



Advice on strengthening
NL polar research and
exploration of
possibilities for a NL
Polar Centre

Service Request #23

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Final Report

In association with:



Ocean Fox Advisory

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Table of abbreviations and acronyms

APECS	Association of Polar Early Career Scientists
ATCM	the Antarctic Treaty Consultative Meeting
AWI	Alfred-Wegener Institute
BAS	British Antarctic Survey
BZ	Ministry of Foreign Affairs
CBD	Convention on Biological Diversity
CCAMLR	Convention for the Conservation of Antarctic Marine Living Resources
COMNAP	Council of Managers of National Antarctic Programs
CPI	Committee for Polar Infrastructure
EPB	European Polar Board
EU	European Union
EUR	Euro
EZK	Ministry of Economic Affairs and Climate Policy
FARO	Forum of Arctic Research Operators
FTE	Full-Time Equivalent
IASC	International Arctic Science Committee
IenW	Ministry of Infrastructure and Water Management
INTERACT	International Network for Terrestrial Research and Monitoring in the Arctic
IPCC	Intergovernmental Panel on Climate Change
IPO	Interdepartmental Polar Committee
KNMI	Royal Netherlands Meteorological Institute
LNV	Ministry of Agriculture, Nature and Food Quality
MoUs	Memoranda of Understanding
NGO	Non-Governmental Organisation
NIOO	Netherlands institute of Ecology
NIOZ	Netherlands Institute for Sea Research
NL	Netherlands/Dutch
NPDC	Netherlands Polar Data Centre
NPP	Netherlands Polar Program
NWO	Dutch Research Council
Ny-SMAC	Ny-Ålesund Science Managers Committee
OCW	Ministry of Education, Culture and Science
PAP	Polar Activities Programme
Q&A	Questions and Answers
RUG	University of Groningen
SCAR	Scientific Committee on Antarctic Research
SIOS	Svalbard Integrated Earth Observing System
SPI	Swiss Polar Institute
UK	United Kingdom
UNCLOS	United Nations Convention on the Law of the Sea
UNFCCC	United Nations Framework Convention on Climate Change

1 Introduction

The aim of this study, commissioned by IGG and implemented jointly by Trinomics B.V. and Ocean Fox Advisory, is to advise on how to strengthen Netherlands (NL) polar research and to explore the possibilities for a NL polar research centre. This study has been motivated by related prior developments:

In 2018, the Committee for Polar Infrastructure (CPI) advised the Dutch Research Council (NWO) on polar research infrastructure and financing requirements¹. In 2020, an evaluation of the Netherlands Polar Programme (NPP), the relevant research programme of the NWO, was undertaken in order to prepare future strategic decisions for polar research². From both evaluations two common elements emerged: the high quality and ownership of the Dutch polar science and research community and the need for more synergies within the system and between science and policy, for a less fragmented research approach and for long-term planning and coordination (beyond the current 5-year planning cycle). To this effect, it was recommended in both reports that the development of a Virtual Dutch Polar Centre be considered. This recommendation was taken up in the Pole Position-NL 3.0 and further elaborated, and has been included in the Dutch Polar Strategy with the intention of this option being considered further. This study is intended to provide input and advice to inform these considerations.

The study is divided into three main parts - first a description of the current status of NL polar research, its strengths and weaknesses; second an elaboration on various scenarios for improvement; and third a description of how polar research is being organised in a select number of other countries for comparative purposes.

The different scenarios that have been elaborated are as follows:

- Description of status quo (“scenario zero”)
- Scenario I: changes without a virtual polar centre
- Scenario II: changes with a polar centre:
 - a. Sub-scenario IIA: virtual centre without own research staff
 - b. Sub-scenario IIB: physical centre with/without own research staff

The scenarios have been developed on the basis of desk research and interviews with key actors within the system. Furthermore, experiences from other countries have been taken into account and have fed into parts of scenario development, primarily for those options where the development of a centre is considered.

Based on this work, recommendations have been elaborated on how to strengthen the NL system as the final chapter of the study.

¹ NWO (2018) [Polar Research Infrastructure: future requirements](#).

² NWO (2020) [Evaluation of the Netherlands Polar Programme 2016-2020](#).

2 Current status of NL polar research

2.1.1 Structure of the NL polar research landscape

The **polar regions are amongst the most fascinating regions on the planet** - not in the least in terms of geography, climate and environment. They are also highly vulnerable, as can be witnessed through the increasingly noticeable **effects of climate change**. The IPCC assessed the effects of climate change now and potential evolutions in the future in its recent Special Report on the Ocean and Cryosphere in a Changing Climate³, and most recently in the Working Group I contribution to its Sixth Assessment Report⁴: Polar glaciers will continue to melt for centuries to come, alongside an irreversible thawing of permafrost. Over this century, ice loss for the Greenland Ice Sheet will continue and is now also likely for the Antarctic Ice Sheet, which in turn will lead to **accelerated sea level rise**. The polar regions will also see an increase in rainfall, impacting their environment and changing the habitats of the vulnerable and unique species living in these areas. The **fragile biodiversity of the regions are threatened**, as already evidenced in migratory birds that overwinter in the Netherlands.

This shows that while the regions may seem distant and isolated, changes at the poles hugely affect the globe as a whole. Based on the IPCC report, the Royal Netherlands Meteorological Institute (KNMI) in October 2021 revised its projections on sea level rise in the Netherlands, stating that by 2100 the sea level could rise above the previously estimated 1m to 1.20m. In case the ice loss in the Antarctic will accelerate, a sea level rise of up to 2m is possible⁵.

In addition, the melting of the ice also means easier access to the material resources the polar regions harbour on land and in the oceans, which implies **greater political attention and potentially tension**. A changing geopolitical environment is already palpable at EU level. The European Commission and the European External Action Service jointly issued an update of the EU Arctic Policy in October 2021⁶, committing, *inter alia*, to enhance (physical) presence of the EU in the region and within relevant organizations.

These recent developments are recognized in the “**Netherlands Polar Strategy 2021-2025**”⁷, which indicates that the Dutch polar research agenda and policy is more relevant than ever. The strategy lays down the policy objectives of the Dutch government for the polar regions, alongside means of implementation.

Scientific research is a major cornerstone of Dutch engagement. It has been ongoing for decades in both regions and encompasses, amongst other subjects, climate change research as well as research into fauna and flora. Polar research in the Netherlands is primarily targeted via the Netherlands Polar Programme (NPP), which is managed by the Dutch Research Council (NWO). The NPP has a research strategy - PolePosition-NL 3.0⁸ - that is complementary to the Netherlands’ Polar Strategy.

³ IPCC (2019) [IPCC Special Report on the Ocean and Cryosphere in a Changing Climate - Polar regions](#).

⁴ IPCC (2021) [AR6 Climate Change 2021: The Physical Science Basis](#).

⁵ KNMI (2021) [KNMI Klimaatsignaal’21](#).

⁶ JOIN(2021) 27 final - [A stronger EU engagement for a peaceful, sustainable and prosperous Arctic](#).

⁷ The strategy pursues the three dimensions “protecting natural habitats and the environment”, “strengthening international cooperation” and “ensuring sustainable economic activity”.

While the Netherlands has consciously decided against operating substantial, dedicated infrastructure in the polar regions, it places emphasis on cooperation with international partners (notably the UK and Germany) for polar research programmes, and maintains a physical presence at both poles via stations that facilitate cooperation and research. These are the Dirck Gerritsz Laboratory (in Antarctica, within the United Kingdom’s Rothera research station) and a Dutch polar station on Svalbard (in the Arctic, run by the University of Groningen).

Within the Programme, four main research themes have been defined together with key thematic questions. These reflect the Dutch comparative advantage and expertise in research and have also been aligned with priorities identified in international bodies, such as the Scientific Committee on Antarctic Research (SCAR)⁹, the International Arctic Science Committee (IASC)¹⁰ and the integrated European Polar Research Programme¹¹.

Table 2-1 Pole Position 3.0 - Research priorities

Research theme	Key thematic questions
Climate change: Covering the current state and (anticipated) changes in Earth, ocean, atmosphere, cryosphere and their dynamics	How do the various components of the ice-ocean-atmosphere system precisely interact and how will this change the future?
Ecosystem dynamics: Covering the state and changes in biology, ecology, stressors and permafrost	How do polar ecosystems function, interact and respond to stressors? How does permafrost thaw impact climate, landscape and environmental systems?
Social sciences and humanities: Covering legal, social, economic, political, historical and cultural knowledge	How can Arctic and Antarctic organisations address, prevent and respond to the negative impacts of (non-indigenous) human presence in the polar regions? How have people in the Arctic interacted with their environment during the Anthropocene?
Sustainable development: Covering integrated impact analyses, innovations and cold region technology	How can we improve sustainability of operations and minimise the negative impact of human activities in the polar regions?

