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# Climate Change in the Arctic: A Policy Simulation with and for Emerging Leaders

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ABSTRACT. A policy simulation is designed to create a safe, fictional environment that captures the complexity and salient features of future governance and policy issues. The goal is to deepen participants' understanding of the issues at hand and provide a way to explore possible solutions on challenging topics. We report on a policy simulation for emerging leaders in the Arctic. The simulation addressed pressing issues related to adaptation to climate change that may, among other things, lead to increasing exploitation of mineral resources and the expansion of shipping in Arctic waters. We describe how the simulation was developed, its implementation and results. We conclude that, to serve as useful tools in searching for solutions to complex policy challenges in the Arctic, policy simulations demand careful design and preparations that engage participants.

Keywords: policy development; policy simulation; climate change; adaptation; resource exploitation; shipping; role play; serious gaming; future studies

RÉSUMÉ. Une simulation de politiques vise à créer un environnement à la fois sécuritaire et fictif pour saisir la complexité et les caractéristiques saillantes de la gouvernance future et des questions de politiques. L'objectif consiste à approfondir la compréhension des problèmes par les parties prenantes et à fournir un moyen d'explorer des solutions possibles au sujet de questions épineuses. Nous présentons un rapport sur une simulation de politiques pour les leaders émergents de l'Arctique. Cette simulation a porté sur les questions urgentes en matière d'adaptation au changement climatique qui sont susceptibles, entre autres, de se traduire par l'exploitation accrue des ressources minérales et par l'augmentation du transport maritime dans les eaux de l'Arctique. Nous décrivons comment la simulation a été conçue, sa mise en œuvre et les résultats obtenus. Nous concluons que, pour que les simulations servent d'outils efficaces en matière de recherche de solutions aux défis politiques complexes de l'Arctique, elles doivent être conçues et préparées avec soin afin de favoriser la participation des parties prenantes.

Mots-clés : élaboration de politiques; simulation de politiques; changement climatique; adaptation; exploitation des ressources; transport maritime; jeu de rôle; jeux sérieux; études futures

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## INTRODUCTION

Simulations, role play exercises, and what are called "serious games" have emerged as ways to immerse participants in future situations (Hallinger et al., 2020; Boissier et al., 2023; Dallaqua et al., 2024). They are of particular use in the wider area of what is known as futures thinking, or foresight activities, which support the participants' creativity, experimentation, and mutual learning in reflecting on what could unfold over time (Mochizuki et al., 2021). When these techniques are used in a policy context, the challenge is to create fictional environments that capture the complexity and salient features of future governance and policy issues, and that encourage participants to develop and test responses to emerging situations. Here we report on a policy simulation on the Arctic based on an approach developed by the Centre for Systems Solutions (CRS) (Ringsmuth et al., 2022). Policy simulations developed by CRS combine elements from games, policy exercises, and interactive theatre, while their design process combines well-established methods in systems science, such as concept maps (Novak and Cañas, 2008), causal loop diagrams (Bala et al., 2017), and system dynamics (J.D. Sterman, 2009), with narrative social science approaches such as worldviews (Thompson et al., 2018) and discourse analysis (Wodak and Meyer, 2016). Serious games thus fit into the general family of methods for strategic foresight, emphasising interaction and creativity. They represent a participatory approach that allows anyone interested in taking part in the exploration of potential futures to develop long-term thinking (Kohler, 2021).

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## EXPLORING THE FUTURE ARCTIC

Progressing climate change in the Arctic will have profound impacts on the environment, its people, the economy, political constellations, and governance (Dabiran-Zoohory et al., 2024). The future is uncertain, however, and neither maintenance of the status quo nor resignation or defeat is an option (Smieszek et al., 2021; Obydenkova, 2024). Future leaders will have to face new situations and orient towards a changing physical and geopolitical landscape to make wise decisions, with implications not only for the Arctic, but also global sustainability. Empowering youth today is crucial for fostering resilient and just societies, and ensuring the Arctic remains a liveable and thriving region for generations to come. A commitment to intergenerational justice recognises that young leaders are not merely the future; they are essential actors and leaders in shaping the present (Dabiran-Zoohory et al., 2024).

