



Rijkswaterstaat
Ministry of Infrastructure
and Water Management

Innovation Agenda 2030

Collaboration for fast and focussed innovation

Update 2023 | #RWSinnovates



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Collaboration for fast and focussed innovation

Developments in the fields relevant to Rijkswaterstaat are progressing faster than ever. The climate is changing, energy needs to be greener, mobility is growing, and space is becoming scarcer. Additionally, a significant part of our country's infrastructure is nearing the end of its technical lifespan.

These developments present us with a challenging task for the coming decades. These are issues that cannot be resolved by relying on old approaches. Keeping our country safe, liveable, and accessible requires new, innovative solutions that are smarter, more sustainable, and more affordable. And this should not be limited to technical innovations, but also include process innovations.

Innovation is crucial. Yet, innovation is only possible if we combine our forces with market parties, knowledge partners, and subnational governments. If we succeed in experimenting and standardising together, we can accelerate the process of bringing innovations to the production cycle and roll them out in practice faster. Without validation, there is no standardisation.

This is what we aim to contribute to with this Innovation Agenda. By being clear about our ambitions and specifying which innovations will have priority in the coming years, we hope that companies and knowledge institutions can better align their own course with ours. This Innovation Agenda will never be complete. If necessary, new developments will earn their spot on it.

But no matter how you look at it, those ambitions are much greater than what we can achieve in the short term. That is why focus is so important. We will have to make good use of

scarce resources to further innovations that have the highest potential to contribute to our goals. This requires sharp choices, creative solutions, and strong collective thinking and action.

Therefore, this Innovation Agenda is, at its core, a call to engage in conversation. It is an invitation to explore together how we can optimally leverage each other's roles and expertise. But also, how we can help and inspire each other. And all that in an optimal form of collaboration. One that is not set in concrete but can be adapted to a situation in such a way that it brings out the best in each other. That way, we can innovate together faster and with more focus.

Let us quickly gather around the table to turn our country's innovation challenges into a shared ambition. I hope that this agenda will inspire you to do just that.

Michèle Blom, Director-General of Rijkswaterstaat



“As you can see, much remains the same in this biennial update as we aim to stay on the course we set at the outset. However, important new developments have been incorporated. Climate adaptation, in particular, takes on a new focus. I am pleased to see the significant steps that we have taken in this with our partners in the past two years. We would like to express our gratitude to everyone who contributed. For those not yet acquainted, we invite you to join us in this effort. However, the task is far from complete. And in some areas, it proves to be even more challenging than we initially thought. The acceleration that is required for the replacement and renovation challenge is an enormous task. Therefore, we extend an appeal to continue working together steadfastly, ensuring a safe, accessible, and liveable Netherlands.

Introduction to the Innovation Agenda 2030

Before you is the Innovation Agenda 2030 of Rijkswaterstaat, update 2030. It outlines the innovation challenges faced by Rijkswaterstaat in addressing significant societal issues related to sustainability, climate, and energy. To tackle these challenges, we depend on the concerted efforts of market parties, knowledge institutions, and other government entities; we cannot innovate in isolation. Hence, we aim to use this agenda as a platform to engage in dialogue with our partners—a dialogue on how we can collectively realise these innovation challenges.

Objectives of this Innovation Agenda

Through this Innovation Agenda, Rijkswaterstaat aims to inform the outside world about its innovation challenges, providing guidance for the dialogues we have with our partners. Additionally, the agenda serves to steer our own organisation by:

- Offering insight into the challenges facing Rijkswaterstaat and the overarching, global innovation issues arising from them.
- Providing an impression of how collaboration with partners can take shape and how we intend to accelerate the scaling of innovations.

Let's tackle these challenges together!

As the implementing organisation of the Ministry of Infrastructure and Water Management, Rijkswaterstaat is deeply embedded in society, contributing to spatial domain activities. As a curious and data-driven organisation, we would like to explore and leverage the opportunities presented to us by new technologies and innovations. We would like to do that together with our community, the partners, and users who are facing similar challenges. That is how we think we can propel the progress of the Netherlands.

Our challenges

Rijkswaterstaat is facing several significant challenges. Foremost among them is the most extensive maintenance challenge in our history: the Replacement and Renovation Challenge (VenR). In the coming years, hundreds of bridges, locks, viaducts, and tunnels will undergo renovation or replacement. The past two years have shown that there is a high need for a significant acceleration in the replacement and renovation of our assets. Considering the current scarcity in the job market and budget constraints for maintenance, this poses a substantial challenge that calls for new approaches to how we work.

At the same time, we must address the impacts of climate change and strive to operate in a climate-neutral and circular manner by 2030, and thus contributing to the reduction of nitrogen and particulate matter. “What we do, we do sustainably” is our new guiding principle.

