

Strengthening the resilience in the Nordic bioeconomy

POLICY RECOMMENDATIONS

Enabling effective and efficient progress towards a more resilient Nordic bioeconomy in times of crises



THANK YOU!

SNS and NKJ would like to express their gratitude to all stakeholders who contributed with expertise throughout the project.

POLICY BRIEF

STRENGTHENING THE RESILIENCE IN THE NORDIC BIOECONOMY

Policy recommendations:

Enabling effective and efficient progress
towards a more resilient Nordic bioeconomy in times of crises

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Summary

■ This policy brief presents recommendations on how to strengthen the resilience in the Nordic bioeconomy. Multiple crises, including the war in Ukraine, the Covid-19 pandemic and climate change, has affected the region over recent years. On this backdrop, the Nordic Council of Ministers assigned Nordic Agri Research and Nordic Forest Research to identify areas suitable for increased Nordic collaboration to strengthen the resilience within the four bioeconomy sectors food systems, agriculture, forestry, fisheries and aquaculture.

In this brief Nordic Agri Research and Nordic Forest Research summarise the results from the project “Strengthening the resilience in the Nordic bioeconomy” carried out during 2022 and the beginning of 2023. Results are based on desktop studies of Nordic initiatives on crises management and resilience, and multiple dialogues with experts from the Nordic bioeconomy.

Key findings

■ Resilience in the Nordic bioeconomy is a complex area, covering food systems, agriculture, forestry, fisheries and aquaculture, and various types of crises (including war and conflict, pandemics, and climate change) with various stakeholders engaged and initiatives ongoing (several recently initiated). To address the complexity, multi-stakeholder dialogues with experts from all parts of the bioeconomy are needed.

There is a limited number of cross-sector initiatives to address the resilience in the bioeconomy and a clear focus on national initiatives (although some bilateral initiatives and a few encompassing the entire Nordic region).

There is a strong focus on resilience throughout the region and the bioeconomy due to the recent years’ crises, but food security stands out as the most prominent topic in the discussions.

There is an explicit interest in increased Nordic dialogue, knowledge sharing and joint efforts (both from experts and decision makers).

Clear mandate and resources are requested to enable cross sector Nordic collaboration. It is challenging to find experts able to devote time to Nordic initiatives. Although considered relevant and important the experts are fully occupied by national (or bilateral) initiatives and lack the mandate and resources to engage in Nordic collaborations.

Policy recommendations for the Nordic countries

Nordic policymakers and stakeholders can enable effective and efficient progress towards a more resilient Nordic bioeconomy by:

- Developing a **joint roadmap** for a resilient Nordic bioeconomy
- Strengthening the resilience in the Nordic bioeconomy value chains by **identifying** and addressing critical dependencies
- Enabling an efficient, accessible, and safe **sharing** of high-quality bioeconomy data across the Nordic region
- Supporting **knowledge sharing** between Nordic crises communication functions
- Integrating the recommendations for a more resilient Nordic bioeconomy in the development of the **Nordic Cooperation Programme** for 2025-2030

The bioeconomy plays a vital role for a sustainable and prosperous Nordic region

The bioeconomy can be described as “[it is] all-encompassing and comprises those parts of the economy that make responsible use of renewable biological resources from the land and water for the mutual benefit of business, society and nature¹”. Bioeconomy thereby refers to the systems and sectors of our economy which rely on biomass, and it comprises the production of goods, services and energy. In the context of this policy brief, the bioeconomy includes the four sectors food systems, agriculture, forestry, fisheries and aquaculture.

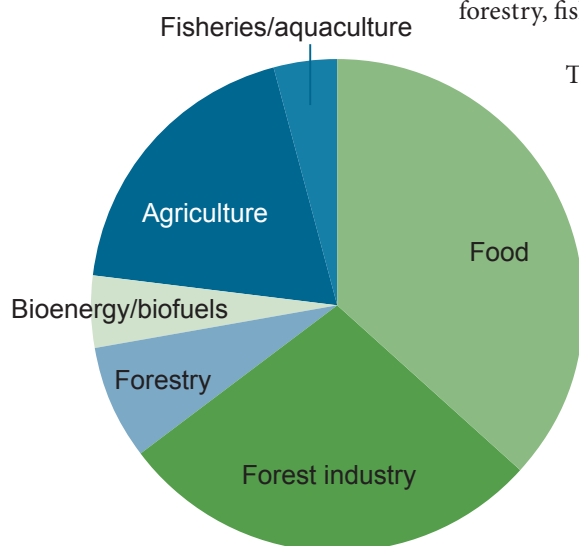


Figure 1: The relative size of each of the bioeconomy sectors, measured as shares of the total turnover of the bioeconomy in Finland, Sweden, Norway, Denmark, and Iceland in 2014^{4,5,6}.