A key question is how we can act now to strengthen a base for collective action that will serve future governance of the Arctic. One initiative is called Emerging Leaders, which is a programme of Arctic Frontiers (AF), a non-profit organisation (Arctic Frontiers, 2024). Emerging Leaders is an early-career and mentoring programme intended for young professionals from the academic, industry, and policy sectors who are already beginning to play important roles in shaping the future of the Arctic. The programme has successfully carried out training and mentoring since 2012 and is therefore a suitable arena for testing novel approaches to capacity building and learning.

The policy simulation created for Emerging Leaders participants was therefore designed to complement their other learning activities and allow them to test their own views and ideas in plausible future scenarios. In this sense, we developed the simulation as an exercise in anticipatory governance, which strives to stimulate the participants' imagination of what may happen and what could, should, or should not happen in the future (Lehoux et al., 2020). However, this policy simulation was not designed to explore some specific policy and was not intended to be followed up with more concrete policy development. It was an educational exercise and not one that would support preparations for real-world political negotiations.

The starting point for this policy simulation was new information emerging from the EU research project Cascades (Cascades, 2023) regarding how impacts of climate change are transmitted across borders through various mechanisms. One case examined by Cascades relates to the wider implications of climate impacts in the Arctic following sea ice retreat and the glacier melting. The Cascades analysis used a systematic framework for describing and understanding the transmission of impacts (Carter et al., 2021; Mosoni et al., 2024). This framework provided the backdrop for the policy simulation on the Arctic.

The first application of the Arctic simulation was carried out with stakeholders in Helsinki in 2023 (Sivonen and Hakala, 2023). In the debriefing, it was felt that the AF's Emerging Leaders programme would be an excellent forum to explore and test the utility of the policy simulation further. Negotiations between AF, the Arctic Monitoring and Assessment Programme (AMAP), CRS, and the Finnish Environment Institute (Syke) concluded that the plan was feasible. Thanks to AMAP, resources were made available for the exercise, and logistics were provided by AF. The simulation was set up as a joint effort between CRS and Syke, with CRS providing infrastructure for the simulation and facilitation expertise, and Syke contributing to content and facilitation.

## SIMULATION SETUP

The Arctic policy simulation was set to the year 2041. This was considered to be far enough into the future to allow for new developments, but at the same time, close enough to maintain a connection to decisions that are currently being made. The overall framing assumed that marine traffic increases in the Arctic Ocean and that international relations are uncertain. On shore, the race towards a green energy transition continues. The Arctic territories of Finland, Sweden, Norway, and Greenland open up as an exciting new frontier for extracting rare earth elements necessary for technology development. The war in Ukraine has ended, and the Russian Federation is again operating normally as a member of Arctic Council. A new European Arctic Regional Task Force has been formed to explore the complex and multifaceted future realities of the European Far North. Members of the task force are entrusted with the responsibility of negotiating and formulating policies to mitigate mounting security risks and enhance resilience in the region.

The simulation focused on the EU, building on a projection that the EU's role and interest in the Arctic have increased, with the EU being an active and formally accepted observer in the Arctic Council. The simulation assumed the EU in this future period to be very much focused on securing the critical raw materials needed for the energy transition, reflecting a full implementation of the recent Critical Raw Materials Act (Regulation (EU) 2024/1252). It is also assumed that the Nordic countries are particularly active. Other actors include big players in the Arctic: USA and Canada, Russia and China. Finally, the simulation placed special emphasis Indigenous peoples, who are assumed to have a stronger, more institutionalised and coherent role in this period in the Arctic than today.