Developments in the field of digitalisation present numerous opportunities. It can help us to improve our capabilities in construction, management, and maintenance, as well as traffic and water management. Digitalisation can also help us optimise network capacity utilisation and conducting the extensive maintenance challenge as efficiently as possible.

Rijkswaterstaat's definition of innovation:

The development and application of new products, processes, services, and systems for Rijkswaterstaat.

Focus points of the Innovation Agenda 2030

The challenges faced by Rijkswaterstaat have been divided into five focus points:

- Asset Management 2.0: Replacement and Renovation
- Sustainability and Living Environment: Sustainable Infrastructure
- Climate Adaptation
- Smart Mobility
- Data and Information Provision (IV)

Various innovation challenges have been articulated for each focus point (refer to chapter 2). These focus points are addressed in conjunction. For example, VenR, Climate Adaptation, and Smart Mobility leverage innovations in the field of data and IV.

Rijkswaterstaat closely monitors societal and technological developments. These developments may sometimes give rise to new challenges, leading to adjustments in the Innovation Agenda.

Not everything is feasible

This Innovation Agenda includes ambitious goals that Rijkswaterstaat cannot achieve independently or with the current budget. Hence, we will allocate our budget to innovations with which we believe we can make the biggest difference. It also requires collaboration with our partners, consider, for example, the exploration for new revenue models. Moreover, conscious choices must be made: where do we want to act as the “launching customer,” and where might we perhaps prefer to follow the activities of others? Additionally, where possible, we will combine our challenges strategically. For instance, executing the VenR challenge in a climate-neutral manner and subsequently sharing our knowledge and experiences.

For the successful application of innovations, Rijkswaterstaat identifies three crucial prerequisites: equal and complementary collaboration, rapid scaling and application of high-value innovations, and maintaining focus. This ensures the vitality and future-proofing of our networks. Therefore, the motto of this agenda is: Innovate together faster and with more focus.

For whom and with whom?

This Innovation Agenda is primarily intended for all collaborating partners of Rijkswaterstaat: market parties, knowledge institutions, and governing bodies. Additionally, it serves as an internal guide, helping Rijkswaterstaat align dispersed innovation efforts across the organisation and prioritise initiatives. Ultimately, our partners benefit from this alignment. This Innovation Agenda aims to inform our partners about our innovation challenges and seeks collaborative input. Yet we acknowledge the need for internal improvements, especially in expediting the broad application of innovations. That is why we conclude this agenda by offering an insight into our internal efforts to accelerate the shift from innovation to production phase, and to enhance our learning and innovative capabilities.

Challenging and encouraging the market

As Rijkswaterstaat, we seek to challenge market parties in various ways to collaborate with us, especially in our projects. This means creating sufficient interest for the market to earn back investments in innovation.

An example: In our replacement and renovation challenge, we will work with portfolios of similar objects. A market party that performs well during the first assignments through innovation may qualify for subsequent projects.

This offers opportunities for recouping investments, serving as an incentive for innovation. In our sustainability challenge, we employ pioneer, peloton, and launching customer projects. As a launching customer, we provide space to apply innovations in our projects, giving companies the opportunities to bring innovations contributing to our challenges to the market. In pioneer projects, we challenge market leaders with extra ambitious sustainability requirements and more challenging award criteria in tenders. Subsequently, we guide the peloton by gradually increasing minimum sustainability requirements. That way, we encourage all market parties to contribute to the gradual sustainable development of our projects.

Collaboration for fast and focussed innovation

We operate with FOCUS: assessing which innovations make the most significant contributions to our challenges and prioritising them.

We work TOGETHER with other governing bodies, market parties, knowledge parties and stakeholders by actively assuming clear roles and responsibilities to tackle societal challenges.

We work FASTER by clarifying decision-making processes and aligning innovation, standardisation, and production more effectively.

Guide to reading

The motto of this Innovation Agenda – Together, Faster, Focus – is reflected in how the chapters have been organised. Chapter 2 describes the innovation challenges and the approach with corresponding roadmaps. Chapter 3 provides an overview of the ways in which Rijkswaterstaat seeks to collaborate. Chapter 4 discusses how we want to incorporate innovations faster into our production cycle. In chapter 5, we delve into the question of learning and outline the actions Rijkswaterstaat is taking internally, thereby extending an invitation to our partners to join this process.



Focus on innovation challenges

This chapter outlines the themes that Rijkswaterstaat considers as the most critical challenges in the coming years and which requires collaboration with our partners. These are referred to as focus points. Each focus point consists of several innovation challenges. Below, the focus points are briefly introduced.

