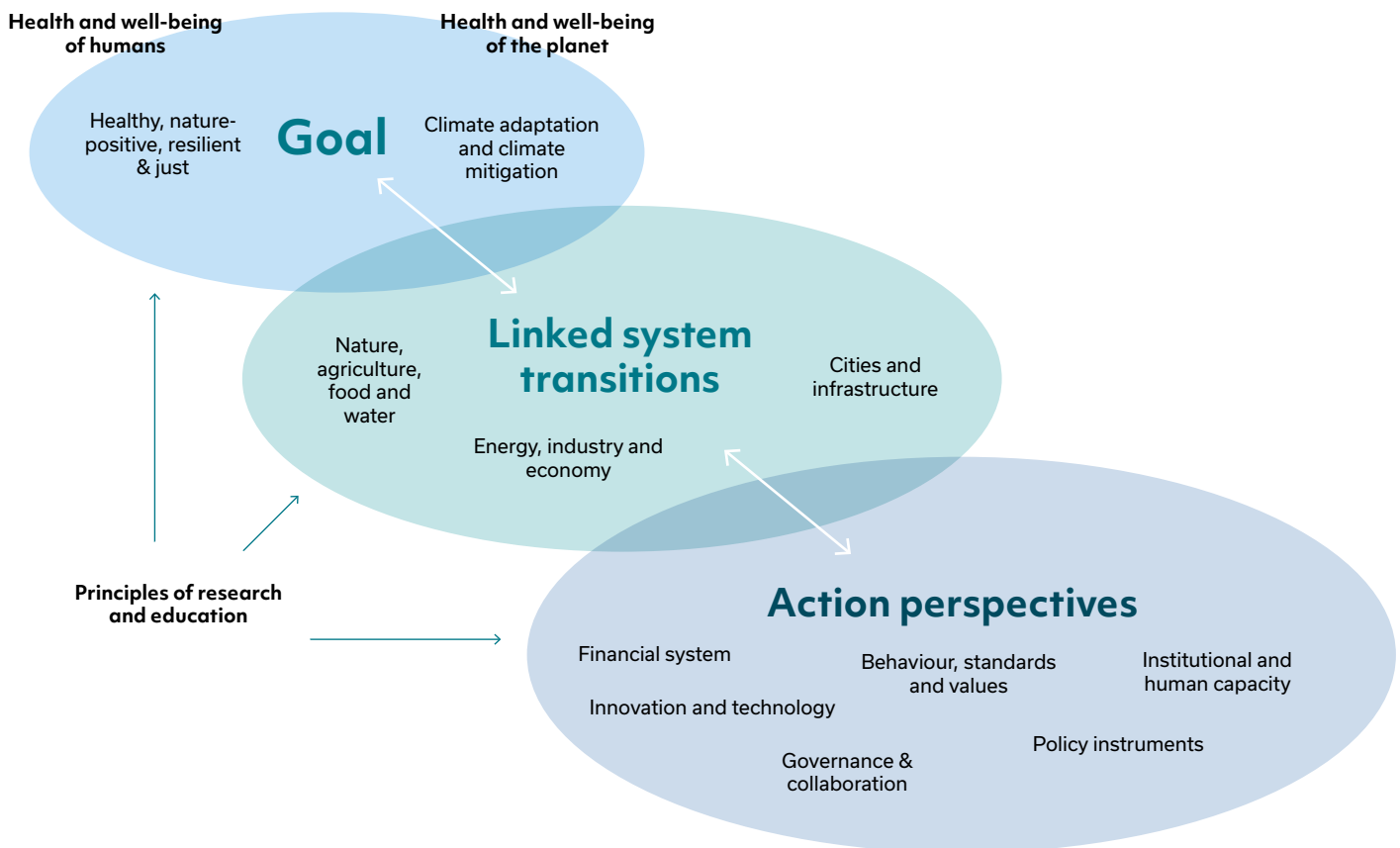


Figure 1

Framework of the KIN Programme. The programme conducts research into societal action perspectives (bottom plane) with a view to accelerating the linked system transitions (middle plane), which are needed for both climate adaptation and climate mitigation as well as other societal objectives: a healthy, nature-positive, resilient and equitable society (top plane).

Cross-sector

The traditional scientific approach (based on a linear model of disciplinary knowledge development and application and communication to actors in society) has generated important scientific insights worldwide in the last few decades. However, the climate crisis calls for integral solutions to complex problems which have to be investigated and implemented in collaboration with actors in society. Climate change affects every aspect

of our society and cuts across sectors; it cannot be framed within a particular discipline and is difficult to resolve with research conducted solely within the confines of knowledge institutions (see chapter 2).

The KIN Programme will therefore initiate research that employs integral and systemic research methods. It will also promote effective forms of collaboration between disciplines, knowledge institutions and social partners (interdisciplinary and transdisciplinary), as well as an iterative and reflective process of co-creation and joint learning. The climate challenge also has implications for the teaching of the next generation. The task of study programmes at every level will not only be to provide relevant climate knowledge, but also to train students in conducting more complex and collaborative forms of research.

That will in turn have consequences for the principles and points of departure of the practice of science on the climate issue, as well as for education. For example, the research in the KIN Programme will focus on the short and the long term together (to avoid any conflict between the two) and will be integral and systemic in nature. It will also shape the transitions (in the sense that it will identify the interventions that are most effective for the transitions), foster broad climate literacy among all societal parties, and will be flexible and adaptive.

Mission-driven research into system transitions and the connection with education

Josephine van Zeben
Professor of Law

Tomorrow's knowledge starts with today's education. The better today's students are taught to think outside the boundaries of their own discipline, the better they will be able to work with scientists outside their discipline later. Specialist professional knowledge will remain important, but students must become familiar with transdisciplinary research from early on. Learning to think in terms of scenarios is an essential aspect of that. Students learn to look beyond the boundaries of their discipline since working according to complex scenarios offers multiple possible solutions. The current study programmes involve some interdisciplinary work, but far more could be done in that respect, for example in terms of retraining lecturers and closer cooperation between universities, universities of applied sciences and other partners.

Main components of the KIN Programme

The KIN programme has three main components and follows three tracks:

- 1 Strengthening system transitions, particularly in living labs: the KIN Programme will select living labs in various locations where system transitions will be launched by increasing action perspectives and further developing transitions, while learning, in collaboration with local actors;
- 2 Developing knowledge to accelerate system transitions in response to questions raised by various actors:

- a bottom-up: supporting and further expanding societal and/or scientific initiatives by developing, testing and evaluating, learning, adjusting and further developing interventions that advance the system transitions. There will also be research into the scaling up of initiatives;
- b national and international and top-down: supporting, developing, testing and evaluating policy on and between different scales in order to accelerate transitions;
- 3 International collaboration: strengthening research into the acceleration of system transitions, capacity building and technology transfer for partners in developing countries where research funding is often limited.

1 Strengthening system transitions in practice

The KIN Programme will select or initiate a number of living labs where the system transitions will be put into practice, by developing while learning, conducting research, testing and evaluating, adjusting and further developing. The lessons learned will also be made available for other locations and other transitions.

There are various geographic areas where the living labs could be started or strengthened. The criteria these locations for living labs should meet will have to be further defined, but would in any case include the requirements that:

- various sectors or system transitions with a potentially major impact on the climate crisis converge there;
- there is sufficient scale;
- the expected outcomes and lessons can be rolled out to other locations;
- a lengthy period of collaboration is feasible (at least 5 years);
- that the parties involved are willing to follow new paths. There should also be links with other sustainability challenges (e.g., biodiversity, nitrogen) and social issues (e.g., health, well-being, justice).