The bioeconomy in the Nordic countries provides solutions to enhance the sustainability and prosperity of the region through both regional and local development. Relatively to its population, the Nordic region include a rich variety of bioresources resulting in the development of different bioeconomy sectors across the region (see figure 1 below). The bioeconomy also represents considerable shares of total employment in the region. For instance, on average, 17.1% of the Nordic population is employed in the bioeconomy². New models of activity through circular bioeconomy also create employment, innovation, as well as knowledge and capacity building throughout the region. These models also encourage cooperation, and environmental and social economic growth³.

The Nordic region is unique in its integration. The Nordic identity is supported by similar languages and cultures and policies ensure the access to free mobility for Nordic populations wishing to study, work, or start

businesses in the region⁷. Countries in the Nordic region demonstrate similar economic and social features, amongst others, high level of education and infrastructure such as transportation and energy supply systems and ICT networks⁸. The integration is also supported by similarities in the bioeconomy sectors, such as resemblances in biomass and leading bioeconomy companies active across the Nordic region (for example Orkla, Arla, and Stora Enso to mention a few).

The bioeconomy diversity observed within the Nordic region

The Nordic region hosts a diversity of activities and management models of the abundant local biomass. Denmark is a country mainly characterised by agricultural activities covering 60% of its land area. Finland and Sweden are characterised by extended forest covers, respectively 62% and 67% of the countries' land areas. The two dominant land covers observed in Norway are forests and open lands, respectively covering 37.4% and 37.6% of the land area⁹. Norway's maritime area encompasses a surface six times larger than its total land mass, hosting fishery and aquaculture activities¹⁰. The presence of fishery is prevailing in Iceland as well, with fishery and aquaculture being the largest stream of revenue for the country¹¹.

The bioeconomy is affected, regardless of whether the crisis consists of climate change, a pandemic, or war and conflict

Society has been hit by several major and unpredictable events with a strong impact on important social systems in recent years. These events include crises such as the drought in the Nordics in 2018, the COVID-19 pandemic in 2020, and Russia's invasion of the Ukraine in 2022. In the short term, humanitarian crises created by war and conflict are the most obvious. We cannot, however, ignore the more long-term effects caused by for example climate change and loss of biodiversity. What all these crises have in common, regardless of the cause, is that they affect several parts of society's functions at the same time. Some of the effects are local as from the big forest fires in 2018, while others are global like the pandemic and the Ukraine crisis.

Recent crises have raised questions about the level of preparedness in our society and the ability to deal with disruptions. The degree of market volatility and uncertainties is significantly higher than what we are used to managing or even imagining as possible. Planning under such complex conditions is difficult but critical to the stability of society – but how do we plan for crises of this magnitude, how do we prioritize between different measures, and how do we assess which measures are most resource-efficient? The latest crises have raised questions about the level of preparedness in our society and our ability to deal with disturbances.

The bioeconomy is affected, regardless of whether the crisis consists of climate change, a pandemic, or war and conflict. However, the impact takes different forms depending on the type and extent of the crisis. The ongoing war in Ukraine, for example, has caused major disruptions in the food supply, but also other parts of the bioeconomy. Ukraine and Russia are important actors both in terms of food and en-

Figure 2: Examples of Nordic Agri Research and Nordic Forest Research work around crisis, resilience and preparedness.



- [Det nordiska jordbruket – utmaningar i en framtid präglad av mer extremväder](#)¹⁵
- [Det nordiska skogsbruket – utmaningar i en framtid präglad av mer extremväder](#)¹⁶
- [Resilience in the food, forest and fishery sectors](#)¹⁷

ergy, and the war has brought about disruptions in the form of blockades, problems in logistics chains, loss of production and price increases in a previously unobserved way.

Just as countries come together to cooperate on military defence, joint strategies for the bioeconomy are needed. National solutions can be strengthened through active cooperation between countries. In the Nordic region, there are strong connections between the countries within the bioeconomy sectors and leading companies are active in several of the Nordic countries. There are thus good conditions for identifying, through active dialogue, areas where increased and formalized cooperation within the Nordic region can facilitate preparedness and strengthen resilience in the event of a crisis.