Simulation participants took on roles as members of the fictive European Arctic Regional Task Force on Arctic Security. The task force advises both the Arctic Council and the EU. Participants were divided into two working groups (WGs), one focusing on transpolar trade routes and formulating recommendations to the Arctic Council, the other focusing on critical minerals mining in the Arctic and formulating recommendations for the EU and the European

Economic Area. Additional stakeholders, such as the UN, NATO, journalists, fictional business associations, and environmental NGOs, were also included in the set of roles participants represented. To increase the realism of the simulation, roles were designed to incorporate existing core Arctic policy trade-offs (Fig. 1). By introducing different viewpoints through the roles, the simulation forced participants to reflect on the different motives and interests that drive developments in the Arctic.

Using a mobile web app designed by CRS for the policy simulations, the general task of both WGs was to debate, formulate, and vote on policy recommendations. Some recommendations were already drafted by organisers to start WG discussions.

In addition to Emerging Leaders participants, a group of seasoned, senior experts on the Arctic were invited to participate. Finally, the setup included a debriefing session to reflect on the link between the simulation and the real world of today. The seniors were also asked to provide input into the discussions.

## SIMULATION SESSION

The simulation included active roles for 30 participants from Emerging Leaders and five seniors. After brief introductions to the task at hand, participants in each WG viewed a video that had been specially prepared for the session. These WG-specific videos were based on elements of an extensively researched and developed systems diagram (see Appendix 1) that described the climate triggers and key mechanisms of impact transmission. The videos were framed as summaries of events of the previous year (2040) in this parallel world and included images of the Arctic and authentic interviews and stakeholder statements. Through the app, the participants received a description of their role, as well as instructions from superiors on issues to be raised in the negotiations. Simulation facilitators took on roles as representatives of the secretariat of the European Arctic Regional Task Force and could, in that capacity, provide guidance on policy development during the simulation.

After participants watched the videos and received their roles, they were encouraged to negotiate in small groups of five to six persons working on different themes. Each WG received three draft policy proposals. In the Transport WG, policy proposals included one urging member states of the Arctic Council to actively support initiatives aiming to establish commercial transpolar trade routes between the Pacific and Atlantic Oceans. Another demanded member states establish strict consent rules regarding infrastructure investments related to new transpolar trade routes (ports, rails, etc.) on territories of Indigenous communities. In the Minerals WG, one policy initiative urged the EU and its partners in the European Economic Area to actively support and accelerate mining of critical raw materials crucial for the energy transition. A second initiative sought for these actors to make a stronger commitment to protecting critical habitats from mining and other extractive activities. A third initiative aimed at developing consent rules for mineral exploitation.

The policy proposals were modified through negotiations, and new proposals were also formulated and entered into the mobile app. In total, 13 proposals were debated, most being modifications and amendments to the original drafts. In the middle of these negotiations, participants in both WGs were shown videos of news depicting dramatic events happening while negotiations were ongoing, and which could change the directions of the talks and resulting policy recommendations.

The Transport WG was confronted with a major accident at sea, leading to a serious chemical spill in Arctic waters. The Minerals WG faced the leak of an enormous amount of wastewater sludge due to the failure of a tailings dam. These dramatic events were followed up by messages to the negotiators, including new policy proposals. The final phase of the negotiations aimed at clarifying the outcomes of the debates to enable a vote on policy proposals. Through this voting, the WGs decided which policy proposals would go forward into further preparations and which should be rejected. The proposals that received majority support put strong emphasis on environmental aspects and Indigenous rights, whereas those that aimed for explicit support of economic activities split participants and did not gain majority support (Table 1).

## INSIGHTS FROM THE SIMULATION

This policy simulation provided two types of lessons. For organisers it provided feedback on the method and challenges of setting up a working simulation. For participants it yielded insights into how the impacts of climate change may play out and why certain types of policy responses may emerge in the Arctic.