Mission-driven research into system transitions – an example

Han Dolman
Director NIOZ

How the North Sea is used will change dramatically in the coming decades. There are already many wind turbines there and their number will only increase in the years ahead. New forms of renewable energy (e.g., floating solar panels) will also make an appearance. But solving one problem – ending global warming – must not be at the expense of the biodiversity and the quality of life of marine animals in the North Sea. If scientists and stakeholders fail to act in unity on this, despite the good intentions solving one problem could ultimately create a new one. Cross-sector collaboration between scientific disciplines and with practical experts is therefore absolutely essential and can yield genuinely future-proof solutions, for instance in relation to the circular economy or a sustainable food supply.

The use of living labs will not only promote the creation, integration and application of knowledge about system transitions, but will allow the knowledge to be refined in a cyclical manner, thus making it possible to take steps to modify systems sooner. In that context, explicit attention should be devoted to geographic upscaling and possible applications in the future. The involvement of participants in the KIN Pact will be essential in that respect.

2 Knowledge development for the purpose of system transitions

The KIN Programme will employ two other pathways, in addition to living labs, to generate innovative and relevant research:

- Bottom-up: research initiated and jointly defined by scientists and societal partners for the purpose of determining how bottom-up initiatives can remain permanently linked to system transitions and how they can reinforce each other;
- Top-down: research devoted to technological development and policy support on various scales. Realising and accelerating system transitions will require a different policy and use of resources. Living labs and bottom-up initiatives will provide important insights into what does or does not work, but scaling up small-scale initiatives of this type to the national level raises different questions. There are also many questions about the policy frameworks that apply in the specific context of system transitions in the Netherlands and how the development and roll-out of technologies can be more closely aligned with changing markets, the wishes of consumers and the principles of equitable transitions. Here too, transdisciplinary research and collaboration with stakeholders and societal actors on various scales – local, regional, national and international – will be important. Along the way, new questions will undoubtedly arise that could be addressed by the KIN Programme.

Mission-driven research into system transitions – example of bottom-up initiative

Heleen de Coninck
Professor of Innovation Studies

There are hundreds of local energy cooperatives in the Netherlands which contribute to energy conservation and sustainable energy generation and help to raise awareness and connect parties in relation to the issue. These organisations could make a greater contribution to the wider energy system transition if they were more in touch with each other, since the knowledge and practical experience they generate is relevant for others. Besides citizens, local authorities and network companies are also involved in these activities. A lot of research is already being conducted in relation to energy cooperatives and various interest groups are also active, but there is room for improvement and their activities could be linked more closely to policy. Some research questions to be answered might be: What can we learn from the cooperatives? Are they effective and under what conditions, and how can we increase their effectiveness? What role can cooperatives play in system transitions? What are the effects on transitions in other systems and what interactions and synergies would be created? How can the initiatives be accelerated and made more transformative? All of these questions, which are being asked by science and the cooperatives themselves, call for transdisciplinary research.

3 The KIN International Programme

Climate change is by definition a global challenge, because the consequences are felt worldwide and are not shared equally, and it makes no difference where a ton of greenhouse gas is emitted. But it is also a call for global cooperation: according to the IPCC, since the system transitions are required worldwide, international cooperation is crucial for achieving them. Furthermore, the risks connected with energy, food security, biodiversity and health in different countries and continents are increasingly interwoven, partly due to global supply chains and financial markets, international travel and political dependencies. Sustainable system transitions take account of this interconnectedness.

The KIN Programme will therefore also have an international dimension, which reflects the arrangements made in the Paris Climate Agreement to strengthen capacity building in developing countries and collaboration with developing countries in relation to the development and transfer of technologies.

System change is not only an urgent challenge in the Netherlands, but even more so in developing countries, which bear scarcely any responsibility for the climate problem but are the most vulnerable to it and face the greatest challenge in adapting to it. Very little research is conducted into adaptation and mitigation in developing countries. The NRCI International Programme will therefore help to develop sustainable and climate-resilient development paths for those countries by financing research that will also be carried out in the countries themselves, if necessary in collaboration with Dutch partners on the basis of parity. The research will be demand-driven, in other words the research agenda will be determined by the parties in the countries themselves, not by the financiers.



Two lines of research

The details have still to be worked out, but some basic principles can already be mentioned. The KIN International Programme will have the same goal as the research in the Netherlands, but then for developing countries: to accelerate system transitions by strengthening and connecting transdisciplinary scientific research. It will follow the two lines described above for the KIN Programme: collaboration in developing and sharing knowledge in concrete living

labs and strengthening the system transitions through local initiatives and top-down policy support and development (national and international).

The principles set out in section 3.4 also apply to the international component of the KIN Programme. But developing countries face different, and usually greater challenges because those countries – especially small and poorer countries – often have less capacity and far less funding for research. This makes it all the more important that there is continuity in the collaboration, capacity building is guaranteed, the programme is flexible and adaptive and the administrative preconditions are as favourable as possible for local research. The rules of international collaborative programmes and the far lower salaries in developing countries often lead to a large portion of the research funding that was intended to finance local research and capacity being spent in the donor country.

Limited scale

The scale of the NRCI International Programme will not permit collaboration with more than a small number of institutions in developing countries. A selection will therefore have to be made. Our advice is to select mainly institutions in poorer developing countries with whom the Netherlands already has a history of collaboration in research, where the gaps in knowledge and research funding are greater, and for whom the NRCI can make a real difference when it comes to system transitions. In addition, the collaboration should help to generate insights that are useful for system transitions in other countries. In that context, the NRCI also recognises that there are large differences between and within developing countries and the selection should be aimed at involving the most vulnerable countries in the transitions, mainly the poorest developing countries and small island states, but in particular vulnerable groups and systems in those countries.

Exchange

More intensive and lasting collaboration could be arranged with the selected partners. This could take the form of exchanges and training courses or allowing talented researchers from the partner countries to follow part of a PhD programme in the Netherlands. The lion's share of the funding for the KIN International Programme would be spent on research and capacity building for and by researchers in the partner countries. The relevant programmes would be organised by the researchers from the countries themselves in accordance with what is most urgently needed in the specific local situation. In this way, we would select the programmes that are most effective and which also make the best use of and provide insights for the system transitions in other countries. International knowledge networks, such as the Adaptation Research Alliance, the Global Centre on Adaptation (GCA) and KNMI Global, could be of assistance in this respect.

The KIN International Programme will have to be worked out in more detail. For the KIN International Programme to perform its crucial role in realising the KIN's mission, substantial funds in the order of a quarter of the total KIN budget would have to be allocated to it. The KIN Centre will also need to have specialist knowledge, capacity and governance to be able to implement the KIN International Programme.

3.2 KIN Pact

A national climate pact for knowledge institutions and societal partners

The researchers working on the KIN Programme will collaborate closely with other parties in society. The KIN Pact will shape and strengthen that collaboration and provide a platform for researchers and stakeholders to feed one another with ideas and knowledge.

Why a KIN Pact?

Reducing the risks of climate change calls for a broad, integral approach with the involvement of numerous parties. The KIN Pact will provide the parties concerned with a platform where they can meet, share knowledge and ideas and reach agreement on actions to mitigate the scale and risks of climate change. Moreover, the urgency of climate change demands that science responds more quickly to questions arising from practice and policy and that new and existing knowledge is more rapidly and effectively shared and applied in practice. The KIN Pact will enable relevant questions to be asked and allow knowledge to feed more smoothly into policy and practice. Accordingly, the KIN Pact will perform the role of a broad, knowledge-based 'movement'.

Pooling resources

The goal of the KIN Pact is to pool resources in the Netherlands in a combined effort to develop and apply new climate-related knowledge that will accelerate the necessary system transitions. To this end, existing networks will be strengthened and new relationships will be created. The KIN Pact will provide a platform for any party that wishes to make an active contribution to connecting, deepening, broadening and strengthening climate-related knowledge with significant scientific and societal impact. The KIN Pact will be inclusive, open and flexible.