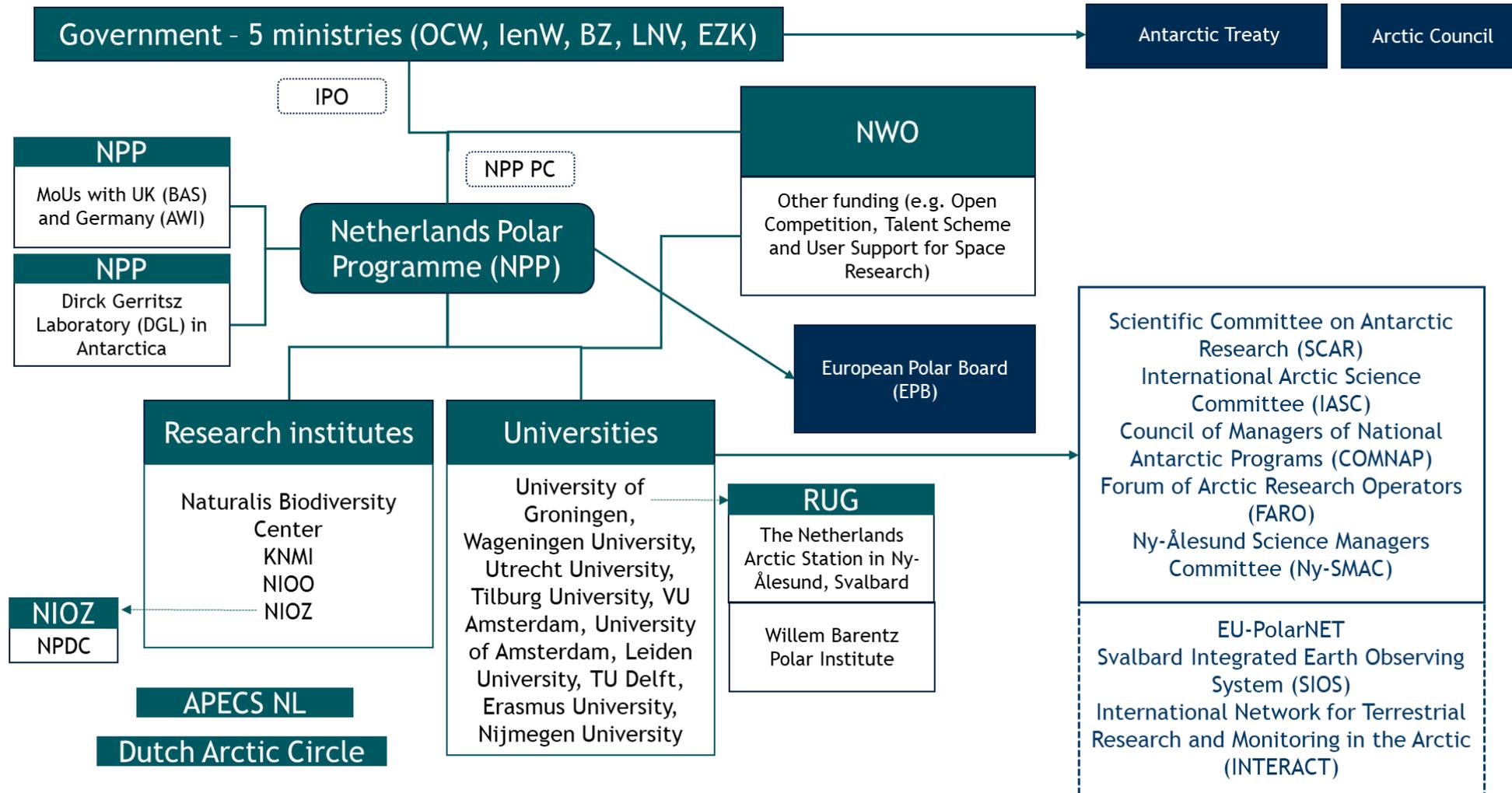
The following sub-chapters will describe the actors, funding and governance of the Dutch polar research landscape in greater detail, with the following graph providing an overview of actors and programmes involved:

⁹ SCAR - [Overview of SCAR Science and Research](#).

¹⁰ IASC - [IASC Working Groups](#).

¹¹ EU-PolarNet (2020) [The Integrated European Polar Research Programme](#).

Figure 1 - NL Polar Research Landscape Overview



2.1.2 Actors

The **main actors in the Dutch polar research landscape** are the Dutch government, the Dutch Research Council (part of which is the Secretariat for the Netherlands Polar Programme), and several universities and research institutes. Connected to these is the Dutch Polar Data Centre located within the Royal Netherlands Institute for Sea Research (NIOZ).

Five ministries within the Dutch government are currently involved in driving Dutch polar policy, framed within a five-year programme, the **Netherlands Polar Strategy 2021-2025**¹². The ministries involved are the Ministry of Education, Culture and Science (OCW), the Ministry of Infrastructure and Water Management (IenW), the Ministry of Foreign Affairs (BZ), the Ministry of Agriculture, Nature and Food Quality (LNV) and the Ministry of Economic Affairs and Climate Policy (EZK). The Strategy formulates the political direction of Dutch engagement in both polar regions nationally and internationally. Internationally, the Netherlands is a Consultative Party to the Antarctic Treaty System and a Member to the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR). In the Arctic, the Netherlands has observer status at the Arctic Council, and engages together with the Dutch research community through its respective committees and working groups.

The ministries (together with the Dutch Research Council) co-finance the **Netherlands Polar Programme (NPP)**, which is a programme that funds scientific research in the polar regions (see below). The NPP is rooted in the Netherlands Polar Strategy, encompasses both polar regions and is further defined in the 2021-2025 research strategy **Pole-Position-NL 3.0**¹³. The NPP is managed by a Secretariat - 2.0 FTE - situated within the Dutch Research Council (NWO). The NWO is one of the main science funding organisations in the Netherlands, investing around 1 billion euro annually into research programmes. It offers a wide range of funding opportunities that are available for polar research¹⁴.

Several universities in the Netherlands are engaged in polar research, most notably Utrecht University and the University of Groningen (RUG). Amongst these, the University of Groningen (RUG) plays a central role for networking for Dutch polar researchers. Through its Arctic Centre it is a research entity as well as a multi-disciplinary networking point for polar researchers across the Netherlands. Other universities engaged in polar research are Wageningen University & Research, Utrecht University, Tilburg University, VU Amsterdam, the University of Amsterdam, Leiden University, TU Delft, Erasmus University and Nijmegen University.

In addition to the network of universities engaged in polar research, there are a number of additional **research institutes** that participate in polar activities. These are as follows: Naturalis Biodiversity Center, the Royal Netherlands Meteorological Institute (KNMI), the Netherlands Institute of Ecology (NIOO) and the Netherlands Institute for Sea Research (NIOZ). Research data from the Netherlands Polar Programme needs to be carefully managed. A Netherlands Polar Data Centre (NPDC) has therefore been set up at NIOZ. Data and research findings are stored and administered there.

Young researchers within the Dutch research community have the possibility to engage themselves in the Dutch chapter of the **Association of Polar Early Career Scientists (APECS)** - an international and

¹² Government of the Netherlands (2021) [The Netherlands' Polar Strategy 2021-2025: Prepared for change](#).

¹³ NWO (2021) [NPP PolePosition-NL 3.0](#).

¹⁴ For example NWO (2021) [Nieuw onderzoeksprogramma Polair Toerisme \(NWA\)](#).

interdisciplinary organization for students, postdoctoral researchers or early career professionals interested in Polar and Alpine regions and the wider cryosphere to network and convene. APECS NL is open for members with the Netherlands as their place of residence, and has recently obtained the legal status of a Dutch foundation ('stichting').

Lastly, the **Dutch Arctic Circle** is the primary platform for engagement between government, the scientific community, civil society and the private sector. Funded by the IPO, it meets regularly to exchange information, views and interests in the polar regions.

International relations

The Netherlands is actively engaged in a large number of international (research) relations, bilaterally and multilaterally¹⁵. At political level the most important fora are the Antarctic Treaty and the Arctic Council, with the Arctic Ministerial Forum having provided an additional high-level political body for multilateral interaction. At intervals, International Polar Years are held - collaborative, international efforts with an intense research focus on both polar regions that are significant drivers of political and research support. The Netherlands engaged in these endeavours since their beginning in 1882/1883. With considerations ongoing, the 5th International Polar Year is might be held in 2032/2033.

As for bilateral cooperation, partnerships with countries all over the world exist, with the partnerships with the German Alfred-Wegener Institute (AWI) and the British Antarctic Survey (BAS) being the most significant. With both, Memoranda of Understanding (MoUs) have been concluded, which provide the basis for an already long-lasting and long-term cooperation between the scientific communities of the UK, Germany and the Netherlands as well as the possibility for Dutch researchers to make use of the infrastructure of the two other institutions.