The assigned roles and policy setup (Fig. 1) could in principle have led to many outcomes. Discussions at the

TABLE 1. Key policies that received enough support to be put to a vote (at least three negotiators supporting them) and the voting results.

| Policy title | Yes | No |
|---|---|---|
| Shipping-related investment support and incentives | 6 | 8 |
| Mining-related investment support and incentives | 6 | 8 |
| Strengthening Indigenous rights | 12 | 3 |
| Broaden the Arctic network of marine protected areas (MPAs) and MPAs with exceptions for regulated commercial trade ships through the Arctic | 10 | 6 |
| Amendment on strengthening ecosystems and habitats protection in the Arctic. | 7 | 6 |

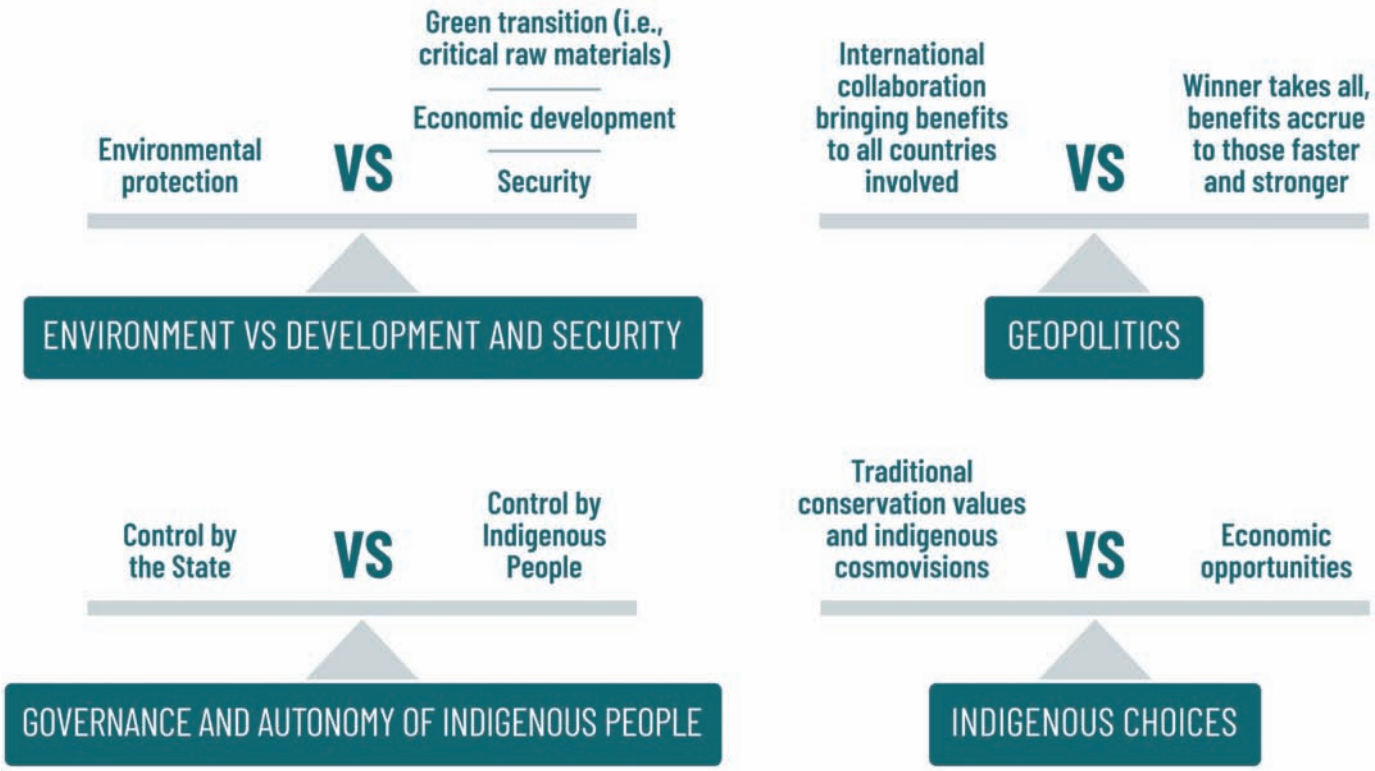


FIG. 1. Core trade-offs represented in the Arctic security simulation.