Membership of the KIN Pact will be accessible and free of charge, but not free of obligation: participants will have to make concrete, traceable and measurable efforts to bring the KIN's goal and mission closer to realisation. In other words, the purpose of the KIN Pact is not to raise or consolidate financial contributions from the participants, but to establish new partnerships and activities.

The KIN Pact will demonstrate the breadth and strength of the KIN, raise the profile of the participants and make their climate-related activities and investments known to everyone. The result will be an overview of who is doing what and what relevant initiatives and activities are underway. This overview could promote the creation of new networks and consortia. The KIN Centre will manage and facilitate the KIN Pact, for example by handling the registration and administration of membership and by organising workshops, lectures, network meetings and national forums.

Who are the participants in the KIN Pact?

Any party that endorses the KIN's mission and wishes to make a concrete contribution to achieving its mission and goals will be able to sign up to the KIN Pact. The KIN Pact will be a dynamic, open and inclusive platform, to which participants will be able to commit themselves for shorter or longer periods. The core members of the KIN Pact will be parties in the Dutch knowledge chain, in other words institutions and groups that already conduct climate-related research, alone or in collaboration with other actors. The most obvious institutions in this context are universities, universities of applied sciences, the research institutes of NWO and KNAW, the Federation of Dutch Applied Research Institutions (TO2 institutions), the National Knowledge Institutions (RKIs) and academic and other hospitals that perform climate-related research, as well as societal partners that support the KIN's mission, such as governmental bodies, companies, the financial sector, NGOs and interest groups, citizen initiatives and educational institutions.

How will the KIN Pact work?

The pact is a non-binding agreement. Every participant in the KIN Pact will endorse the KIN's mission and objectives and undertake to devote some part of their activities (to be determined by themselves) to achieving them. How the partners will be able to formalise their participation in the KIN Pact will have to be investigated at a later stage.

The pledges made by the parties will have to be concrete and measurable. The names of the participating parties, their pledges and the progress they are making in meeting them will be posted in a transparent and accessible manner on a common website. The participants will exhibit ownership and accept their own responsibility. The KIN Pact will function by virtue of the dedication of the participants and their genuine desire to realise the KIN's mission and the common goals. Each partner's participation in the KIN Pact will be renewed at regular intervals (for example, every three years), at which time their success in fulfilling the pledges they made will be reviewed. In the interim, the parties will be able to upwardly adjust their commitments. New members will be able to join the KIN Pact at any time.

The KIN Pact will focus primarily on the interventions and changes needed to mitigate the risks of climate change. It will keep pace with current events and respond to developments in science, policy formulation and implementation and the public debate.

What will happen in the KIN Pact?

The partners in the KIN Pact will perform different roles and carry out different activities, depending on their ambitions. Some activities and roles will be defined as the plans are further elaborated. They will include: knowledge transfer; mutual sharing of facilities, plans and data; establishing new partnerships and consortia within the entire knowledge chain and between knowledge institutions and societal parties; and knowledge dissemination and outreach.

The KIN Pact will appoint ambassadors from the participating parties and assist them in disseminating the KIN's mission and bringing the parties even closer together. Because of

the wide range of issues covered and societal participants involved, the KIN Pact will play an important role in initiating and organising events such as knowledge campaigns, festivals and transition movements relating to subjects of relevance for the KIN's mission.

Once a year a conference and general assembly will be organised, at which progress with the initiative will be discussed and decisions can be made on new activities. The KIN Pact will also appoint an advisory board to provide the KIN Council with regular advice on what is going well, what needs to improve and what is missing.



3.3 KIN Centre

National network to strengthen climate research

Goal

The goal of the KIN Centre is to make the KIN a reality and provide it with powerful support. The KIN Centre will manage, support and coordinate the KIN Pact and the KIN Programme. It will link the national research and drive innovation. Through the networks of the participating knowledge institutions, it will forge closer links between the national research and regional/local initiatives and major European and international programmes.

The KIN Centre's other objective is to bolster the KIN Pact and, via the Pact, involve the public and policy makers in the national research and keep them informed of developments, while at the same time ensuring that urgent challenges and issues raised by society find their way onto the KIN Programme's research agenda.

Characteristics, role and duties

The KIN Centre is a consortium of the knowledge institutions in the Netherlands, which will conduct interdisciplinary and transdisciplinary research aimed at accelerating the system transitions that are needed to mitigate the risks and negative effects of climate change. It will constitute a national hub for national climate research, bringing together people, fields of research and knowledge institutions at national and international level. It will connect and improve the coherence of the research in the Netherlands and promote innovative research. The hub itself will be efficient and goal-oriented, and thus relatively small. The KIN Centre's core tasks will be to:

- 1 coordinate the KIN Programme;
- 2 manage the KIN Pact;
- 3 form a bridge between the national research and society.

In performing these tasks, the KIN Centre will strengthen the link between the national research and society and policy makers, for example through the government's Climate Council. The KIN Centre will ensure that the participants in the KIN Pact and the KIN Programme will nourish and enrich each other with ideas and the latest insights, creating fruitful synergy in the process.

1 Coordination of KIN Programme

The KIN Centre will support the KIN Programme and manage its resources on behalf of the KIN Council. The KIN Centre will have a relatively small staff, but it will include professional experts (such as programme managers) to guarantee that the research is carried out as efficiently as possible and the objectives are achieved. The KIN Centre will also function as the secretariat of the Programme Council, which will prepare the selection of subjects to be covered in the national programme.

The partners (knowledge institutions) in the KIN Centre will jointly implement the KIN Programme and train the researchers. The KIN's Centre's principal role in that process will

be to connect, coordinate and direct those activities, but it will also provide additional impulses, for example through the Fellows programme. The KIN Centre will organise activities to foster co-creation, including hackathons, sandpits and Crutzen workshops.⁵ During such workshops, the purpose of which is to promote transdisciplinary research and open innovation, participants in the Dutch National Climate Agreement and the KIN Programme will spend a brief, intense period formulating new bottom-up research questions or research proposals. The KIN Programme will also have funds to actually implement such proposals quickly and efficiently, subject to an evaluation by the Programme Council and a decision by the KIN's Council, for example through the fellowships or direct financing of researchers at the partner institutions. The KIN Centre will be a frontrunner in promoting a new style of leadership and an open scientific culture, with a focus on aspects such as open science, diversity and inclusion, scientific integrity and the new rewards and recognition system.

2 Management of the KIN Pact

In addition to the partners in the KIN Centre, the KIN Pact will connect various other societal stakeholders that endorse the KIN's mission. The KIN Centre will encourage these parties to share their knowledge and enable them to feed the KIN Programme with new ideas. On the other hand, it will widely disseminate the results and the latest scientific insights generated by the research programme, for example by organising events such as lectures, seminars, roundtable sessions and master classes for policy advisers and other stakeholders, as well as an annual conference for the entire KIN community. Another of the KIN Centre's tasks will be to organise the KIN Pact Advisory Council, which will provide advice on what is going well and where there is room for improvement and analyse new perspectives. The KIN Centre will actively canvass new parties to join the KIN Pact and monitor the commitment of the existing participants.

3 Role in relation to society and policy makers

In its role as manager of the initiative, the KIN Centre will have the important task of integrating and synthesising the results of national and international research and interpreting them for society and policy makers.

Society – The KIN Centre will focus on facilitating co-creation among research institutions and between the knowledge institutions and societal actors. To this end, it will employ innovative methods designed to involve societal stakeholders more intensively in climate research. These activities will complement and supplement the communication and outreach activities of the partner institutions and promote the mutual collaboration with and inclusion of other stakeholders (via the KIN Pact, for example). The KIN Centre will create a website containing accessible climate-related knowledge and news about the climate and global developments for the general public, but also a lot of relevant information for the affiliated researchers (for example, notices of calls and reports of networks and conferences). It will also publish a newsletter and, in association with the Climate Council, an annual update on climate change (see text box).