Multilaterally, the Dutch research community interacts with organisations of a permanent nature, as well as with networks/consortia of a more temporary nature. Amongst the first category are the Scientific Committee on Antarctic Research (SCAR), the International Arctic Science Committee (IASC), the Council of Managers of National Antarctic Programs (COMNAP), the Forum of Arctic Research Operators (FARO), the Ny-Ålesund Science Managers Committee (Ny-SMAC), as well as the European Polar Board (EPB) and APECS (see above). As to the latter, it is worth noting that the Netherlands hosts the Secretariat of the EPB (co-located with the NWO in The Hague).

Important currently-active networks/consortia include the Horizon 2020-funded project EU-PolarNET, the Svalbard Integrated Earth Observing System (SIOS), and the International Network for Terrestrial Research and Monitoring in the Arctic (INTERACT). Dutch researchers are widely engaged in further international projects, an individual listing of which would go beyond the limits of this study¹⁶.

2.1.3 Funding and Governance

Several layers of funding have to be distinguished in the Dutch polar research landscape (see Table 2):

1) OCW research funds

¹⁵ For a full overview and representation see <https://www.nwo.nl/en/researchprogrammes/netherlands-polar-programme/international-networks>.

¹⁶ For a project listing, see NPP (2022) [Polar research projects funded by NWO \(incl. Netherlands Polar Programme\) and the European Commission](#).

The largest tranche of public funding for research in general, particularly for pure science, stems primarily from institutional funding, much of which stems from the Ministry of OCW budget. Within the Netherlands, this 'institutional funding' refers to expenditure on institutions without competition or direct selection of projects - institutions are free to spend these resources themselves according to their own models, including on polar research. These funds are provided to universities, universities of applied sciences and public knowledge and research institutions that carry out research under the aegis of the NWO, KNAW and/or NWO-I.

The OCW also funds research through intermediary organisations such as the NWO. It has to be noted that other ministries also fund research, for example EZK through the Netherlands Enterprise Agency (RVO: grants & funding), but also through other means of direct funding for policy-oriented research (see here also NPP funding below).

2) Funding to enable the implementation of the Netherlands Polar Programme (NPP)

The second line of funding for polar research stems from project/programme funding, most of which is distributed through competitive tender. In the polar context, the majority of this is done through the NWO's polar research programme, the NPP, though an additional proportion is allocated through the NWO directly. Funding is provided through a covenant between five ministries and the NWO that came into effect in 2021 and that secures a five-year rolling budget. This means that the budget level is stable for five years; down-ward adjustments can only come into effect five years after such a decision has been taken - however increases are possible at any time.

The ministries contribute a total of EUR 3.4 mio/a. NWO provides EUR 250.000/a for the funding of the NPP Secretariat (2.0 FTE), as well as a guarantee for EUR 500.000/a from NWO funding lines¹⁷.

This funding covers pure research purposes, supports activities that are in the interest of the research community as a whole (APECS Netherlands, representation in EU-PolarNET) as well as the cooperation with international partners to enable the operation/management of the polar stations in the Arctic and Antarctic regions. However, this funding does not cover supervisor costs or infrastructure overhead.

The NPP Secretariat is furthermore responsible for managing the implementation of the NPP's financing rounds for polar research. The funding partners (five aforementioned ministries plus the NWO) are in charge of the governance of the programme. The five ministries are organized in the Interdepartmental Polar Committee (IPO), chaired by the Ministry of Foreign Affairs. As a research programme of the NWO, the NWO Executive Board is the ultimate formal decision-making and legally responsible body for the design, execution and payment of financing rounds, as well as for the setup of evaluation commissions.

In order to advise and support the Executive Board in its decision-making role, the Netherlands Polar Programme Committee was set up under an independent chair, in which both entities - IPO and NWO - are represented. As an entity, the Committee decides on the strategic direction of the NPP, sets annual budgets and evaluates implementation.

¹⁷ In case this sum is not achieved on a 5-year average, NWO will provide the missing equivalent for polar research purposes.

3) Polar Activities Programme (PAP)

Further to this, the five ministries also finance the Polar Activities Programme (PAP) with a total of EUR 270.000/a (managed by the Ministry of Foreign Affairs on behalf of the IPO). This budget line is less intended for pure research purposes and is not connected to the NWO, but finances different more policy-focused activities necessary for the smooth functioning of the Dutch polar policy and research system:

- participation in meetings of the Arctic Council working groups and expert groups by representatives of Dutch research institutions,
- carrying out studies that are relevant to policy,
- organising workshops,
- supporting Dutch policy input to the Antarctic Treaty Consultative Meeting (ATCM) and the Committee for Environmental Protection (CEP) of the Antarctic Treaty, and
- ad hoc policy-related projects (independent of location).

4) Further funding sources to enable polar research

The various actors in Dutch polar research can also avail themselves of other funding sources for research activity:

- Other funding from NWO (e.g. Open Competition, Talent Scheme and User Support for Space Research)
- Other public funds in Europe (e.g. Svalbard Environmental Protection Fund, Horizon Europe)
- Private funds - corporate and philanthropic (e.g. Belmont Forum)

Table 2 - Funding sources and activities covered

Source	Amount	Activities
OCW research funding Research funding by other ministries	Varied	<ul style="list-style-type: none"> - Direct funding from government to universities, universities of applied sciences, all public knowledge and research institutions acknowledged by the OCW (lump sum contributions without earmarking) - OCW funding through intermediary organisations such as NWO - Other ministries
NPP funding: 5 ministries (Education, Culture and Science (OCW); Infrastructure and Water Management (IenW); Foreign Affairs (BZ); Agriculture, Nature and Food Quality (LNV); and Economic	EUR 3,9 mio/a	NPP funding, includes <ul style="list-style-type: none"> - Research funding¹⁸ - Activities in the interest of the research community as a whole - Research bases in the polar regions

¹⁸ For NWO share - Funding from other NWO instruments, such as the Open Competition, Talent Scheme and User Support for Space Research (minimum guaranteed amount of 500.000/a over five years)

Source	Amount	Activities
Affairs and Climate Policy (EZK), and NWO		
Polar Activities Programme (PAP)	EUR 270.000/a	Administered by, and at the direct disposal of, the ministries (operates outside of the NWO) Includes: <ul style="list-style-type: none"> - participation in meetings of the Arctic Council working groups and expert groups by representatives of Dutch research institutions, - carrying out policy-relevant studies, organising workshops, - supporting Dutch policy input to ATCM and CEP, and - ad hoc policy-related projects (either in the Arctic, Antarctic or domestically).
NWO funding of NPP Secretariat	EUR 250.000/a	2.0 FTE
Other	Varied and depending on instrument/programme/call	<ul style="list-style-type: none"> - Other funding from NWO (e.g. Open Competition, Talent Scheme and User Support for Space Research) - Other public funds in Europe (e.g. Svalbard Environmental Protection Fund, Horizon Europe) - Private funds - corporate and philanthropic (e.g. Belmont Forum)

2.1.4 Analysis of the status quo - strengths and weaknesses of the current system

For the purpose of the present study, 15 interviews¹⁹ were conducted with interview partners that are all closely involved and engaged with polar research in the country. All interview partners were asked to identify the strengths and weaknesses and highlight opportunities for strengthening polar research in the Netherlands. From this input and on the basis of literature review, strengths and weaknesses can be described and classified as follows.

¹⁹ In total, 18 interviews were conducted - 15 with Dutch counterparts and 3 with counterparts from within the EU

Strengths of the current system

1) Excellence and high degree of efficiency

Polar research in the Netherlands is praised for its excellence - both nationally and internationally. This is on the one hand being demonstrated through external evaluations, such as the 2016 publication of the Norwegian Polar Research Institute 'Demonstration of "substantial research activity" to acquire consultative status under the Antarctic Treaty'²⁰ where the disproportionately high publication output by the Netherlands was explicitly noted in competition with substantially larger high-output countries such as Germany. On the other hand, high research quality is also underpinned and evidenced by the high demand for Dutch researchers in international research and consortia. All interview partners indicated that they are or have been involved in research activities with international partners, some also said that the share of international activities by far exceeds the cooperation with national partners.

It was also noted that this performance is being delivered with a limited amount of funding as compared to other countries, underlining the efficiency of Dutch research activities.