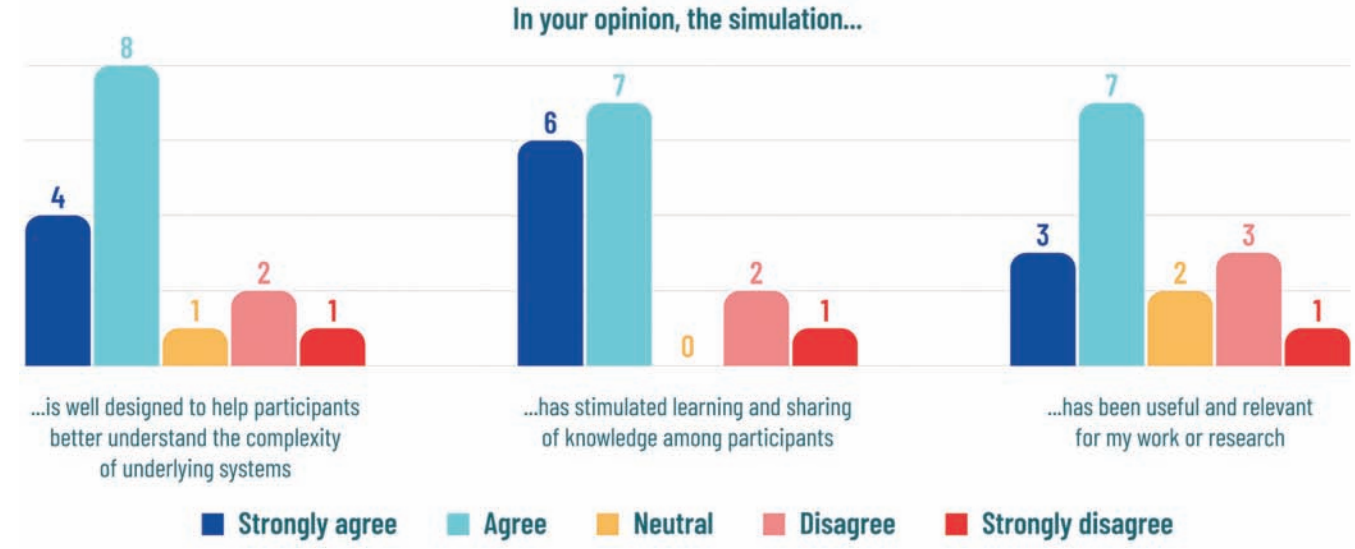


FIG. 2. General feedback from simulation participants. Total responses: 16 out of 30 participants.

Arctic Frontiers conference, which strongly emphasised indigenous rights and wider sustainability issues under the heading Actions and Reactions, and the composition of the Emerging Leaders group, in which many worked with sustainability topics, probably tilted the balance towards a pro-environment, pro-Indigenous rights vote (Table 1). This concern for broad sustainability issues is also reflected in an analysis written by participants of the Emerging Leaders 2024 (Dabiran-Zoohory et al., 2024). None of the policies focusing strongly on investment and development received a majority vote. The simulation and voting did not, however, deal with asymmetries in power or the events and processes that would unfold over longer time frames. The compression into a few hours of processes that, in reality, take years to complete obviously means that outcomes and processes are fictive. The process nevertheless provided participants with insights into the dynamics of real-world events. The policy simulation thereby contributed to thinking about how to develop anticipatory governance (Lehoux et al., 2020). This thinking is essential in an environment like the

Arctic which will likely experience significant physical and political change in the years to come. Policy simulations can thus become a tool for creating and examining what Jasanoff (2015) calls future imaginaries, which articulate expected or desired futures.