⁵ This type of workshop is inspired by the Lorentz Center '... with Industry' workshops, where a group of young researchers supervised by a number of senior researchers and representatives from the business community spend a week searching for a solution to a specific business-related problem.

Policy makers – Politicians, parliamentary committees and policy makers in the ministries and local authorities must be familiar with the KIN Centre. Via the Climate Council and the broad public consultation on climate proposed by Minister Jetten,⁶ the Centre will constitute a contact point for politicians and policy makers and provide solicited and unsolicited advice to the Climate Council and the government on the subject of climate research (see text box). The KIN Centre will respond to enquiries by finding the right researchers to answer the questions and translating the questions into scientific objectives (demand articulation). The KIN Centre would thus create realistic expectations: some questions can be answered quickly; others require years of research. The point of departure is that the KIN Centre will not assume the role of existing institutes/ institutions, but rather ensure that questions find their way to the researchers and institutions best suited to answering them, from a national perspective.

Relationship with the Climate Council – As proposed to the House of Representatives by Minister Jetten on 2 June 2022, the Climate Council will advise the minister on climate policy. The Climate Council will act autonomously / without outside influence. Its members will serve in a personal capacity. It is proposed that a principal-supplier relationship could be established between the Climate Council and the KIN, via the KIN Centre. The Climate Council would then use the KIN Centre as its main point of contact on scientific questions. If the knowledge already exists, the KIN Centre would ensure that the question reaches the institution best equipped to answer it. If the knowledge is not yet available, the KIN Centre would help with the demand articulation and in formulating realistic expectations. The Climate Council will publish an annual State of the Climate, with input from the KIN Centre.

Council, management committee and organisation

Dutch research institutions that conduct climate research will be represented in the KIN Centre by virtue of a cooperation agreement. The partners will delegate representatives for the KIN Council, which will be similar to the decision-making bodies of large international organisations such as the EUMETSAT Council or the UN General Assembly. The KIN Council will meet at least twice a year, or as often as is deemed necessary. Because of the substantial number of partners (approximately 30 to 50 institutions), it might be advisable for the KIN Council to appoint a smaller executive board from among its members so that decisions can be made more quickly.

The KIN Council will be charged with managing, monitoring and accounting for the use of the KIN's resources and will be responsible for meeting the KIN's objectives. The NRCI Council will in any case be advised by the KIN Programme Council and the KIN Pact Advisory Council and will be assisted by the KIN's management board, which will function as the secretariat of the KIN Council and the advisory councils and manage the day-to-day affairs of the KIN Centre and its staff.

The KIN Centre's staff will consist of a small team of professionals assigned to the three core activities:

- 1 the KIN Programme: a number of experienced senior programme managers (profile: project manager with a research background, PhD);

⁶ Letter to the House of Representatives, Ontwerp Beleidsprogramma Klimaat [Draft Climate Policy Programme], 2 June 2022.

- 2 the KIN Pact: officers with management, organisational and connecting skills and with an extensive scientific, political and social network;
- 3 the organisation of activities to build bridges with society and policy makers, including outreach, various types of interactive events, symposia and workshops, and channelling questions from the Climate Council and other actors.

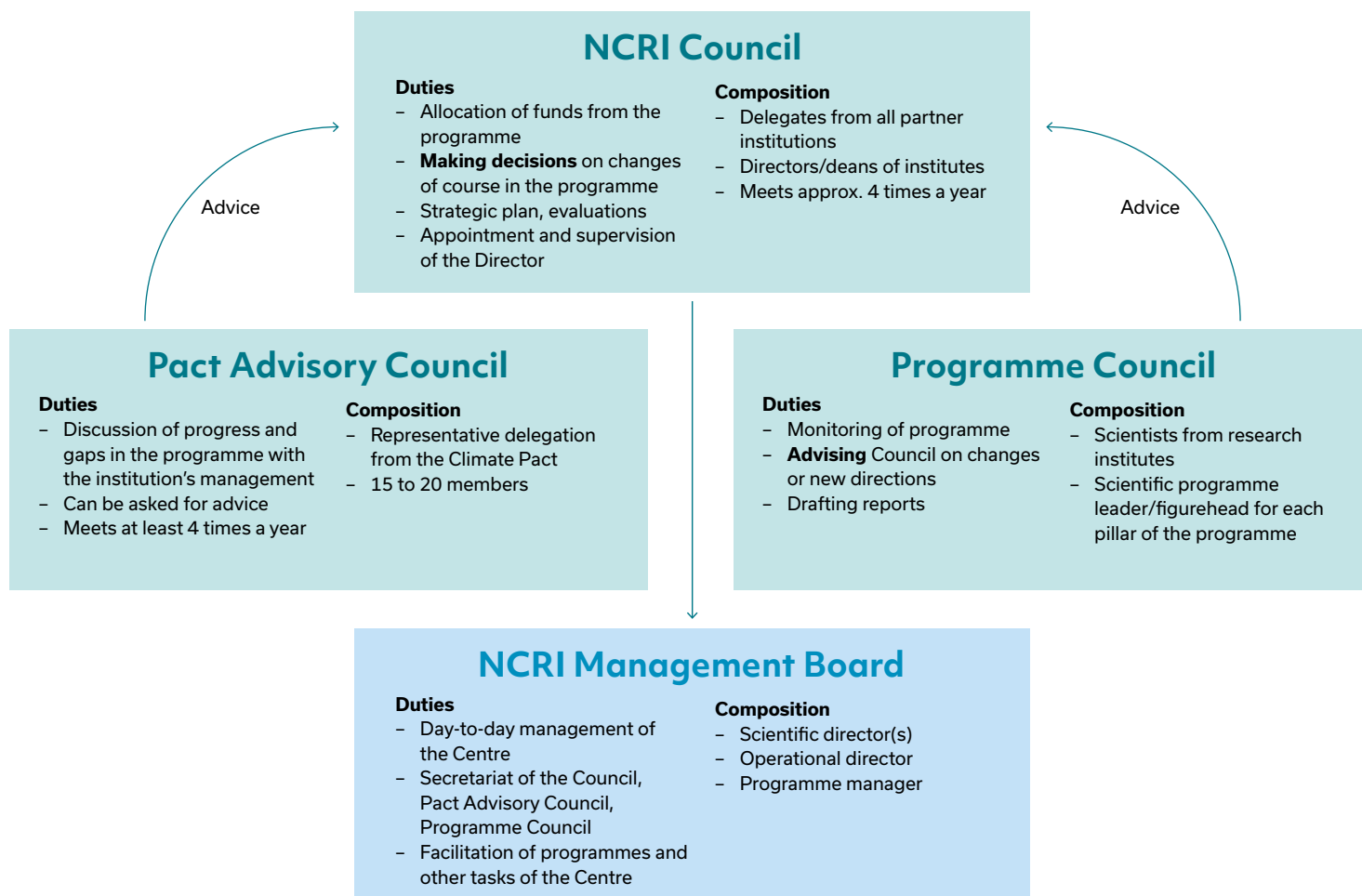


Figure 2

Organisation and management of the KIN. The KIN Council consists of representatives of all the relevant knowledge institutions. The KIN's Management Board exercises day-to-day management of the KIN. The KIN Programme Council and the KIN Pact Advisory Council advise the Council on developments in the programme and society.

Accommodation and embedding

The KIN Centre should preferably be hosted by a 'neutral' institution whose operations are very clearly in the national interest and which will be the workplace of the KIN Centre's director and staff. It should also have different types of workspaces (including offices, meeting rooms, auditoriums, etc.) to afford affiliated fellows and researchers with accommodation for shorter or longer periods and to create an environment that promotes interaction between different disciplines. As far as possible, the host institution's facilities will be used for the KIN Centre's other operational requirements (such as IT and cybersecurity, Finance & Control, HR, legal support, Health, Safety and Environment, Communication).