The Dutch polar research landscape can be considered as a network of institutions, including key universities, research institutes, government ministries and, to a lesser extent, wider stakeholders including the NGO community and the private sector. While there are prominent nodes of activity and information within this network - notably the NPP Secretariat and the Arctic Centre at RUG - there is no centralised hub of polar research activity. This 'horizontal' network of linked nodes contrasts with the more vertical and centralised approaches to research demonstrated by Germany's AWI and the UK's BAS, which dominate the research landscape in their respective countries. This horizontal nature to the research network presents strengths for the Netherlands, including a high responsiveness, adaptability and ability to maximise funding use across the network, as well as weaknesses - notably the vulnerability of the current research landscape (and as a result, its output and international standing) to the loss or weakening of key nodes/individuals. The implications of this network structure and these strengths and weaknesses will be explored in greater detail in subsequent sections.

2) High degree of ownership and dedication amongst the polar community

Judging from the interviews it can also be said that the polar community in the Netherlands can be characterised by a high degree of ownership - both at policy level as well as at research level. At policy level this is expressed through the continuous and long-lasting financial and political support that polar policy and the research programme have enjoyed over the years across five different ministries and multiple governments. At research level it is depicted best by the fact that many vital networking functions are being performed by dedicated individuals on a pro bono basis.

As a consequence of this dedication, there are well-functioning informal cooperation structures in place. Informal communication is part of any institutional system, and has benefits and disadvantages alike: it can significantly speed up information flow and implementation, and create ownership within the community. While this is a factor that thus helped build strengths within the system as highlighted

²⁰ Andrew D. Gray & Kevin A. Hughes (2016) [Demonstration of "substantial research activity" to acquire consultative status under the Antarctic Treaty](#), *Polar Research*, 35:1.

above, it is however a tool of the privileged inner circle that again benefits some, but leaves participants outside of the circle uninformed or lesser informed. Furthermore, it is vulnerable to losses of key individuals, for example due to retirement. These factors need to be compensated in order to maintain a level, functional playing field.

3) NPP funding and governance

The excellence and efficiency of Dutch polar research have been powered significantly by the NPP's funding and enabled through its governance. The NPP Secretariat as well is generally perceived as a well-functioning entity that is managing the NPP funding and related activities well and effectively.

The funding is perceived as very stable, which makes it possible for Dutch researchers to build up long-lasting relationships with the international research community. Through the Ny-Ålesund research base and the possibility it creates for regular, annual visits resulting from NPP funding, it is possible to repeat research activities using the same methods producing results that equal long-term monitoring without having set up an explicit monitoring programme. This is a key strength to the long-term stability of the NPP.

Further, due to the legacy of polar research in the Netherlands, NPP is in a unique position within NWO with a dedicated budget line, allowing it for matched funding with other financial instruments of NWO.

4) Well-anchored with international partners

As demonstrated above, Dutch researchers have good international collaborations and are well-anchored within the international system. This is important since the international polar community is concentrated around a limited number of countries, and access to this community depends largely on excellence and being able to make a valued contribution. Cross-border research collaboration often fulfils an informal diplomatic function, including by keeping communication channels open in times of conflict or dissent.

The existing limited infrastructure presence in the polar regions, and the subsequent reliance on partnerships, was also well received. Some very explicitly praised the decision of leaving only a small footprint on the delicate nature of these regions, while others noted the cost-effectiveness of the approach, and that such an approach also fostered further international partnerships.

Weaknesses of the current system or areas for improvement

1) Science-policy interface

The interface between the scientific and policy communities is considered a current weakness, both by policy and science practitioners. Here, areas for improvement can be found in multi-level cooperation, in information flow and communication and in the nature of the funding landscape.

a. Multi-level cooperation

This has been among the top most-mentioned areas that deserve improvement - with different actors referring to different types of cooperation.

For one, there is the **desire for better and more cooperation between the different research actors**. Some fear that a lack of cooperation within the discipline would lead to fragmentation which could be seen as a risk to the NPP. However, most state that cooperation **within the discipline** is working well, but that it is cooperation across disciplines that could be improved and could benefit research results (in particular inclusion of humanities in a landscape dominated by natural sciences). This is mirrored in the clear trend within the official research policy to promote **multi-disciplinary research**. Explicit efforts have been made to promote better research cooperation, notably with the recent **funding call that required the setup of consortia** due to the research volume and the intra-disciplinary nature. The response to this call was two-fold. Those receiving funding from this call note their own personal positive experiences in the consortium setup indeed resulting in better cooperation. Others, however, criticize the approach as a design flaw, as the setup benefits pre-existing cooperation clusters within the very small research landscape that the Netherlands represents. Newcomers or “outsiders” (e.g. those in other disciplines) have a hard time entering, and have lower chances for NPP funding under such a call setup.

A second dimension is the desire for **better cooperation between government and the research community** - a desire that is expressed by both actors, but again with different expectations. Some government representatives underline that policy-making needs to be supported by scientific research. Therefore, their expectation is that government-funded research should also answer relevant and current policy questions - favouring **applied, policy-driven research**. Given limited resources, priority setting is furthermore expected, with priorities to be set aligning with the comparative advantage of the Netherlands, and aligned to Dutch and international priorities. There is a perceived coordination gap between policy and research on this topic.

While some researchers share the policy-interest, several however believe that scientific interests fall short in the system, and in particular for **fundamental research and specifically for setting up long-term monitoring programmes**. In addition, government involvement is partly criticized as too high, seen largely as a consequence of the recent restructuring and the setup of the new NPP programme committee. While the reforms of the past years are in general seen as supportive and positive for the system, the fact that the re-organisation capped the direct link between policy makers and the research community was noted as a deficiency across the board. The Annual Polar Symposium is regarded as important, however not seen as being enough to nurture a productive and lasting science-policy interaction.

b. Communication (including to the public)

Communication within the science-policy interface is crucial - this is largely about **translating scientific language into political terms or into terms understandable to the general public**, and vice versa. While awareness is there across the field, there is room for improvement.

Some (interview partners from government as well as research) criticized lack of **information regarding the activities of academia in polar research**. They would welcome a better overview of areas of research or of international cooperation activities in order to make better connections to their own

work and activities, and be able to gain further information or find partnerships where necessary or useful.

Due to the international engagement of the research community also in **multilateral fora** such as the Arctic Council sub-bodies and the Antarctic Treaty system, participants are confronted with having to deal with a grey area in science-policy interaction where information is no longer purely scientific and starts to have political connotations. While this issue has been addressed in the past through agreements regarding which bodies are to be covered by government representatives and which by members of the research community, there is general interest within the community to learn more about the political dimensions of their work and to understand how the research activities and results can influence political decision-making.

One further communication angle is the desire to make research activities and results more widely known within the **public and promote media engagement**. It has been noted that this is in some cases hampered by the availability of funds specifically for this purpose - cases including when a researcher was involved in an international project that would not necessarily have a link back to an institution with a communication unit. However also when such a link exists, there is usually competition in media communication as to which projects are being promoted and at which moment in time. It was considered regrettable that a platform for wider and easier dissemination of information to the public does not exist, or depends largely on voluntary work by some individuals.

c. Funding design and priorities

As mentioned above, some items have been raised in relation to NPP funding: the consortium calls, the tension between policy-driven and fundamental research, as well as the setting of priorities for NPP funding. These views have been explained in the sections above.

In addition to these views, a criticism was shared in relation to NPP funding not providing for a **level playing field for researchers** in the Netherlands, as it only covers research activities and limited overhead costs. This implies that an independent researcher or institution would always have to rely on co-funding for an NPP project, for example for funding towards research supervisors, whereas researchers located at an accredited institution would be able to rely on existing unrestricted funds, infrastructure and facilities there.

2) Access to information

While in general interview participants stated to be well informed within their respective areas and appeared aware of where to find information in case gaps exist, there is **potential for improvement**.

As described above, the community as a whole (policy and research alike) could benefit from better **information flow on research activities and research actors** across the country, and from a better understanding of policy interests and concerns in the region. Some would welcome more information on the NPP governance system. Others, mostly non-university-based researchers, also stated that they would benefit from greater insights into infrastructure options (both managed nationally through NPP and the Arctic Centre and internationally through MoUs), possibilities of sharing such facilities, and access conditions.

Academia have a good level of **knowledge on funding streams**, however what is noticeable is that some are better informed about alternative funding options and hence have wider access to international funding sources, such as grants offered by the government of Norway (e.g. the Svalbard Environmental Protection Fund). Some also undertake projects **with non-governmental actors and the private sector**, while others are not aware of the possibility for such cooperation. While the Dutch Arctic Circle is generally known as a platform, it does not appear to have much influence on the network. The main reason for these different levels of knowledge appears to be that it has been historically built on existing personal connections and experiences.

3) Long-term sustainability of polar research in NL

A central element of concern is the long-term sustainability of polar research. The current system produces outstanding research quality, supports strong political and academic standing of the Netherlands internationally and is - in view of a generally very resource-intensive research area - highly cost-effective. It becomes clear from the Polar Strategy as well as from Pole Position 3.0 that considerations are being made about how this system can evolve in the future. This is mostly related to the identification of new international partnerships and sharing of infrastructure and facilities. In view of maintenance costs and increasing demands on existing facilities, but also in light of changing policies of host countries (such as recently seen with Norway), it is sensible to diversify and expand good relations beyond the existing ones.