Nordic Agri Research and Nordic Forest Research have investigated the consequences from several recent crises in the Nordic bioeconomy, including effects of the 2018 drought for forests and agriculture and the impact of the COVID-19 pandemic. The studies have resulted in several reports and documents for decision-makers* (see figure 2) and have provided valuable insights into vulnerabilities in the Nordic bioeconomy showcasing the need to strengthen the resilience. The studies also present successful examples of existing Nordic initiatives and identify actions suitable for Nordic collaboration, for example:

- "The Nordic countries should share experiences, instructions and informational material on measures to reduce the risk of forest fires."¹²
- "The Nordic cooperation on agriculture in extreme weather conditions should be developed and formalized."¹³
- "Developing a shared plan for conservation and restoration of marine and coastal areas at a Nordic scale to enable long-term resilience of the sector."¹⁴

Multiple crises hitting the Nordic bioeconomy in recent years, combined with the potential in increased Nordic collaborations to strengthen the resilience in the bioeconomy, led the Nordic Council of Ministers to issue a new assignment, namely, to facilitate joint Nordic efforts enabling a more resilient Nordic bioeconomy.

What is resilience?

Resilience is the capacity of a system, region, or group of people to cope with uncertainty, shocks, disturbances, and long-term crises¹⁸. Resilience can be assessed on different timeframes: short-term resilience consists in the persistence of systems to shocks and crises, and the ability to continue normal activities despite disturbances. Medium-term resilience consists in the adaptivity of systems to shocks and crises, and the ability to reorganise and integrate new solutions to the usual activities. Long-term resilience consists in the transformability of systems, and the ability to organise the system around social, environmental, and planetary boundaries¹⁹.

What is polycrises?

Polycrises are a complex interplay of simultaneous crises. They are characterised by several crises of differing scales and sources impacting different areas of an economy or region at the same time. The interplay of these clusters of crises makes them more threatening to our society than the sum of each individual crises. The Covid 19 pandemic has for example been described as a large scale polycrises in which public health, economies, political structures, and social systems have been impacted simultaneously. The risk of polycrises is currently growing, mainly due to decreasing resilience and the interconnection of risks at the global scale.^{20, 21, 22}

Strengthening the resilience in the Nordic bioeconomy is a complex task requiring multi-stakeholder collaborations

In 2022 the Nordic Council of Ministers gave Nordic Agri Research and Nordic Forest Research a new task; to facilitate the Nordic efforts aiming to increase the resilience in the Nordic bioeconomy. Covering four distinct sectors of the bioeconomy and all types of crises, resilience in the Nordic bioeconomy is a highly complex topic. The breadth, but also the current relevance of the topic, means various stakeholders are engaged and numerous initiatives are ongoing or recently finished.

To manage the wide scope of the assignment, Nordic Agri Research and Nordic Forest Research adopted a multi-method approach including a systematic literature search enabling an overview of the topic, expert workshops, and interviews to identify and prioritise areas with clear Nordic added value, and high-level involvement providing guidance and mandate.

Big interest but limited number of cross-sector and international initiatives

The purpose of the systematic literature search was to provide an inclusive picture of the topic, outlining the efforts made to understand and strengthen the resilience in the Nordic bioeconomy. As such, the mapping served to answer two central questions:

- What initiatives on Nordic bioeconomy resilience are ongoing or recently closed?
- Who (which experts and which organisations) are involved in these initiatives?

By analysing Nordic efforts regarding resilience in times of crisis more than 100 reports and ongoing projects, led by almost 70 different organisations (primarily governmental agencies, universities, and research institutes) were identified. Notably, the mapping was limited to publicly available initiatives, hence not encompassing any private measures to manage crises and increase the resilience.

The mapping highlights the relation between types of crises, countries, and bioeconomy sectors (see figure 3, next page).

It is primarily five types of crises covered in the identified reports and projects, namely war, pandemic and disease, climate, radioactive waste, and preparedness in a general sense. In addition, the mapping shows that the five types of crises are occurring to different extents within the four bioeconomy sectors. There is for example a greater focus on the impact of the pandemic in the food sector and agriculture than in fishing, while the climate crisis is discussed in relation to all sectors. It also becomes evident that there are more initiatives with regards to food and agriculture than in the other two sectors, and that the number of initiatives differs between countries.