KIN Programme Council and KIN Pact Advisory Council

The KIN Council will have two advisory councils. The KIN Programme Council will provide advice on the progress being made with the KIN Programme and assess the quality and urgency of new research proposals and whether they are suitable for the KIN Programme. The members of the KIN Programme Council will be researchers from the partner institutions, with a scientific figurehead for each of the priority themes in the programme, who will also serve as ambassadors for the KIN. The KIN Pact Advisory Council will provide the KIN Council with input from society and advise it on what is going well, what improvements are needed and what gaps there are. Its members will be delegates from the KIN Pact.

Research fellows

An important instrument for the envisaged acceleration of transitions will be the research fellows. We envision different types of fellowships. For example:

- **Senior fellows** Talented and innovative senior researchers who endorse the KIN's mission and will typically be employed by one of the partner institutions. Based on their scientific knowledge and expertise, they will be deployed for one or more years to work specifically on one or more of the selected themes of the KIN. During that period, their work will be partially funded by the KIN to give them the time and space to quickly move in new directions.
- **Post-doctoral fellows** Researchers appointed to start and/or support work on new interdisciplinary research proposals. They can be appointed as employees of the KIN Centre or of a partner institution, depending on which option makes more sense and where the research is mainly concentrated.

The fellows will not necessarily work in the KIN Centre. That will depend on the subject matter and which partners are involved with the research proposal. Although a bespoke approach will be adopted, the KIN Centre will explicitly be able to offer (temporary) accommodation for the fellows. The intention is that the KIN Centre will provide an inspiring and entrepreneurial environment in which researchers seek contact with each other and which fosters innovation and cross-pollination between different disciplines.

Culture and other aspects

The KIN's Council will be comprised of representatives of all the partners in the KIN Centre. It must be crystal clear from the structure and the definition of the role and duties of the KIN Council that they will always be representing the national interest and never purely the interests of the relevant partner.

The KIN Centre will propagate innovation, not only in the research but also in how the Centre is managed: publicity for the KIN Centre must not be left to a single individual. The KIN's director and the chairpersons of the KIN Council and the KIN Programme Council should be selected to serve the interests of the collective and to ensure that less well-established researchers also receive publicity.

The members of the KIN management board and the KIN Programme Council and the chairperson of the KIN Council will all be scientists, and the KIN's director should have a strong network in The Hague. The KIN Centre will have an open culture in which social safety, inclusion, diversity and scientific integrity are key and employees are rewarded and recognised for their unique talents and contributions. Diversity and inclusivity will be reflected in the composition of the KIN Council and the KIN Programme Council, which will also have room for young talent (consideration could be given to shared leadership and mentoring to facilitate this).

Activities organised by the KIN Centre / output

The KIN Centre undertakes a variety of activities which may contribute to the acceleration and the success of the system transitions that the KIN focuses on:

- Synthesising and integrating national and international knowledge and successful developments;
- Organising Crutzen workshops (see section 3.4 for a brief description), hackathons, sandpits, etc. with the partners in the KIN Pact with a view to formulating innovative interdisciplinary / transdisciplinary research projects, which could then be kick-started with resources from the KIN programme, for example through the fellowships;
- Facilitating fellowships to give innovative research a flying start;
- Educating a new generation of talented researchers who are trained in interdisciplinary and transdisciplinary research and systems thinking, for example by promoting the establishment of new climate-related BSc and MSc programmes at universities and enhancing the national cohesion of these programmes;
- Examples of activities to keep the general public informed about the research:
 - encouragement of mutual collaboration through academic workplaces (consortia of practice, policy and research);
 - publication of an annual State of the Climate report (in association with the Climate Council);
 - publication of a climate newsletter;
 - organisation of an annual conference for climate scientists and stakeholders;
 - organisation of the National Climate Knowledge Day;
 - organisation of masterclasses;
 - promotion of systems thinking and interdisciplinarity studies among the general public;
 - provision of substantive expertise to assist the deliberations of citizens' assemblies on the subject of climate.

Further elaboration

The structure of the KIN Council and the staff of the KIN Centre and the precise functioning of the advisory councils, as well as issues such as participation, the exit strategy (when and how the KIN will be dissolved), the formulation of measurable output indicators and evaluation of the KIN (every five years) will have to be elaborated in more detail at a later stage (see also chapter 4, Recommendations for the KIN).

3.4 Implementation and budget: a sketch

As explained in Chapter 2, the urgency and complexity of the challenges posed by climate change call for a different type of research: mission-driven research with the primary aim of accelerating the pace of the necessary transitions. The benchmark for the quality of the research is not the number of publications, the number of grants obtained or the number of invitations to give presentations, but the actual impact in terms of accelerating the necessary societal transition. That calls for a fundamentally different approach to research, one for which few resources are currently available and which is moreover only useful if carried out on a significant scale. The proposed research in the KIN will build on existing strengths in the current Dutch research and therefore none of the budget can be taken from the funding for the existing research institutions. In other words, new funding will be required.

The guiding principles for the budget are as follows:

- 1 **Collaboration without competition:** in light of the urgency of the challenges created by climate change and the necessary system transitions, research questions must be addressed quickly and with targeted research. Good proposals with strategic importance and great urgency must not fall by the wayside due to competition or restrictive administrative conditions. The decisive factor must be the quality of the research, as guaranteed by critical review of proposals. Accordingly, the vast majority of the projects in the programme will be selected not through competitive calls, but by having the suitability of a proposal for the KIN Programme and the KIN mission judged by the KIN Programme Council. Funding will be awarded directly to the knowledge institutions that employ or hire the researchers and fellows. The KIN Council will decide on the allocation of the funds, subject to the advice of the KIN Programme Council.
- 2 **Facilitation without barriers:** the KIN Programme will not be based on standard conditions, as is usual for example with NWO programmes. As far as possible, the KIN will remove administrative barriers and restrictions to doing what is needed, naturally subject to the general criteria for the expenditure of public funds. The costs of technical and other support staff, infrastructure, charges for computing time on supercomputers and similar expenses will have to be covered from the KIN budget.
- 3 **Continuity:** the continuity and coherence of the national research depends on stable funding over a period of years. The budget will be adopted for a period of at least ten years, with an external evaluation and assessment scheduled after four years.
- 4 **Flexibility:** the KIN will consciously have a highly flexible structure so that it can respond quickly to new insights and developments. Ministries and local authorities will be able to submit topical research questions to which the KIN will be able to provide a rapid and targeted response with its research capacity. Other questions will also frequently arise from ongoing research or from the KIN Pact. The KIN Centre will therefore regularly organise workshops (such as the Crutzen workshops described in the text box below), where the participants will define new research projects to address these questions, which can then be launched immediately with earmarked 'free' funds.
- 5 **Strengthening:** the KIN is intended to supplement and reinforce the current research capacity at the knowledge institutions and bring focus to interdisciplinary and transdisciplinary systems studies. Researchers will remain attached to their own institution and will carry out their research there and at the KIN Centre, thus strengthening the link between existing research and the national KIN Programme.
- 6 **Integral costs:** the budget allocated by the KIN will be in addition to existing budgets for ongoing research. In accordance with the financing from the National Growth Fund, funding will be based on integral costs; in other words, the wage costs of the researchers

(and other personnel) plus a premium. Because various methods can be used to calculate integral costs and the method used also varies from one institution to another, a standard premium of 75% is proposed. That percentage is an estimate of the actual costs of the envisaged partners in the KIN.