However, concern for the sustainability of the system comes from a different insight, related to the consideration of the Dutch polar research community as a horizontal network mentioned previously. This network is historically grown, relies on its historic relationships (also internationally) and depends to a large degree on the ownership of the various actors and on a limited number of dedicated individuals that perform functions on behalf of, and in the interest of, the community on a voluntary basis. These actors and individuals represent the 'nodes' in the research network where information is stored, and they are central to the overall efficacy and success of the entire community. Typically, these networks evolve and change configuration over time as different nodes increase or decrease in significance and the lines of communication between them change with shifts in personnel and research priorities. However, the current network is especially productive and successful in its contributions to polar research and the international standing of the network, leading to a natural desire to maintain the excellence of the network, reducing its ability to evolve and thus its resilience. The key individuals are aware of their support function in holding the system together, and are hence hesitant to leave wishing to keep the system from damage. This situation however leads to a vicious circle. While there is interest and a new generation waiting to take foot, the desire to keep the network consistently functioning at the same level (i.e. treating it more like a vertical institution) ossifies its current configuration, leaving comparatively little space for newcomers to enter into important roles, different connections to be made or for a young generation of researchers to evolve and have perspective beyond their university degrees. As a result, what would otherwise be a natural, more resilient evolution of the network (to positive or negative effects for research outcomes), current circumstances and the desire to keep the network rigid are likely to result in a 'big bang', where a series of retirements or departures of key individuals dramatically changes the quality of the network and creates gaps in institutional knowledge, relationships and experience that cannot be easily replaced. The next section examines some of the ways in which these challenges can be addressed through different scenarios for polar research in the Netherlands.

3 Scenarios to strengthen NL polar research

3.1 Scenario zero - Business as usual

Scenario zero - business as usual - is described in greater details in Current status of NL polar research 2. From our research it has become clear that the system shows essential factors of its strength: It is characterised by excellence in research and shows a high degree of efficiency. It performs well on the basis of a high degree of ownership and dedication amongst the polar community. It owes its excellence and efficiency to a large part to NPP funding and governance; and it is well-anchored with international partners.

At the same time, there are areas where improvements can be made relating to the science-policy interface, the communication and the long-term sustainability of polar research in the Netherlands. These are summarised in the Table 3 below, alongside what subsequent scenarios work to address these areas for improvement. It has to be noted some of the described areas can refer to more than one theme or sub-theme, and that the chosen categorisation serves the purpose of easy illustration and translation of our research results. Where interlinkages exist, these are highlighted in the text.

Table 3 - Areas for improvement and scenario correlation

Theme	Area for improvement	Scenario
Science-policy interface		
Sub-theme: Multi-level cooperation	Better and more cooperation between different researchers, and better integration of newcomers/“outsiders”	Scenario I, IIA, IIB
	Logistical/infrastructure support	Scenario IIA, IIB
	Better cooperation between government and research community	Scenario I, IIA, IIB
Sub-theme: Enhance communication within the research community and externally	More communication about ongoing activities of academia in polar research	Scenario I, IIA, IIB
	More active exchange on engagement in multilateral policy fora	Scenario I, IIA, IIB
	More engagement of the public and promotion via media	Scenario IIA and IIB
Sub-theme: Funding design and priorities	Evaluation and implementation of the NPP	General recommendation
Access to information		
	See also: Sub-theme Communication	
	More active information about (alternative) funding streams, possibilities for engagement and infrastructure	Scenario I, IIA, IIB
Long-term sustainability of polar research in NL		
	Reduce reliance on individual while increasing the resilience of the network	Scenario IIA and IIB
	Actively promote a new generation of researchers	Scenario I, IIA and IIB

3.2 Scenario I - Changes without a polar centre

The following scenario describes possible changes that could be introduced within the current landscape in order to strengthen the research landscape without introducing a dedicated polar centre. These changes are intended to address those areas for improvement identified in Chapter 2.1.4 above and propose modifications either on the basis of the interviews, or on the basis of practices that are common in other areas.

It has to be highlighted that within all scenarios that suggest changes to the existing system a careful balance has to be found, since two-fold objectives are to be achieved: maintain the assets and strengths of the current system, and suggest improvements that indeed benefit the research landscape as a whole. All scenarios have been built up incrementally, but can also be approached in a “mix&match”-kind of way, as measures do not necessarily exclude each other but can create synergistic benefits. It has to be noted that in some cases assumptions were necessary in order to progress the analysis, however in all such cases it is clearly indicated which assumptions were made.

3.2.1 Characteristics/Elements

1) Improve the science-policy interface

1.1) Enhance multi-level cooperation

- **Better and more cooperation between different researchers, and better integration of newcomers/“outsiders”**

Re-evaluate cooperation across disciplines - consortium calls as double-edged sword

Responses as to the need for more cooperation across disciplines varied. Given however that some of the stakeholders have expressed a strong desire for improving measures in this area, we have decided to include this also within this scenario.

Consortium calls have been designed as the method of choice for promoting greater cooperation across disciplines. While those have appeared successful to a certain extent, they also seem to work against a level playing field for researchers. Two kinds of measures could be considered. One, these considerations around consortium calls should be included into the next evaluation of the NPP in order to undertake a fair assessment how to level the playing field. This could also take account of a better integration of newcomers with a view to building a strong research base for the future. Second, funding foreseen for a project cycle could only to a part be directed into consortium calls, leaving room for traditional project calls within the same cycle.

Promote bottom-up cooperation

This scenario as such aims at enhancing the existing network and hence should contribute to better bottom-up cooperation. Cooperation amongst researchers - be it within or without a discipline - can also be facilitated through extending targeted information. This is complementary to possible suggestions for expanding information on polar research as a whole, as described below, and relates to information that is handled by the research community themselves. One specific element seems to be to enhance the information on the two research stations, namely information and guidance on what they can be used for, how they are used, what are the conditions for access and how to submit and conditions for any requests. Again, better and more targeted information can contribute to levelling the playing field for all.

➤ **Better cooperation between government and research community**

Reintroduce a permanent research consultation forum

The new NPP governance structure resulted in the discontinuation of the science-driven committee that was previously responsible for designing calls and providing direction for the programme. While this was seen as justified by many, the side effect was that there was no longer a direct continuous interaction between policy makers and research community. This was noted during the interviews across the board as major deficiency. Hence, this suggestion aims to close a gap in the new NPP governance structure, a direct consultation link to the polar research community. It should allow for a regular exchange between these two, and could be implemented in a cost-efficient manner, for example quarterly digital meetings where updates are provided on several items.

1.2) Enhance communication within the research community and externally

➤ **More communication about ongoing activities of academia in polar research**

Make better use of existing communication material related to research project

It has become a general requirement that along with research results researchers receiving public funding have to provide summaries in plain language for communication purposes to the general public and for policy makers. It has been confirmed that this was also the case for NWO-funded projects, however it was felt that the material found little practical use. There is room for improvement for both, funding institutions as well as for researchers in their own publication activities. Benefits will arise through easier access for the general public or policy makers to research material, and will be even more substantial if such research material is published or inter-linked via one webpage²¹.

Updated overview of ongoing and past projects in the Netherlands

Projects and research results are being published and promoted on a number of different websites. Regular update of these websites support communication purposes, and again, as highlighted above, could generate more resonance if these different websites were inter-linked via one webpage.

➤ **More active exchange on engagement in multilateral policy fora**

Dedicated debriefing after major meetings of policy fora for research community

Some elements have been discussed in the sub-chapter on Cooperation above. In addition, and in view of discussions on the science-policy interface it became clear that all actors are interested in better information and exchange on ongoing discussions in relevant policy fora - policy representatives for conveying the latest policy developments back to the scientific community which is indeed interested in receiving active information, as well as scientific representatives to report about latest international scientific developments and foster an active discussion on those.

This is a feature that can be implemented at low-cost, and can be either easily embedded in existing government consultation procedures or connected with the permanent research consultation forum above.

1.3) Address funding design and priorities

²¹ A more integrated approach for joint display of communication material and of project information is being discussed under the following scenarios (to varying degrees).

NPP funding design and priorities have been highlighted in interviews as distorting the level playing field for researchers in the Netherlands. While official evaluation procedures and cycles exist for the NPP, we have chosen to highlight concerns within the context of this study since they could pan out negatively for the future development of polar research. It is hence suggested that the following is considered in the ongoing implementation and future evaluation of the NPP:

Relevance of Dutch research - international links and priorities

The interconnection of Dutch research with the international network and context is one of its strengths and a factor in why it is being regarded highly in the international research community. This should be maintained, also in future iterations of the NPP, and can be strengthened further through a more intensified communication culture between science and policy as suggested above. For example, in one of the interviews with one international partner it was pointed out that in the Arctic area there is lack of research expertise relating to food and agriculture where the Netherlands could bring particular added value and knowledge.