The reports and projects have different focus areas. Some concentrate on areas specific to a certain sector, for example animal diseases, storms, and forest fires. Other areas are discussed in relation to several of the sectors. Among these cross-sector areas three reoccur more often than others, namely 1) issues related to import, storage, and logistics, 2) climate adaptation, and 3) contingency planning.

1 Import, storage, logistics, for example:

- Livsmedelsproduktion ur ett beredskapsperspektiv Sårbarheter och lösningar för ökad resiliens – Myndigheten för samhällsskydd och beredskap (MSB), Sverige
- Nordic food transition – Nordiska ministerrådet, Norden
- Nordic Agriculture and Climate Change: Mitigation and Adaptation Recommendations from leading researchers and private companies within the Nordic plant breeding – NordForsk och NordGen, Norden
- Risiko- og sårbarhetsanalyse av norsk matforsyning – Direktoratet for samfunns-sikkerhet og beredskap (DSB), Norge



2 Climate adaptation, for example:

- Klimatanpassning av skogen och skogsbruket – Skogsstyrelsen, Sverige
- Oppdatering av kunnskap om konsekvenser av klimaendringer i Norge – Center for International Climate Research (CICERO) och Vestlandsforskning, Norge
- Climate change induces multiple risks to boreal forests and forestry in Finland: A literature review – Meteorologiska institutet, Finland
- Analyse af danskernes syn på klima og bæredygtighed – Landbrug & Fødevarer, Danmark

3 Contingency planning, for example:

- Beredskabsplan For håndtering af udbrud af planteskadegørere – Ministeriet for Fødevarer, Landbrug og Fiskeri, Danmark
- Beredskabsplan for nye sygdommer på akvatiske dyr – Mattilsynet, Norge
- En robust livsmedelsförsörjning vid kriser och höjd beredskap – Livsmedelsverket och Jordbruksverket, Sverige
- Conclusions and Recommendations for Strengthened Crisis Preparedness in Finland and Sweden – Hanaholmen, Finland

In conclusion, the mapping shows a big interest in the topic throughout the region. There are however a limited number of cross-sector initiatives addressing the resilience in the bioeconomy. Instead, a clear focus on national initiatives (although there were some bilateral initiatives and a few encompassing the entire Nordic region) was found.

Method – Systematic literature search

The mapping was based on a systematic literature search, carried out in May 2022. The search was made via the Google search engine and covered the period of 2018-2022 to focus on recent year's crises but including the drought 2018. The keywords used were selected to cover the subject area and included resilience, crisis, crisis management, vulnerability, preparedness, and the four sectors (agriculture, forestry, fishery, and food). The search also included the five Nordic countries and was made in Swedish, Norwegian, Danish, Finnish, and Icelandic. Although extensive, the mapping should not be seen as all encompassing, but rather providing an overview of initiatives in the Nordics of relevance for a resilient bioeconomy.

A complex topic requires a broad approach and multi-stakeholder dialogues

The mapping provided both insights into the resilience in the Nordic bioeconomy and an overview of organisations and experts involved in the topic. It hence served as a solid foundation for the next of question, namely:

- What areas to prioritise in strengthening the resilience in the Nordic bioeconomy?

To address this question, NJK and SNS engaged in multi-stakeholder dialogues aiming to identify areas of relevance for increased Nordic collaboration while providing Nordic added value. The dialogues were used to narrow down the large number of areas revealed in the mapping, to analyse where increased Nordic efforts would make a substantial difference and formulate policy recommendations enabling an effective and efficient progress towards a more resilient Nordic bioeconomy. The project scope, milestones, and results are briefly outlined in figure 4.