A feedback survey completed by Emerging Leaders participants provided an evaluation of the simulation; about half of the participants completed it (Fig. 2). Of these, three in four felt the simulation had helped them understand the complexity of the underlying systems and stimulated learning and sharing knowledge. Many raised playing a role that differed from their own as a particularly enlightening experience. One participant justified the positive evaluation by noting that the simulation demanded "addressing problems from a different point of view than you may traditionally hold, or you normally must take." Another noted that "it helps with considering what the arguments can be for the opposite field." About 60% thought the simulation also had value for their own work or research. For example, one participant noted that it could help in:

> normalizing raw emotion in climate discussions, notably in the policymaking world where emotion is seen as a weakness, where it is actually our greatest strength in relating to this shared, common problem. Also allowing for more spirited debate among practitioners about their beliefs as opposed to polite complicitness, which often leads to no actionable policy recommendations.

Depending on the question, three to four individuals out of 12 – 16 responding gave the simulation a low score (Fig. 2) and provided written criticism that mostly focused on the way the simulation was organised. Responses indicated that some felt the policy simulation was too abstract or artificial to be of any value**.** Previous research has shown that not all simulation participants enjoy roleplaying equally or see its value (Krath et al., 2021). This suggests that the practical organisation of the simulation is very important for desirable outcomes. Preparing participants for what they can expect is also essential in order to engage those who may be sceptical of serious gaming as an approach.

The participants provided numerous important suggestions on how to improve the policy simulation in the future. These included further clarification of rules of the simulation, for example, how policies should be developed, and what the requirements are for policies to become adopted. Some participants also underlined the need to have more information on the relationships and asymmetries of power between roles. From the point of view of simulation design, there is a delicate balance between allowing for creativity in role play and providing fixed instructions. Strict normative rules and guidance run the risk of stifling creativity and may work against emergent learning.

The debriefing, intended to be a reflective moment for participants to analyse their experiences and conceptualize them as a base for learning, is seen as one of the most important parts of a serious game (Crookall, 2010; Boissier et al., 2023). However, several of the Emerging Leaders participants felt that the discussion was too dominated by invited senior experts who had been asked to make the connection to reality. The unintended effect was that the debriefing partly failed to bring out views and reflections of those who were the prime actors in the simulation. Making the debriefing more interactive and more focused on lessons that can be drawn from the simulation is clearly one of the main improvements for any future application. Participants' comments demonstrated the importance of creating immediate possibilities for what Krath et al. (2021) call "social comparisons," which allow users to see their peers performance. The questioning of the setup and the realism of the simulation is also an important aspect. Careful planning of the debriefing is thus essential to ensure that the whole policy simulation meets participants' expectations.

Although policy simulations lack realism in describing actual negotiation processes (i.e., lack of power relations and the compressed timing), we argue that policy simulations can be a useful tool in Arctic policy development. In educational use, such as the Emerging Leaders programme, they can provide opportunities for testing arguments and ideas in a way that forces participants to appreciate diversity and complexity (Bots et al., 2010; AlMubarak, 2023). Policy simulations can be integrated with other pedagogical approaches, such as problem-based learning or challenge-based learning. The latter modality, especially, which aims at achieving learning by identifying, analysing, and designing solutions to sociotechnical problems in an international context, where the goal is to find collaboratively developed, sustainable solutions (Gallagher and Savage, 2023), has conceptual parallels with the policy simulation carried out with the Emerging Leaders. Evaluations have found that approaches based on the identification and development of solutions to prespecified problems enhance student engagement (Almulla, 2020). The participant evaluations (Fig. 2) suggest that reflexive learning was achieved, and that policy simulations can be an effective pedagogical approach that strives to achieve student engagement.

Role plays have also been used in real policy processes that are highly complex (Sterman et al., 2014). Amongst policy makers in the Arctic, such policy simulations can, through roles and "time travel," provide a safe environment for testing and exploring the consequences of radical ideas not normally put on the table in real negotiations. There are many areas in which policy simulations could provide essential contributions. For example, creative and concerted action across multiple sectors and scales has been identified as necessary for northern sustainable food systems (Wilson et al., 2020) and in the area of circumpolar health issues (Cueva et al., 2022). Policy simulations can explore creative actions and subject them to stress testing that reflects uncertain future events.

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