Long-term monitoring through traditional projects/Consortium calls

The potential impact of consortium calls on the level playing field of researchers has been highlighted above. Furthermore, it is important to realize that the structure of the NPP so far with its traditional project calls has basically indirectly allowed for maintaining research setups over time, coming as close to a long-term monitoring in some areas as one possibly can without having foreseen specific or dedicated budget lines to a specific long-term monitoring focus. This is not to be underestimated for the sustainability of the system and consideration should be given how this can be pursued and/or institutionalized in the future.

Consider pre-proposal stage for policy-driven research calls

As for policy-driven research calls greater alignment could be made between policy expectations and scientific delivery. Again, this would be supported by a more intensified communication culture, but can also easily be implemented through ongoing implementation, by for example making specific use of the information sessions for NPP project calls or by introducing a pre-proposal stage for policy-driven research.

2) Close information gaps and ensure equal access to information

More active information about (alternative) funding streams, possibilities for engagement and infrastructure

While information levels are in general high, all actors would benefit from information being collected on or accessible via one webpage. This was mentioned under previous headings already, and could also include an overview of funding streams (NPP and alternative ones), and of people involved in polar research across the country (or alternatively focal points for universities and knowledge institutes or other institutions). For greater efficiency, existing webpages, e.g. the NPP website and/or the Arctic Centre website, could be expanded for that purpose. If both options were used simultaneously, a synchronisation of content seems desirable.

Hence, information could be expanded on the following items:

- Funding streams;
- People involved in polar research across the country and/or focal points for different entities involved;

- Communication material on past and ongoing projects;
- Research stations: coordinators, access and access conditions
- Conditions for using infrastructure of international partners (where possible).

3) Ensure long-term sustainability of polar research in NL

In addition to continuing efforts for supporting current and promoting new and diverse international partnerships, two elements are of significance across all scenarios, with varying degrees to which they can be addressed within each of the scenarios:

Reduce reliance on individual while increasing the resilience of the network

and

Actively promote a new generation of researchers

Many of the measures suggested under this scenario are aimed at enhancing the network and increasing its resilience through information, communication and awareness. Furthermore, space needs to be created for a new generation of researchers to allow them to access, make use and contribute to the network. With APECS Netherlands being the voice of young polar researchers in the country it should act as one of the main vehicles to make this happen, and the financial commitments that APECS Netherlands receives by the government (OCW via NPP/NWO) confirm the political support. APECS Netherlands should actively seek to engage all young researchers active in the field of polar research within its activities and network. Also, APECS Netherlands should form part of the permanent research consultation forum mentioned above.

3.2.2 Costs

Costs within this scenario would be rather limited and arise mostly for the hosting of events or information sessions, if physical, or, if desired, for the setup and running of a dedicated website. Therefore, an estimate that costs lie within the 0 - 50.000 EUR range is realistic. While different funding models exist, in this scenario it is assumed that costs could be covered through public funding, subject to their availability.

3.2.3 Governance structure

Under this scenario the current governance structure remains largely untouched. The institutional change within this scenario is the introduction of the permanent research consultation forum. Once installed and with all key actors being represented within this body, it can also be used for supporting other functions, e.g. evaluation cycles under the NPP, collection and dissemination of information and long-term sustainability. Given that the network already is supported through its informal nature, the exchanges and the bonds created within the consultation forum can in return contribute to complementing this function.

3.3 Scenario IIA - Virtual polar centre without own research staff

The following scenario is looking into the setting up of a virtual polar centre without its own research staff. This scenario does not repeat measures suggested in the previous chapter, which can be implemented either stand-alone and/or in combination with a virtual polar centre.

3.3.1 Characteristics / elements

From the interviews feedback on the proposed virtual polar centre can be summarised as follows:

In general the majority of reactions ranged from active support, openness under certain conditions to neutral. As to reasons why a virtual centre has not yet been implemented, despite the discussion being ongoing since six years, the current NWO restructuring and a related re-organisation fatigue as well as lack of a convincing business case and implied costs were mentioned.

It became also very clear that interview partners have different ideas and expectations when describing or visualizing a virtual polar centre. Importantly, there is not yet one consolidated view and agreement what this polar centre would mean for the Netherlands. Certain features, expectations or conditions were mentioned repeatedly:

- Needs to be built bottom-up;
- Would benefit from an independent structure and perceived neutrality within the existing system;
- Key actors are performing their respective tasks well, and should be able to continue their work; not all activities have to necessarily be replaced by a centre;
- Central role as a clearing house/information hub/entry point to the community/public communication function.

Given this feedback, and building on the insights and analysis results from Chapter 2.1.4, we believe a virtual centre could be conceived in the following form and with the following features:

1) General features

A virtual center should essentially be the expression of an (institutionalised) NL Polar Network, and we believe this should also be expressed in its name - so that it will be actively viewed as a reinforcement and supporting architecture to underpin the existing (formal and informal) linkages within the Dutch polar research community, offering resilience in connectivity and information-sharing for all.

The NL Polar Network should be a hub/(virtual) meeting point where information flows together, where people can exchange, and where newcomers and outsiders find entry points to the community. At the same time it should preserve the assets of the NL research landscape, the networked, disaggregated format and way of working that makes it unique. As such it would allow for long-term sustainability and less vulnerability, since it will become less dependent on individual key actors in the system.

Functions that are currently held by specific entities would remain with these entities, with the NL Polar Network providing additional services in community interest. In case certain functions could no longer be fulfilled by certain entities, the Network can provide for cover - either by facilitating finding replacements or by taking over functions if institutionally desired and sufficiently resourced.

The NL Polar Network will require an institutional structure that reflects its independent nature and allows for fulfilling the required functions for all partners alike. This needs to be reflected in terms of Secretariat location as well as location of its virtual presence (domain name).

2) Functions

For the virtual centre to fulfil its function in service to the NL Polar Network it should be built around a virtual information platform where all information and communication flows together. How the centre could contribute to the areas for improvement highlighted in Chapter 2.1.4 is described in greater detail below.

The virtual information platform should be an effective backbone and one-stop-shop of the NL Polar Network. Models for such platforms exist. One striking example can be found with the ISAAFFIK gateway used in the Danish system²². ISAAFFIK is an online information platform, where users can access the following information: expeditions, events, activities, courses and education programmes, and where they can participate in informal discussions or find partners for collaboration. ISAAFFIK is maintained by a Secretariat (1 FTE), however is essentially user-driven, which means that the content is actively provided by the users. Anyone engaged with Arctic research, education, consultancy, infrastructure and logistics can become a user, and can take active part in providing and seeking information. ISAAFFIK is a powerful tool with a wide range of functionality and extensive support and assistance functions.

A host of information can be organised via such a platform/gateway in an interactive manner and bring added value to improving the science-policy interface, communication and information, such as the ones described below. It has to be noted that not all information necessarily has to be publicly accessible, and a distinction can be made between public and password-protected areas.

Who is Who of the Network

All participants of the research community could be featured in a publicly accessible person index with a description of their functions, track record and contact details. This should be conceived in its widest possible way, and include researchers within the discipline but also without, such as humanities and science, in order to contribute to cross-discipline communication and cooperation.

Funding structure and possibilities

This would be a centralised description of all funding structures and possibilities within and outside the Netherlands. Instead of this being a static website collection, maximum use should be made of the possibilities of the digital world, including:

- Regular updates of the various funds, particularly for new calls for proposals
- Special dedicated section for the NPP
 - Fund information and structure
 - Announcement of new calls for proposals
 - Hosting of digital information session on the calls for proposals
- For each, Q&A sections and information request buttons or forms for relevant enquiries for the Network Secretariat

²² ISAAFFIK - [ISAAFFIK - the arctic gateway](#).

Promote projects from all across the Netherlands

Create a single entry point for the projects and research results that are being published and promoted on a number of different websites. This would increase visibility of activities across the Netherlands in an easy manner. A joint entry point could be realised in various manners: a low-input option would be to link various websites via one common one; a higher input-option would be the joint setup and maintenance of a fully fledged database that allowed access to research results as well as communication and photo material for press purposes.

Virtual information sessions or video displays on topics of relevance

The platform could be used to host virtual information sessions on topics of relevance. That could be for example on practical matters that concern every polar researchers, such as how to interact with local and indigenous communities in remote polar areas, or how to prepare for an expedition in extreme weather conditions. Such topics could be particularly interesting for first-timers, information sessions can be recorded and put on the platform for permanent display.