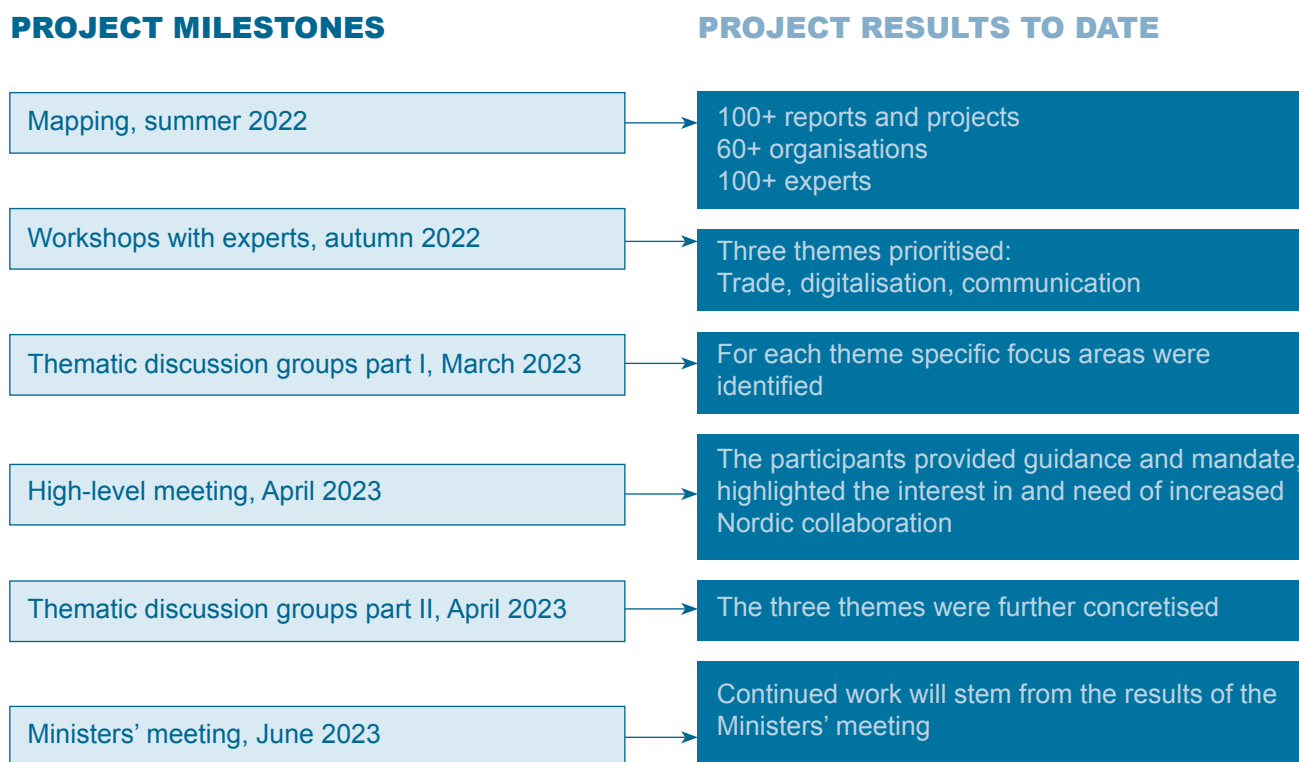
To manage the breadth of the topic, the dialogues were organised in different steps. Firstly, Nordic workshops were held focusing on one sector at the time. A list of key aspects with regards to a resilient Nordic bioeconomy, identified through the mapping, were presented at each workshop. The attending experts were asked to add any missing aspects and then, based on the revised key aspects list, the experts discussed which aspects to focus upon within this project. Criteria for the selection of key aspects included need of increase knowledge or efforts, Nordic added value, and policy relevance. This exercise resulted in three key aspects of relevance across the specific sectors: trade, digitalisation, and communication. For the purpose of this projects these aspects were labelled themes. These themes then formed the base for a second round of Nordic discussions, this time including people from all sectors but experts in the specific theme.

In addition to the expert discussions, Nordic Agri Research and Nordic Forest Research arranged a high-level meeting with representatives from national governmental agencies from the Nordic countries. The meeting participants provided guidance and mandate to the process and explicitly requested increased Nordic collaboration to strengthen the resilience in the bioeconomy.

Despite the challenges stakeholders want to increase Nordic cross-sector collaborations

The mapping and the dialogues conducted clearly showcased the complexity of the topic. Although there is common ground (such as the need of stable access to affordable energy), there are several differences between (and within) the sectors. The level of resilience and the core challenges to ensure resilient production vary between the sectors, from feed in fish production to fertilizers in agriculture, to mention two examples.

Figure 4: Project information in brief including project milestones and results



There are substantial variations depending on the types of crises and differences in terms of how they affect different regions, sectors, and actors within each sector. While all types of crises impose stress on the bioeconomy, there are great differences in how this stress materialises and hence how to mitigate and prepare for it. The effects from climate change differ from those of war and conflict, which in turn are different from the effects of a pandemic. And in addition, it is extremely difficult to foresee the effects of situations of polycrisis and how it may affect different parts of the bioeconomy at different points of time.