Example of innovation in the KIN

Crutzen Workshops

It is July 2024. The first projects in the national programme are underway and have already yielded some initial findings and the KIN and the Climate Council have just jointly published the first State of the Climate report. There is growing public questioning of the climate impact of health care. The KIN therefore organises a Crutzen workshop: a group of roughly 40 senior and younger researchers in the fields of medical science, behavioural science, climate science and ecology, and economists and lawyers come together with health-care workers and organisations of patients to present their knowledge and the results of research and to consider the most important questions that still need to be answered when it comes to reducing health care's climate footprint.

The workshop yields a number of specific ideas, which are shortly afterwards translated by the researchers into research proposals. Those proposals are then submitted to the KIN Programme Council, which decides that they are appropriate consistent with the programme, are sufficiently urgent and possess the quality to deliver good results. The proposals are then submitted, with the advice of the Programme Council, to the KIN Council, which decides to allocate funds for them.

For one proposal, a post-doctoral fellow is appointed to lead the research, together with professors from two disciplines. Three PhD candidates are appointed by the relevant institutions and will conduct part of their research at the various locations.

For the second proposal, two senior researchers and a professor are appointed as senior fellows attached to the KIN Centre for two days a week for a full year, who will work with two PhD candidates and a post-doc on the development of a new model for assessing the integral effects of climate change and loss of biodiversity on the spread of malaria in Africa. The salaries of the three senior fellows for the two days a week that they spend at the KIN Centre are paid from the KIN's budget. The professor is also exempted from other duties, such as teaching, in order to devote him- or herself entirely to the research for a year.

- 7 **Supervision and coordination:** in addition to the researchers at the affiliated institutions, the KIN will need its own (scientific) staff if it is to meet its responsibilities in terms of realising the KIN's mission, bringing coherence to the focus areas, synthesising the results in reports and effective communication. Part of the budget will therefore be used to recruit (non-scientific) programme coordinators and scientific programme leaders (KIN-PLs). Broadly speaking, the ratio will be 1 KIN-PL to 10 FTE KIN-affiliated researchers.
- 8 **Sufficient research capacity and knowledge dissemination:** to realise its mission, the KIN must have sufficient expertise and capacity in all of the domains covered in the KIN Programme. The KIN will therefore take steps to identify any areas of research that are under-represented and fill the gaps, and promote the creation of study programmes and capacity for scientific communication where it is most badly needed.

Indicative budget

The following sections describe the components of an indicative budget based on the three main pillars of the initiative (see Chapter 3.1). There is also an indicative budget for the KIN Centre, which will support the KIN, and a budget for KIN activities. Finally, there is an indicative budget based on the assumption that the KIN will be fully operational in its third year.

1 Support for living labs

Living labs will be supported by strengthening and underwriting existing living labs. In addition, new living labs will gradually be established. Existing living labs need to be strengthened to enable them to maximise their contribution to the acceleration of system transitions by involving all the relevant disciplines and to ensure that they are connected efficiently and optimally with the rest of the country and the national research.

As a first step, the KIN will identify and compile a list of all the living labs in the Netherlands with a view to drawing up a roadmap for establishing an integral relationship between them and the KIN Programme. On the basis of that roadmap, the KIN will provide between one and three of the living labs with additional funding to enhance the synergy between their existing programmes and the KIN Programme.

Creating new living labs will take longer and require a greater effort. The assumption is that it will be the third year of the KIN before any new living labs can be established to address what are then the most urgent research questions. Although it will very much depend on the specific subject, the location and the scale, it is estimated that approximately € 10 million a year is a realistic estimate of the budget for a new, medium-sized living lab. After the start-up phase, it is expected that at least one living lab will be devoted to each of the main themes of the KIN Programme.

Because of the complexity and diversity of the structures of living labs, a more precise estimate of the costs will have to be made in the coming period.

2 Knowledge development for system transitions

The point of departure for the second budget component is that every year the KIN will select a number of topics on which new transdisciplinary research projects will be initiated. As mentioned earlier, they could be initiated top-down by ministries, local authorities or the KIN Council itself, but they could also emerge from grassroots movements, science, the KIN Pact or society. The regular Crutzen workshops (15-25 a year) will play an important role in shaping the projects. Assuming that targeted research is conducted in relation to all of the most important knowledge gaps identified by the IPCC, on average there would have to be around 30 projects underway simultaneously. Naturally, the staffing of each project will vary greatly. The budget is based on an average of 1.5 senior fellows and six other staff members (such as junior researchers, but also support staff to provide a range of non-scientific assistance) for each project. For half of all projects, a higher cost item is budgeted for equipment, IT and/or materials.

3 International Programme

The KIN's international programme will involve research programmes with a limited number of partners in developing countries. The details will have to be worked out later (see Chapter 3.1), but it is essential that budgets are closely matched to the existing resources for international cooperation. At the same time, it is important that KIN funds can be used to bolster existing initiatives. Naturally, KIN funds will have to be in addition to existing financing. To make a real difference, the task force recommends an annual budget of € 25 million, to be managed by a sub-committee of the Programme Council whose members have a knowledge of international cooperation and good connections with relevant ministries.

4 KIN Centre

The KIN Centre will have a small, professional staff (see Chapter 3.3), who will focus on organising activities for the KIN and providing support for the KIN Council, the KIN Programme and the KIN Pact.

5 KIN activities

Chapter 3.3 mentions various activities falling into the category of miscellaneous, which will have to be organised by the KIN, including scientific workshops (15-25 a year) and an annual conference.

The amounts budgeted for those activities are shown in the table below. After a start-up period of two years, the necessary annual budget for the KIN is expected to be around € 100 million, a quarter of which would be earmarked for the KIN International Programme.

In consultation with the task force, NWO, ZonMw and KNAW compiled a rough initial inventory of the scale of climate research in the Netherlands in order to assess whether such an amount can realistically be invested. The number of senior researchers (with permanent appointments) working in the discipline was estimated on the basis of publicly available information from the various knowledge institutions (such as websites and annual reports). The inventory

suggests that there are approximately 300 senior researchers in the Netherlands currently working on topics relating to climate research. Assuming that every senior researcher represents a research budget of roughly € 0.5 to 1 million, the Netherlands spends around € 150 to € 300 million annually on climate research. In addition, a far larger number of researchers (around five to ten times larger) are engaged in research closely connected with system transitions, for example research devoted to the energy transition and/or sustainability. There will be substantial overlap between that research and the KIN Programme and it could therefore also make a significant contribution to the KIN Programme.

An annual sum of around € 100 million would represent a realistic budget for connecting, deepening and expanding national climate research and for innovative research aimed at accelerating the system transitions.

Table with budget estimates (x €1 mln, rounded off)

	Year 1	Year 2	From year 3
Supporting and strengthening living labs			
Strengthening and alliance with existing living labs	0,3	3,0	6,0
New living labs	0	0	10
Knowledge development to accelerate system transitions			
Bottom-up (from society/KIN Pact/science)	14	22	28
Top-down (e.g. policy, integrating science)	7	10	14
KIN scientific programme leaders (KIN PLs)	0,4	0,7	0,8
<i>Free space (10%)</i>	<i>2,1</i>	<i>3,3</i>	<i>4,3</i>
International			
Capacity development with existing groups	0,3	2,5	5
Participation in local (development) projects	0,3	12	25
Centre			
Management and support	0,4	0,7	0,7
Programme managers	0,4	0,7	0,7
Communication	0,2	0,4	0,4
Physical operations	0,1	0,4	0,4
KIN activities			
Annual conference	0,4	0,4	0,4
Promotion of new study programmes, scientific communication	0,3	0,8	0,8
(Crutzen) workshops	0,4	0,8	0,8
Total budget	27	58	97



4

Recommendations

Based on the findings in this report, the Climate Research Task Force makes the following recommendations for the implementation of the KIN.