Virtual forum for exchange

The virtual gateway could host a permanent digital forum for various purposes, e.g.:

- exchange on specific topics of relevance or interest and/or research questions
- project (calls) announcement and calls for cooperation

For this function in particular it might be interesting to provide password- and members-only-restrictions.

The NL Polar Network would be run by an **independent secretariat**, responsible for the maintenance and running of the Network, the virtual information platform, and for additional functions such as:

- Day-to-day information point for any enquiries from within or outside the community, directing them where necessary to the correct contact point within the Netherlands
- Supporting the funding structure through digital hosting of the permanent research consultation forum or the debriefings from multilateral fora
- Keeping the information platform up-to-date and linked up to daily information and provide the contact to technical support where needed
- Central organiser and/or host for events, such as the Annual Polar Symposium, networking events for APECS Netherlands, or of meetings of the Dutch Polar Circle
- Expanded version: become a coordinator for European or international calls for proposals

3.3.2 Costs

Costs arise for staff, infrastructure and possibly miscellaneous overhead costs:

- One FTE for the secretariat
- Office space and equipment for one person
- Technical infrastructure for hosting the virtual platform server, data and related requirements such as high-speed internet connection, domain name/domain server
- Technical setup of the virtual platform, incl. technical support and maintenance
- Poss. travel and events budget.

It is hence estimated that costs for this scenario lie within the range of 100.000 - 200.000 EUR. While different funding models exist, in this scenario it is assumed that costs could be covered through public funding, subject to their availability. Efficiencies of scale could be considered such as co-location of the Secretariat or of the virtual platform server with existing institutions, in which case considerations of costs have to be weighed against considerations of (perceived) neutrality.

3.3.3 Governance structure

The governance structure under this scenario could be rather light. As an independent entity it might be desirable to set up the NL Polar Network as for example a foundation. A board of directors would be responsible to oversee the work programme and budget of the Secretariat, which would be approved at regular intervals, e.g. annually. The board of directors would be comprised from permanent members, such as the funding entities, rotating members, such as representatives of the research bodies which rotate on a regular basis, and, if desired, observers such as representatives from APECS Netherlands or the Dutch Polar Circle. Ad-hoc observers could also be considered, for example for international or EU partners.

The Secretariat could be authorised to act on behalf of the board, and hence would be able to engage in the necessary daily business transactions to perform its functions. Apart from its daily functions, it would also be required to keep track of all financing operations, annually report on the delivery of the work programme and budget and prepare meetings of the board of directions, through e.g. the preparation of draft work programmes and budgets for their consideration and approval.

3.4 Scenario IIB - Physical polar centre without/with own research staff

Under this chapter, two variants of one scenario are being discussed: a physical centre without its own research staff and a physical centre with its own research staff.

It has to be noted from the outset that within the Dutch research community we have not met any real demand for a physical centre. There were individual voices that could see benefit in having a physical centre as a meeting point/remote work place for the community, however certainly nobody pleaded in favour of centralising all polar research within a physical centre with research staff. The lack of demand has mostly to do with how the system within the Netherlands has grown historically, and the sector is simply not big enough to warrant its own research institution.

Nevertheless, models for both variants exist and will be discussed in the following sections.

Variant I: Physical polar centre without research staff

3.4.1 Variant I - Characteristics / elements

For this variant, an example could be the Swiss Polar Institute (see Chapter 4.7). It is a physical institute with a staff of 7 FTE, which has been set up for providing services to the polar community as a whole and for promoting synergies. It has funding sources available for its purposes, including for infrastructure and logistics, however has no own research funding.

Functions of a physical centre in the Dutch centre and building on the previous chapters could be:

Bundling a part of/all services that would be in the interest of the community as a whole

A physical centre could take over all the services described for the virtual centre - from running the information platform to acting as a coordinator for European and international research calls.

This could be expanded even further, if one were to take an approach of a clear distinction between pure research activities and activities of a service character for the community. This could then mean that universities, research institutes and funding institutions would merely focus on their core work, whereas the physical polar centre takes on all other currently decentralized functions: managing the research stations and facilities of both polar regions, managing the contacts with international partners/MoUs, representing research within international and EU fora and regularly debriefing/consulting the community, representing at policy functions, promoting networking events and promoting stakeholder contacts.

Further functions

Similar to the Swiss SPI, functions are to be determined according to demand. Two elements were mentioned as areas for improvement that have not sufficiently yet been addressed in previous scenarios, since they require a greater institutional change and more resources. In a setting such as this physical centre, these two elements could be addressed:

The centre could take over a more strategic role in terms of publishing results and communication, by developing a communication strategy taking in all relevant expected national and international events/developments, such as the publication of significant research materials (IPCC reports, national research reports), international multilateral developments in relevant multilateral fora (e.g. Arctic Council, Antarctic Treaty Conferences, UNFCCC, CBD, UNCLOS, CCAMLR), international events of wide reach (e.g. 5th International Polar Year 2032 - 2033).

It could also play a significant role in facilitating long-term planning of the research community by providing - at regular intervals - international state of polar research reports that can feed into the revisions of government and research strategies.

One further function inspired by the SPI would be to provide services related to the organisation and logistics of expeditions that are meant to address the community as a whole, such as for projects similar to SEES.nl.

Additional infrastructure requirements

A physical centre obviously demands a physical infrastructure; to meet requirements in this scenario at a minimum an office with space for staff and a bigger meeting room and related office equipment. If the centre were to provide extra work stations for roaming researchers, this would increase these requirements and hence costs. Therefore this scenario variant assumes the most cost-efficient version. One cost-efficiency consideration could be the co-location with existing entities, again, pointing to considerations of perception of independence.

3.4.2 Variant I - Costs

Costs arise similarly to the virtual centre described above with the following amendments/additions:

- 4 FTE for the Secretariat (one senior, one policy officer, one policy officer/communications officer, one admin/technical support)
- Office space and equipment for four persons, meeting room

- Communication and promotion activities budget
- Logistics support budget.

It is hence estimated that costs for this scenario lie within the range of 300.000 - 800.000 EUR per year. For this scenario, we would recommend consideration of different funding models than purely public funding. The SPI, for example, is financed through a combination of public funding, membership fees and - for the biggest share - via a philanthropic donor. Since many of the suggested functions of the physical polar centre would be in the interest of the research community, a similar combination of public funding, membership fees and donations could be envisaged in this case.

3.4.3 Variant I - Governance structure

The governance structure under this scenario could be similar to the one for the virtual centre. As an independent entity it might be desirable to set up the NL Polar Network as for example a foundation. A board of directors would be responsible to oversee the work programme and budget of the Secretariat, which would be approved at regular intervals, e.g. annually. The board of directors would be comprised from permanent members, such as the funding entities, rotating members, such as representatives of the research bodies which rotate on a regular basis, and, if desired, observers such as representatives from APECS Netherlands or the Dutch Polar Circle. Ad-hoc observers could also be considered, for example for international or EU partners.

The Head of the Secretariat could be authorised to act on behalf of the board, and hence would be able to engage in the necessary daily business transactions to perform its functions. Apart from its daily functions, it would also be required to keep track of all financing operations, annually report on the delivery of the work programme and budget and prepare meetings of the board of directions, through e.g. the preparation of draft work programmes and budgets for their consideration and approval.

In addition it would be suggested to undertake regular independent evaluations of the Secretariat as to its efficiency and effectiveness, and in order to adjust its functions and/or governance structure where needed.

Variant II: A physical polar centre with research staff

3.4.4 Variant II - Characteristics / elements

For this variant, examples would be the German Alfred-Wegener-Institute or the British Antarctic Survey (see Chapters 4.3 and 4.8). They are both big physical research institutes that centralise all functions under one roof. Funding is available for both, research (including expeditions) and infrastructure/logistics.

Functions specific to a physical polar research centre in the Netherlands, could encompass all those described under Variant I, adding the research, infrastructure, expeditions and logistics component of dedicated research centres.

One could discuss different approaches to this with different degrees of institutional change:

Minimal institutional change would be implied by maintaining all existing research entities and adding a research component to the physical centre on top of that. The research directorate of the physical centre could then be tasked with pursuing very specific research topics, for example answering to specific policy questions or undertaking specific long-term monitoring programmes. The research directorate could also provide additional staff for availability to universities or research institutes upon their request to support their research projects. The latter easily runs the risk of becoming inefficient, in particular in a system that is built up like the Netherlands, and where research staff shortage has not been highlighted as a significant impediment.

Maximum institutional change would be implied by moving all existing research entities and merge them under the roof of the physical centre. Such a change would need to be duly justified, and the question arises as to its added value. The polar research community within the Netherlands is rather small, and creating synergies among this community can be done through means other than co-locating all engaged researchers as was described in previous chapters.

It is to be noted that AWI and BAS both have extensive infrastructure, including ships and planes. Given the Dutch decision to de-prioritise own infrastructure, this is being disregarded under this variant.