There are also challenges in bringing together experts from the different sectors as they are often organised in governmental agencies or research groups focusing on one specific sector or a specific area within a certain sector. It is also worth noting that while policy makers tend to speak of the bioeconomy, this is not a concept commonly used by the experts in terms of defining their expertise or issues in relation to the resilience. Rather experts tend to talk about and organise themselves in more defined areas such as for example food security, forest fires, and animal diseases (which are still very broad topics).

Still, the stakeholders involved in this project emphasise the importance of more cross-sector and Nordic collaborations to strengthen the resilience of the Nordic bioeconomy. The issues are broad and complex, and hence the stakeholders involved argue that the people and organisations involved in solving (or at least mitigating) these issues need to cover a wide range of expertise. This does however create high levels of complexity in terms of the analysis that needs to be conducted, and the organisations that need to be put in place and managed. It is hence of outmost importance to align the level of ambition with resources and mandate.

Trade, digitalisation and communication are of particular relevance in increasing the resilience of the Nordic bioeconomy

A systematic literature search and analysis of Nordic initiatives on resilience in the Nordic bioeconomy, in combination with input from Nordic experts via multi-stakeholder dialogues, resulted in three themes being prioritised for further Nordic collaboration, namely, trade, digitalisation and communication. Through several discussion sessions the themes were analysed and then concretised into recommendations for future Nordic efforts.

Trade in the Nordic bioeconomy

The Nordic countries are subject to intensive trade, depending on imports and exports within the region and with other parts of the world. For instance, 40% of the food consumed in the Nordic region is imported^{23 24}. The dependance on imports and exports entails a dependence on fossil fuels and energy^{25 26 27} and a vulnerability to price fluctuations²⁸. Functional trade systems and access to fuel are therefore key elements for the resilience to crises²⁹. The development of domestic alternatives to imports is recommended to decrease exposure to import-related crises and risks of contamination^{30 31 32}.

Another trend in the Nordic region highlighted by the experts included in this project is the increasing centralization of the food trade systems. This creates an imbalance in bargaining power between grocery trade actors and producers. This trend is coupled with a decrease in profitability for primary producers^{33 34}. Solutions to decreasing profits can include maintaining exports, increased circularity of raw materials and nutrients, as well as incentivizing direct sales of local products^{35 36 37}.

In conclusion, the Nordic bioeconomy is dependent on import and export, internally in the Nordics but also with other regions both nearby and faraway. In the Nordics, bioeconomy trade systems are getting increasingly centralized with uneven profit distribution within the value chains. To strengthen the resilience, it is vital to manage critical import and export dependencies.

Digitalisation in the Nordic bioeconomy

The Nordic region is characterized by a shift to online trade and digitalisation of services. Digitalisation tools such as big data analytics can, amongst others, support a more efficient use of value chains and increase profits^{38 39}. Digitalisation and automation are increasingly important in everyday lives in the region, and the digital shift has notably been accelerated by the recent Covid 19 pandemic^{40 41 42}. The reliance on digital services exposes private and public actors in the region to the threat of cyber-attacks, shortages of power and disruptions in the ICT infrastructure^{43 44 45}.

To reap the benefits from digitalisation and ensure a positive societal impact, it is crucial to enable data sharing and ensuring compatibility between different Nordic data collection initiatives^{46 47}. Cyberthreats however require finding a balance between the necessary openness and accessibility of data resources and ensuring security⁴⁸. It is also essential for actors in the Nordic region to increase the understanding of vulnerabilities and to develop knowledge about new threats^{49 50}.

In conclusion, data constitutes the core of the digital bioeconomy, enabling smart and sustainable solutions vital to strengthening the resilience in the bioeconomy. Data, however, also exposes us to risks related to inclusion, integrity, and cyber security.

Communication in the Nordic bioeconomy

Communication infrastructure is crucial for resilience in the bioeconomy and needs to be maintained and developed, notably in areas with poor or no coverage. Moreover, communication infrastructure is a crucial element to detect and warn the public about threats and crises^{51 52}. The reliance in the Nordic countries on e-communication can however make the societies vulnerable to communication system failures⁵³. Developing knowledge about threats to, and vulnerabilities in, the communication infrastructure is needed to support the development of monitoring techniques crucial to preventive measures and effective communication.