Asset Management 2.0: Replacement and Renovation

In the coming years, (parts of) hundreds of bridges, locks, tunnels, storm surge barriers, and linear elements will need replacement and/or renovation. Innovations are necessary to achieve this smoothly, affordably, and sustainably. By restructuring its asset management and aligning it with ISO55000 standards, Rijkswaterstaat aims to better control the maintenance challenge of the networks. Maintenance includes both management and maintenance, as well as replacement and renovation. A unified information system with current, reliable, and comprehensive data is a fundamental requirement.

Sustainability and Living Environment: Sustainable Infrastructure

For the transition to climate-neutral and circular infrastructure projects, having a 'vision for the future' and consistent multi-year planning is of great importance. Rijkswaterstaat opts for a robust ambition: Becoming climate-neutral and circular by 2030. To achieve this, we increasingly embed sustainability in our tenders and projects. Additionally, we have developed a roadmap with the market, other subnational governments, and knowledge institutions for each transition path, outlining the route up to 2030. Based on new developments, we will refine and sharpen this route progressively. In addition to this transition, Sustainability and Living Environment also focus on our role as area partner. By utilising our area, knowledge, and/or execution power, RWS can make a significant contribution to major challenges in the spatial domain, such as those relating to the energy transition, housing, nature, and climate adaptation.

Climate Adaptation

Climate change poses significant challenges for Rijkswaterstaat. By addressing water safety and freshwater supply, we are already anticipating some future threats. Yet, the increasingly intensive use of space in our country and the growing weather extremes necessitate additional measures. Choices must be made, and together with policies and external partners we must determine where we take which (additional) measures and which risks we find acceptable. We must radically adapt our approach: making room for climate adaptation with water and soil as guiding factors.

Smart Mobility

Smart Mobility is the collective term that encompasses all smart developments in the field of digitalisation and automation of mobility, such as self-driving cars, autonomously sailing ships, digitalisation in traffic and mobility management, new mobility services, and connectivity and data-driven work that are essential in this context. For this endeavour, Rijkswaterstaat engages with the market. The ambition is to make the most of the new possibilities where it is beneficial for Rijkswaterstaat, its partners and the users. This should contribute to increasing safety, sustainability, traffic flow, and to our capability to provide smarter services to (marine) road users.

Data and Information Provision (IV)

We want to leverage the opportunities that digitisation offers to ensure that the Rijkswaterstaat's work is organised in a better, smarter, faster, and more affordable way. Here, again, Rijkswaterstaat closely monitors market developments. Data and IV are closely linked to the other focus points. For Smart Mobility, for example, innovation in the field of Data and IV are necessary.

The approach with roadmaps

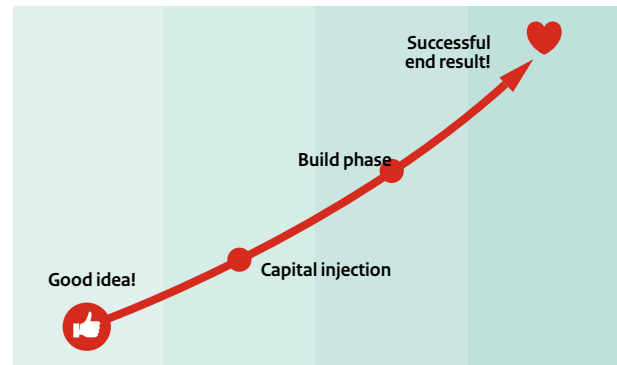
Rijkswaterstaat employs roadmaps for tackling innovation challenges. Goals are placed on a timeline, and the key activities and milestones are identified. Roadmaps are created only for challenges in which Rijkswaterstaat has a significant or leading role. For these challenges, we collaborate with other clients, market parties, (organised) citizens, and knowledge institutions. Together with the best experts, we form an innovation ecosystem around such a roadmap. The specific tasks and timelines for each roadmap are determined collaboratively.

The status, structure, and format of the roadmaps vary. Some roadmaps, such as those for Sustainable Infrastructure and the Tunnels roadmap of VenR, are almost completed and have been developed in collaboration with partners. For other challenges, the roadmaps are still in development and need to be discussed with partners: for this, we invite you to share your thoughts. We also welcome innovation proposals, both in terms of process and technology, that align with the roadmaps.

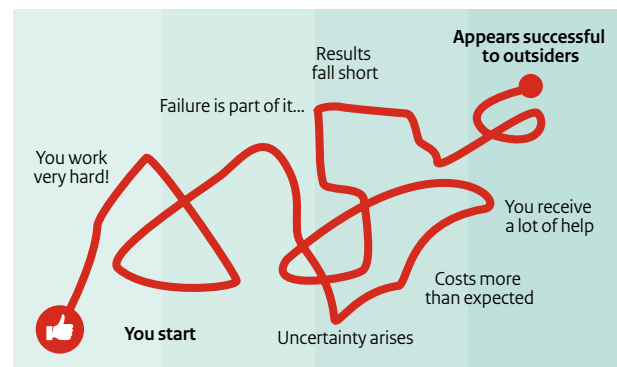
Benefits of working with roadmaps

Innovation processes are dynamic and unpredictable.