Start quickly

Climate change is too urgent to permit any delay. Start drawing up the concrete details of the plans for the KIN in this report as soon as possible and, after consulting stakeholders (e.g., Ministry of Economic Affairs and Climate, Ministry of Education, Culture and Science, Universities of the Netherlands, executive boards, Applied Research Organisations (TO2s), Public Knowledge Organisations (RKIs), appoint a quartermasters team to put the plans for the KIN into practice. Consider taking the following measures to accelerate the initial phase:

- organise a meeting to gather feedback from scientists, politicians and representatives of societal partners engaged with climate research;
- draft an implementation plan, which fleshes out the advice in this report and incorporates the input from the consultations;
- start preparations for the pilot phase, with workshops and initial programmes (as described in section 3.4) to gain experience with the envisaged new working methods;
- appoint a steering group to supervise the quartermaster phase; members of the Climate Research Task Force could be asked to play a role in this.⁷

Implement the advisory report in its entirety

The KIN approach described in this report must be implemented coherently and in its entirety. To have an impact, the various tracks must be initiated and carried out simultaneously. Specifically this means that:

- the design of each of the three components of the KIN, the Programme, the Pact and the Centre, must receive attention during the implementation phase;
- workshops and programmes devoted to system transitions and covering all of the relevant aspects (from technology to society) should be organised during the pilot phase.

⁷ Appendix 3 contains a proposal for a mandate for the quartermasters.

Facilitate and accelerate the knowledge transition

The KIN will be employing a new, integral method of (co-)creation, production, application and sharing of knowledge. That will also require a transition in the relevant part of the knowledge chain. Where possible, facilitate and accelerate that process with the KIN approach proposed in this report, and ensure that the incentives for researchers work effectively. This can be accomplished, for example, by organising workshops during the pilot/start-up phase at which stakeholders and researchers jointly produce a concrete research programme.

Monitor national and international developments

Do not regard the KIN as a stand-alone competitive project, but treat it as a programme designed to supplement, coordinate and enhance existing initiatives, both national and international. The urgency of the climate crisis demands intensive collaboration, not competition.

Adopt a long-term perspective

This report proposes an approach tailored to the longer term. Like the international programme, system transitions and generating the knowledge needed to realise them take time. An initiative like this will have to continue for at least ten years.

Appendices

| Assignment and Terms of Reference

1 Background

Climate change is a major challenge that will occupy societies worldwide for generations to come. The realisation is growing that climate change will bring about major changes and create uncertainties and risks in numerous areas. Science can and must play a key role in developing integral strategies and scenarios for tackling climate change in the longer term. This conclusion prompted the Executive Board of NWO and the Academy Board of the KNAW to jointly decide to appoint a 'task force' to make the necessary preparations for a Dutch Climate Research Initiative.

The purpose of the initiative is to consolidate the country's strengths in climate research in a national research programme along three parallel, supplementary and mutually reinforcing tracks:

- 1.1 A national pact on climate research, designed to highlight the activities of the various actors engaged in climate research in the Netherlands and to foster agreement among those actors to devote some of their activities and resources to achieving a common goal. To that end, they will sign a Memorandum of Understanding and make commitments ('pledges'), which will be published on a website and then monitored. This will provide transparency about the efforts and strengths of knowledge institutions, governmental bodies, NGOs and other actors and facilitate the effective pooling of resources at the national level.
- 1.2 A national centre of excellence for integral climate research of international repute. The centre will consolidate the strengths of Dutch research institutes, universities and other organisations in relation to climate research. It will host events such as lectures, debates, workshops, etc. with a view to connecting people, institutions, strategies and knowledge and generating new, disruptive concepts and visions.
- 1.3 A national programme of integral climate research that promotes and facilitates the fundamental integration of relevant scientific disciplines. Although significant progress is being made in specific areas, such as climate forecasting and advances in circularity and the energy transition, there is a risk that the integration of insights and activities in concepts, models and practice will fall even further behind. Creating a scientific basis for integral climate research demands special attention, and that includes training a new generation of climate scientists who are capable of largely abandoning the traditional distinction between the natural sciences, social sciences and humanities.

These terms of reference set out the task, the composition and procedure of the task force.

2 Basic principles

- 2.1 The task force is a temporary advisory body established by the boards of NWO and KNAW.
- 2.2 The task force will advise the boards of NWO and KNAW on the establishment of a national climate research initiative based on the three tracks defined in sections 1.1 – 1.3 and work towards a concrete action plan.
- 2.3 Formal decisions relating to the task force and the advice it provides will be made by the boards of NWO and KNAW.
- 2.4 The task force will be supported by the offices of NWO and KNAW.

3 Task force's assignment

- 3.1 The task force's assignment is to define the three tracks and submit a proposal to the boards of NWO and KNAW for the ideal design of (1) the climate pact, (2) the Centre of Excellence and (3) the national programme, bearing in mind the ultimate goal of formulating strategies and scenarios for combating climate change and meeting the relevant international targets.

4 The task force

- 4.1 The task force will have between 7 and 11 members, including a chairperson and two vice-chairpersons. All of the members of the task force will be appointed by the boards of NWO and KNAW.
- 4.2 The task force will be representative of the broad field of climate-related research, will be diverse and inclusive in every respect, and will be closely associated with relevant scientific and societal sectors through its members.
- 4.3 Once formed, the task force will be divided into three groups (sub-task forces). Each sub-task force will focus on one of the three tracks of the national climate research initiative (see sections 1.1–1.3). The chairperson and the vice-chairpersons of the task force will be the team leads of the sub-task forces.
- 4.4 Each sub-task force will consist of 2-4 members of the task force, together with 2-4 additional members with specific expertise in the domain of the track concerned.
- 4.5 The members of the task force are jointly responsible for its advisory reports.

5 Profiles of members of the task force

- 5.1 The members of the task force will have strong ties with climate-related research.⁸ They will have considerable experience in one or more domains relevant to this initiative.

⁸ In a broad sense of the term, including academic, practice-oriented, policy-inspired research in different fields and at different levels, national and/or international

- 5.2 The members of the task force will be connectors and innovators. They will have a broad perspective that extends beyond their own discipline, approach and institutional setting. They will have an open, creative and proactive attitude towards innovation and establishing links between different aspects and domains of climate research.
- 5.3 The members of the task force will have close relationships with relevant societal and scientific actors and networks through their own field of work.

6 Procedures of the task force

- 6.1 The task force will meet regularly and on the initiative of the chairperson and/or vice-chairpersons to discuss progress with the project as a whole and the progress in the sub-groups and to plan further steps.
- 6.2 The three sub-task forces will meet independently of the wider task force and on the initiative of the team lead of the relevant sub-task force.
- 6.3 All of the activities of the task force (and of the sub-task forces) will receive support from the office.
- 6.4 The task force will report to the boards of NWO and KNAW; the sub-task forces will report to the task force.

II Background, composition and procedure

In 2019, the Royal Netherlands Academy of Arts and Sciences (KNAW) and the Dutch Research Council (NWO) resolved to establish a [Permanent Committee for National Institutes](#) (PCNI). The PCNI was asked to advise on broad scientific and societal developments to which the two organisations should respond through their portfolio of national research institutes. To that end, the PCNI organised a round of broad strategic consultations and a conference, which was held in the autumn of 2021. The PCNI concluded from this broad 'field survey' that KNAW and NWO could play a prominent role in advancing Dutch science in the domain of climate. The PCNI observed that almost all of the participants in the consultations and the conference agreed that climate change and climate adaptation represented the greatest existential challenge facing society.

In the [advisory report](#) it published for the boards of KNAW and NWO in January 2022, the PCNI concluded that climate is a theme that demands a proactive and responsive approach and calls for a 'new-style institute'. The focus should be on cross-domain collaboration, knowledge sharing, coordination and inclusion. It suggested that existing networks and relevant expertise could be consolidated in such an organisation.