The Nordic region is characterized by considerable trust in official communication and governmental institutions⁵⁴. Active communication and transparency towards the public is pivotal to resilience and continued trust in the region. It is also crucial to ensure resistance against misinformation⁵⁵. Preparation exercises, creation of crisis scenarios as well as knowledge of communication routines and alternative networks of communication are recommended as critical tools for preparedness and increased resilience^{56 57}.

In conclusion, communication routines and networks enable detection and communication of threats to relevant actors and the public to prevent escalation of crises and spreading of misinformation. People within the Nordic region share a general trust in institutions and the information they communicate. The central role of communication networks for the resilience of the bioeconomy however exposes us to risks in terms of e-communication failures.



Networks allow effective and efficient knowledge sharing and collaboration while also ensuring flexibility crucial to crises management

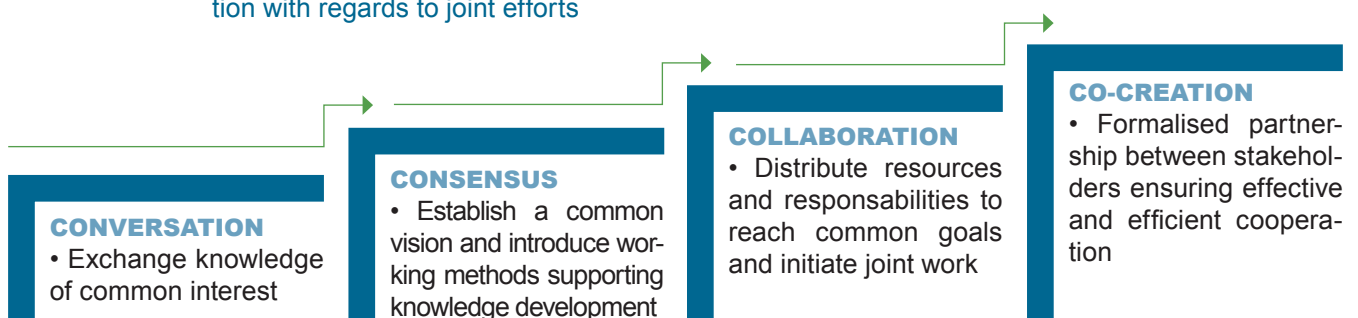
Networks bringing together multi-disciplinary expertise from government agencies, private sector organisations, and civil society groups is a proven method for resilience strategies against crises. Networks are characterised by a decentralized and distributed structure, in which different actors and organizations collaborate and share information and resources to achieve common goals, and may be used to predict, respond, and evaluate crises through a holistic approach. A network containing independent experts with a diverse set of competence are effective in responding to crises⁵⁸.

Efficient knowledge sharing between multiple stakeholders in a network may lead to an improved capability of identifying potential risk and vulnerabilities. It may also enable the development of strategies to mitigate or prepare for crisis. The effectiveness of the network is however dependent on the coordinators ability to pool the correct expertise for specific purposes. A network as a crisis management method also provides the possibility of evaluating crises and integrating lessons learned into future efforts and thereby building a more resilient system over time⁵⁹.

For a network to reap its benefits, its members must engage in regular exercises enabling them to develop trust and deepen their understanding of each other's capabilities. It furthermore requires a well-organised structure and clear communication channels that facilitate the exchange of information, resources, and expertise. With this foundation the network becomes flexible and capable of mobilising quickly⁶⁰.

Successful examples of networks within the Nordic cooperation include for example The Nordic network for forest fires (Nordiska nätverket för skogs- och vegetationsbrand) and the Nordic Testbed Network – Supporting digital transformation in the Nordic bioeconomy. The Nordic network for forest fires is coordinated and financed by SNS and is a result of the Nordic joint initiative to investigate the effects of the extensive forest fires 2018. It addresses resilience in the forestry sector and includes experts from the forestry sector and the rescue services. Nordic Testbed Network is financed and coordinated by Nordic Agri Research, Nordic Forest Research and the Nordic working group for fishery and aquaculture. It includes over 20 testbeds throughout the Nordic and Baltic region focusing on knowledge sharing and collaboration with regards to the speedy development of digital solutions for forestry, agriculture, food systems, and fishery and aquaculture.

Figure 5: The collaboration ladder – a framework to discuss levels of ambition with regards to joint efforts



A network may serve different purposes, from enabling the diffusion of information and facilitating conversations on specific topics, to co-creation where stakeholders work together in joint efforts (see figure 5). Setting the level of ambition is therefore an important aspect of creating a successful network. The expectations need to be clearly defined and agreed upon among the members. Resources to coordinate the network, and to manage planned activities must be secured, and the network participants need a clear mandate to participate in the network and engage in joint efforts.