On paper, it may seem like this:



But the reality is much more unpredictable:



How the roadmap approach works

- For each roadmap, ambitions and goals within a specific scope are defined as sharply as possible.
- We indicate where we currently stand and the steps we will take and when to achieve the ambitions and goals.

The adaptive approach with roadmaps helps to navigate this unpredictability. We can adjust the approach to new developments or redirect it based on results. Additionally, we can monitor progress based on the roadmap.

Roadmaps for focus points

The table below provides an overview of the different roadmaps associated with the focus points of the Innovation Agenda. As mentioned above, the status of the roadmaps varies, and periodic updates will be made, updating existing roadmaps or occasionally adding a new one.

In the attachment, you will find an overview of the key concrete results from 2021-2022 and a summary of the major innovations in 2023 and 2024.

Focus Point	Roadmaps
Asset Management 2.0: Replacement and Renovation	<ul style="list-style-type: none"> - Locks - Storm surge barriers - Tunnels - Bridges - Linear infrastructure
Sustainability and living environment: Sustainable Infrastructure	<ul style="list-style-type: none"> - Transition Path Pavements - Transition Path Sustainable engineering constructions - Transition Path Road, Dyke, and Rail Equipment - Transition Path Maintenance of the coastline and fairways
Climate Adaptation	<i>Roadmaps for climate adaptation will be developed in a later phase.</i>
Smart Mobility	<ul style="list-style-type: none"> - Road Traffic Management - Shipping Traffic Management
Data and Information Provision (IV)	<ul style="list-style-type: none"> - Sensing and AI - Digital twins and predictive twins - Enabling technologies

Introduction to Innovation Portfolio Management

To make better decisions about innovations that have the most positive impact on our goals and challenges, Rijkswaterstaat is developing innovation and portfolio management. While innovation portfolios were already used in some parts of the organisation, a Rijkswaterstaat-wide overview is also desirable. Digital and sustainable themes are integral parts of the portfolio.

This enables us to:

- Prioritise more effectively;
- Be more capable at assessing whether these innovations alone will achieve our objectives or if more is needed;
- Gain better visibility into when things will go into production, allowing us to respond accordingly (this is also expected to accelerate scaling);
- Achieve more synergy between innovations by inspiring each other and engaging in conversations about them.

System dynamics modeling

It can be difficult to make informed decisions about which innovations contribute the most to our challenges. Therefore, we, together with stakeholders and experts, examine each innovation challenge to understand where an innovation intervenes in the system, how it contributes to our goals, and identify any blind spots. We use a method called system dynamics modeling for this. It helps us better steer the coherence of innovations and the conditions needed to make them successful.

Innovations with multiple objectives

Some innovations contribute to multiple focus points, viewed through an integrated lens. These are particularly valuable innovations for us. An example of this is the Flexible groyne with Xstream blocks. With 60% pore space between these sustainable concrete blocks, it results in a 50% reduction in CO₂ emissions and also due to the use of fewer primary resources compared to traditional groynes. Additionally, it is a construction that is easily modular during damage repair and necessary shape changes, such as fluctuations in water levels, making it a climate-adaptive measure. Another advantage is that it saves 40% in costs and that it is very rapidly constructed with minimal capacity. This is on top of the savings it brings by reducing the need for dredging the water bottom

Results in 2021-2022

"Development Innovation Portfolio Management (see framework): a first pilot has been conducted for the Locks roadmap, and we have developed a dashboard that can be used for all objects, areas, and services of Rijkswaterstaat. With this, we can steer innovations across the entire organization, but also per focus point or, for example, bridges or riverbanks.

For Sustainable Infrastructure, roadmaps have been created for each transition path. These have been shaped together with partners. Some roadmaps from VenR were still quite process-oriented and have been sharpened with more substantive milestones.

The coherence between the focus points has been strengthened. For example, a joint roadmap AI for Smart Mobility has been created by Smart Mobility and Data and IV.

The developed evaluation framework has been applied in various places, including Data&IV, and is used to weigh innovations.

Focus for 2023-2024

The innovation portfolio management is set up through a growth model. In the coming year, we will further elaborate on the innovation portfolios. Additionally, we will further develop the use, and management of the innovation portfolios so that we are better able to make choices from an overview and quickly move innovations towards implementation.

We will further elaborate on the coherence between the focus points based on several concrete topics that transcend focus points (including data-driven asset management, sustainable materials in objects).

Connecting focus points to production lines in a correct way.



Dit is een uitgave van

Rijkswaterstaat

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