KNAW and NWO acknowledged the urgency and importance of linking the research in this field. Climate change will continue to present a major challenge to societies worldwide for generations to come. There is a growing realisation that climate change will cause enormous changes, uncertainties and risks in numerous areas. Science must play a key role in developing integral strategies and scenarios for tackling climate change in the longer term. In the knowledge that different, sometimes highly diverse, forms of climate-related research will have to collaborate intensively on this theme in the future, in February 2022 KNAW and NWO resolved to establish a [Climate Research Task Force](#), which would operate on the principle that the climate challenge calls for an integral and inclusive (and thus interdisciplinary) approach to research.

Task

The task force was instructed to review how Dutch climate researchers from every discipline could join forces in carrying out an agenda for integral climate research and how existing knowledge and expertise could be streamlined. To that end, the task force is composed of researchers from knowledge institutions throughout the country who represent a wide range of expertise and encompass the entire domain of climate research.

The task force was given the task of devising a research programme with three parallel and mutually reinforcing tracks and producing an advisory report on the subject for NWO and KNAW:

- 1 A national pact on climate knowledge, highlighting the activities of the various Dutch actors in the field of climate;
- 2 A national centre of integral climate research of international repute, in which Dutch research institutions, universities and other organisations combine their strengths in the field of climate knowledge;
- 3 A national programme of integral climate research that promotes and facilitates the fundamental integration of relevant scientific disciplines.

The complete Terms of Reference in which the task force's assignment is described can be found in appendix 1.

Procedure

The members of the task force split up into three sub-task forces for the purpose of defining the three tracks of the initiative. Each sub-task force was supplemented with a number of scientists and experts, so a larger number of researchers were involved in preparing and writing this advisory report. A list of the members of the task force and of the sub-task forces is presented below.

The task force held its kick-off meeting on 14 April 2022. Between 14 April and 8 July the task force held fortnightly (online) meetings. The three sub-task forces met online in the intervening weeks.

The task force based its advice primarily on the expertise of its members, their experience in conducting research, participating in consortia (interdisciplinary, national and international) and fund raising for research. The task force also surveyed the broad 'climate field' in the Netherlands, with the help of the offices of NWO, KNAW and ZonMw which gathered information about research groups, consortia and initiatives. Given the short period within which the task force was asked to produce its advice, more extensive consultation and more detailed analysis of the field was impossible.

The task force was assisted by staff members from the offices of NWO, ZonMw and KNAW.

Composition of the task force

- Professor Heleen de Coninck, TU Eindhoven and Radboud University, chairperson
- Professor Gerard van der Steenhoven, KNMI and University of Twente, vice-chairperson
- Professor Linda Steg, University of Groningen, vice-chairperson
- Professor Han Dolman, NIOZ and Vrije Universiteit Amsterdam
- Professor Jan Willem Erisman, University of Leiden
- Dr. Sanli Faez, University of Utrecht
- Professor Liesbeth van de Grift, University of Utrecht
- Dr. Marjolijn Haasnoot, Deltares and University of Utrecht
- Professor Carolien Kroeze, Wageningen University and Research
- Professor Andrea Ramirez Ramirez, TU Delft
- Professor Diana Suhardiman, KITLV and University of Leiden

Additional members of the three 'sub-task forces'

- Professor Maarten van Aalst, IRCRC and University of Twente
- Professor Eefje Cuppen, University of Leiden
- Professor Bart van den Hurk, Vrije Universiteit Amsterdam and Deltares
- Dr. Maud Huynen, University of Maastricht
- Professor Derk Loorbach Erasmus University, DRIFT and DIT
- Professor Emeritus Johan Mackenbach, Erasmus Medical Centre
- Dr. Reint Jan Renes, Amsterdam University of Applied Sciences
- Professor Bert Scholtens, University of Groningen and University of Saint Andrews
- Professor Detlef van Vuuren, University of Utrecht and PBL
- Dr. Ellen Weerman, HAS University of Applied Sciences
- Professor Birka Wicke, Radboud University
- Professor Josephine van Zeben, Wageningen University and Research

III **Proposal for the mandate of KIN quartermasters**

A mandate for a quartermaster or a team of quartermasters might be as follows:

1 **KIN Programme**

- 1.1 Catalogue and check the relevant research activities currently underway in the knowledge institutions; make an inventory of the major themes being covered.
- 1.2 Define lines of research for the programme and the KIN International Programme.
- 1.3 Establish lines of communication and links between the knowledge institutions.

2 **KIN Pact**

- 2.1 Draw up a template for a statement in which the envisaged partners in the KIN Pact express their commitment and give an overview of their current efforts in the field of climate research.
- 2.2 Identify and approach parties to join the KIN Pact.

3 **KIN Centre**

- 3.1 Further define the governance model of the KIN Centre and the staffing it requires.
- 3.2 Identify and approach partners in the KIN Centre.
- 3.3 Secure declarations of intent from the envisaged partners regarding their cooperation with and participation in the KIN.
- 3.4 Draw up a cooperation agreement.
- 3.5 Design a participation system.

4 **Budget**

Draft a detailed underpinning of the necessary budget, which also shows which elements of the programme are already being financed or will be financed from other sources.

5 **Pilot phase**

Set up a pilot phase (including a budget) during which experience will be gained with the new approach to research in the KIN programme.

6 Exit strategy

Although the KIN is obviously not a short-term initiative and will have to continue for at least ten years, the plans for the KIN should also clearly show when and under what conditions the activities of the KIN will end, for example what objectives must have been achieved.

It must be possible for PhD programmes that have just started to be completed. It is also important to consider in advance how the contributions of the various partners will be mutually settled.

7 Monitoring and evaluation

Formulate measurable indicators for evaluating the KIN.

IV Glossary of terms

Climate Council	The scientific advisory council, as proposed by Minister for Climate and Energy Policy Rob Jetten in his Draft Policy Programme sent to the House of Representatives on 2 June 2022, which will advise the minister on climate policy.
KIN	Dutch Climate Research Initiative
KIN Council	The KIN body charged with managing, monitoring and accounting for the use of the KIN's resources and which is responsible for achieving the objectives of the KIN.
KIN Centre	The hub from which the activities of the KIN will be supported. The partners will be attached to it by means of a cooperation agreement in which they undertake to make a contribution (usually in the form of resources in kind) to the KIN Centre and to achieving the KIN's mission. Funds from the programme for the partners will also be allocated by the Centre.
KIN Management Board	The management of the KIN Centre, comprising one or more scientific directors and a director of operations. The KIN management will function as the secretary of the KIN Council and manage the KIN on a day-to-day basis on behalf of the KIN Council.
KIN Pact	The collective of knowledge institutions and other parties in society that are engaged in or wish to be engaged in climate research, including governmental bodies, NGOs, companies and foundations. The partners in the KIN Pact pledge to make a (self-determined) contribution to achieving the joint mission of the KIN.
KIN Programme	The national research programme for integral climate research.
Programme Council	The Programme Council will advise the KIN Council on the progress with the KIN programme and assess new research proposals on the criteria of their quality and urgency and whether they are suitable for the KIN programme. Its members are researchers from the partner institutions. The Programme Council will receive support from the KIN Centre.
Pact Advisory Council	The Pact Advisory Council will provide the KIN Council with input from society and advise the Council on what is going well, what improvements are needed and what is missing. Members of the Council are delegates from the KIN Pact. The Pact Advisory Council will receive support from the KIN Centre.
Senior fellows	Talented and innovative senior researchers, typically employed by one of the partner institutions, but temporarily financed from the KIN Programme to quickly develop new lines of targeted research in the KIN Programme.
Post-doctoral fellows	Junior researchers, funded from the KIN Programme, with full-time appointments to start working on new research proposals. They can be hired as employees of the Centre or of a partner institution, depending on which makes more sense and where the research will be concentrated.