Overall, networks offer a flexible and collaborative approach to crisis management, which can be particularly effective when facing complex and interconnected crises. By leveraging the strengths and resources of multiple actors and organisations, networks can improve the effectiveness and efficiency of crisis response efforts. Networks thereby provide a favourable method to strengthen the resilience in the Nordic bioeconomy.

Nordic networks for increased collaboration and knowledge sharing, two examples:
[The Nordic network for forest and vegetation fires](#)
[Nordic Testbed Network](#)



Recommendations

to strengthen the Nordic bioeconomy

Expanded Nordic collaboration is key in creating a more resilient bioeconomy, especially in the wake of polycrises. Addressing the challenges of one, let alone multiple crises affecting the region simultaneously, requires coordinated efforts. The diverse perspectives and interests of stakeholders across the different sectors of the bioeconomy need to be considered, and the work must be based on a solid understanding of the systemic interdependencies that characterize the Nordic bioeconomy.

The potential for more joint Nordic efforts to strengthen the resilience in the bioeconomy looks promising. A combination of similar societal structures and topographies, Nordic businesses active across the region, similar political ambitions in for example climate measures, and existing networks and initiatives, creates favourable conditions for Nordic collaboration. In addition, the dialogues conducted as part of this project indicate a strong interest from Nordic stakeholders to work together to address the challenges associated with crisis preparedness and crisis management in the bioeconomy.

Based on the need of, and interest in, increased Nordic collaboration to strengthen the resilience in the Nordic bioeconomy this policy brief presents five policy recommendations. Nordic policymakers and stakeholders can enable effective and efficient progress towards a more resilient Nordic bioeconomy by:

• Developing a joint roadmap for a resilient Nordic bioeconomy

A common view on how to strengthen the resilience in the Nordic bioeconomy and a strong commitment to this end will give necessary direction and mandate to work together across the Nordic region. A joint roadmap will serve this purpose and enable increased Nordic collaboration. It will need to align with the Nordic 2030 vision, and preferably be integrated in the Nordic collaboration program for 2025-2030. Central aspects of the roadmap are to:

- support higher and more stable production in the Nordic Bioeconomy
- include the entire value chains connected to the Nordic bioeconomy
- consider defense strategies and collaborations of relevance for the Nordic bioeconomy

• Strengthening the resilience in the Nordic bioeconomy value chains by identifying and addressing critical dependencies

Understanding the opportunities and barriers for increased resilience in Nordic bioeconomy value chains is a complex but necessary task to improve crises preparedness and management. Investigating trade flows and identifying critical dependencies in the Nordic bioeconomy value chains will enable efficient Nordic dialogues on mitigating measures addressing unwanted reliance on inputs vital to the bioeconomy.

• Enabling an efficient, accessible, and safe sharing of high-quality bioeconomy data across the Nordic region

Access to data is crucial to both crisis preparedness and crisis management, but is associated with a range of legal, ethical, and technical challenges. Identifying and bringing together Nordic stakeholders engaged in bioeconomy related data development will support efficient Nordic knowledge transfer and Nordic data sharing initiatives.

• Supporting knowledge sharing between Nordic crises communication functions

Efficient and correct communication is critical in times of crises, and people in the Nordic region have high trust in official information. Reliance on e-communication and potential misinformation however pose significant risks that need to be mitigated. The Nordic countries face similar needs and challenges in relation to crises communication and by supporting knowledge sharing more resilient crises communication is enabled.

• Integrating the recommendations for a more resilient Nordic bioeconomy in the development of the Nordic Cooperation Programme for 2025-2030

For the recommendations to materialise and have an impact on the resilience in the Nordic bioeconomy they must be integrated into the Nordic collaboration. The recommendations should therefore be included in the development of the next version of the Nordic Cooperation Programme for the food, fishery, agriculture, and forestry sectors.

To create effective and efficient Nordic cooperation for increased resilience in the bioeconomy, a clear mandate from policy makers is required. By pointing out the direction and clarifying who will take responsibility for driving the work forward, opportunities are created to mobilize relevant organisations and experts in each Nordic country. Joint Nordic efforts will enable the development of a bioeconomy that stands stronger in times of crisis.



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