Hence under current circumstances, taking account of historical developments and mindset, the complete centralization of polar research under one roof is perceived as rather unrealistic by the project team while setting up a physical research centre that complements the existing system could be a model that, if so desired, could be set-up in a way to complement and fit within the system.

3.4.5 Variant II - Costs

Costs in addition to those presented in Variant I will have to foresee a dedicated research budget, which in return will depend on the design, function and purpose of the research department. Taking account of the fact that the annual budget of physical research centres such as AWI amounts to 140 mio EUR²³ (with 90% of the costs of AWI being financed by the German Bundesministerium für Bildung und Forschung)²⁴, and matching current research expenditures, costs can be estimated conservatively to be in the range of 1 - 10 mio EUR per year (for a model with minimal institutional change).

Since even in its most minimalistic version of this variant institutional changes would imply changes in the financing structure, no assumption is being made in this variant as to how costs could be covered.

3.4.6 Variant II - Governance structure

The governance structure could build on the structure as described for a physical centre without research staff, but would require additional elements: First, it would need to include a specific research coordination arm that oversees short-, medium- and long-term planning (also in view of budgetary decisions) and is accountable to and reports to the board of directors. Second, since such a variant would also have considerable more staff, a dedicated human resources department would most likely be required, and workers' rights need to be considered. Under Dutch Law it is required to constitute a Works Council for businesses employing at least 50 workers.

²³ Stadt Bremerhaven - [Alfred-Wegener-Institut](#).

²⁴ Wikipedia (2022) [Alfred-Wegener-Institut](#).

Hence, the governance structure would also be considerably bigger than for previous variations, and would therefore also be more cost- and resource-intensive.

3.5 Comparison of the scenarios

In order to compare the scenarios and their impact against the key themes highlighted previously in this section, a qualitative heat map has been developed to allow for quick and easy comparison of the scenarios. For this heat map, it is important to note that not all themes have been given equal importance - four have been identified as especially important to consider in comparing the scenarios, and have been weighted more heavily. These ‘vital dimensions’ include:

- Better and more cooperation between different researchers, and better integration of newcomers/“outsiders” (1.5x weighted)
- More communication about ongoing activities of academia in polar research (1.5x weighted)
- Reduce reliance on individual while increasing the resilience of the network (1.5x weighted)
- Additional relative cost (beyond existing budget allocation) (3x weighted, as a particularly significant factor for consideration).

In order to develop the heat map, each of the themes were given a qualitatively assigned weighting based on interviewee responses and the authors’ assessment of the different scenarios, from a scale of -4 for negative effects and +4 for positive effects. It is important to note that on this scale, ‘1’ denotes a neutral score. What the scores mean for the different themes is represented by the table below:

Table 4 - Heat map scoring system

Scales	-4	-3	-2	1	2	3	4
Science-policy interface	Very strong negative effect	Strong negative effect	Minor negative effect	Neutral	Minor positive effect	Strong positive effect	Very strong positive effect
Access to information	Very strong negative effect	Strong negative effect	Minor negative effect	Neutral	Minor positive effect	Strong positive effect	Very strong positive effect
Long-term sustainability	Very strong negative effect	Strong negative effect	Minor negative effect	Neutral	Minor positive effect	Strong positive effect	Very strong positive effect
Additional relative cost	>600.000	500-600.000	400-500.000	300-400.000	200-300.00	100-200.000	<100.000
Willingness	Interviewees unanimously against	>75% interviewees against	Majority interviewees against	No clear majority in favour/against	Majority interviewees in favour	>75% interviewees in favour	Interviewees unanimously in favour

The resultant heat map is illustrated below, with aforementioned weightings applied:

Figure 2 - Scenario heat map

		Scenario 0 - BAU	Scenario 1 - Changes without a centre	Scenario 2A - Virtual polar centre	Scenario 2B without researchers	Scenario 2B with researchers
Science-policy interface	Better and more cooperation between different researchers, and better integration of newcomers/"outsiders" *	1	2	3	3	3
	Logistical/infrastructure support	1	1	2	3	4
Multi-level cooperation	Better cooperation between government and research community	1	2	2	2	2
Enhance communication	More communication about ongoing activities of academia in polar research*	1	2	3	3	3
	More active exchange on engagement in multilateral policy fora	1	2	2	3	3
	More engagement of the public and promotion via media	1	1	2	3	3
Funding design	Evaluation and implementation of the NPP	1	2	2	2	2
Access to information	More active information about (alternative) funding streams, possibilities for engagement and infrastructure	1	3	4	4	4
Long-term sustainability of research	Reduce reliance on individual while increasing the resilience of the network *	1	2	3	3	4
	Actively promote a new generation of researchers	1	2	2	2	2
Cost	Additional relative cost (beyond existing budget allocation)*	4	3	2	-4	-4
Willingness	Expressed interest in scenario	1	2	2	1	-3
Weighted average (x1.5 for vital dimensions, x3 for cost)		2,04	2,75	3,13	1,79	1,67

As highlighted by the mapping, with the weighting applied, both Scenario 1 and Scenario 2A are attractive ways to implement improvements across the polar research network at comparatively lower costs. Business as usual, while not as poorly ranked as the two variants of Scenario 2B (physical centre with/without dedicated research staff) ranks lower due to the 'neutral' impacts of continued business as usual.

4 Mapping of polar research systems and communities in relevant countries

The following chapter contains an overview of the polar research systems and communities in countries relevant for the Dutch context, namely Denmark, Finland, Germany, Norway, Poland, Sweden, Switzerland, the United Kingdom and the European Union. The analysis focuses on their general polar research system, their existing polar strategy and policies, the countries' presence in the polar regions, the national funding mechanisms, their participation in and openness to international cooperation and finally a discussion of any national virtual or physical polar research centres. This collection of information has fed into parts of the scenarios as established in the previous chapter. Furthermore, the EU-PolarNet has recently published an overview of all polar activities and research systems in all the major active polar countries: *Catalogue of national polar programmes and other large-scale programmes (2022)*²⁵ and *Directory of European polar research funding programmes (2022)*²⁶. These documents have formed the basis for our work and have been complemented through the project team's desk research and three interviews with European partners with additional material according to the focus of this study.

4.1 Denmark

4.1.1 *Polar research in Denmark as an Arctic country*

The Kingdom of Denmark is one of the Nordic countries in Europe. The Kingdom also comprises the autonomous territories of Greenland and of the Faroe Islands. Since Greenland forms part of the Arctic region, this is where Denmark places its particular interest both in foreign policy as well as in research. This seems confirmed through our online literature research, which mainly lists activities related to the Arctic region on official government websites. Even though the Faroe Islands are part of the Kingdom of Denmark, they have been self-governing since 1948 and control their own policies in most political and economic areas. Therefore, they have their own (polar) research system and strategies and are internationally regarded as distinct from Denmark in polar affairs.²⁷

The most dominating Danish fields of study for the Arctic region are natural sciences, earth and related environmental sciences, biological sciences and environmental engineering. Considering that the Kingdom of Denmark is an Arctic country, the researchers and authorities focus their efforts on the Arctic, so there is only limited funding available for Antarctic research. Several universities and research institutes contribute to polar research in Denmark and Greenland, of which the biggest are Aarhus University and the University of Copenhagen as well as the Geological Survey of Denmark (GEUS), Greenland Institute of Natural Resources, and the Technical University of Denmark (DTU) for more field-specific contributions. A targeted polar research programme currently does not exist in Denmark. Therefore, polar research is part of the free competition for funding, in line with the principles of the Danish system of research councils. This leads to a severe competition between universities, research centres and researchers.²⁸ Polar proposals can be submitted at the Independent Research Fund, Innovation Fund Denmark and Danish National Research Foundation which then review and approve them in competition with general Danish research. The biggest share of polar research

²⁵ EU-PolarNet (2022) [Catalogue of National Polar Programmes and Other Large-Scale Programmes](#).

²⁶ EU-PolarNet (2022) [Directory of European Polar Research Funding Programmes](#).

²⁷ Official website of Denmark - [The Faroe Islands](#).

²⁸ Stakeholder consultation.

activities for Denmark happen in Greenland. Here, the funding, promotion and strengthening of general research is done by the Greenland Research Council.²⁹

The Kingdom of Denmark has extensive polar research infrastructure. The Danish Arctic Station and the Sermilik Research Station are managed by the University of Copenhagen. There are two research stations, Villum Research Station and Zackenberg Research Station, which are owned by the government of Greenland and managed by the Aarhus University. In addition to research stations, there are several Danish measuring and observation installations in the Arctic region as well as research vessels.³⁰ The infrastructure and logistics are the responsibility of universities and research institutes, while the funding and support for the research in itself comes from the Danish main funding bodies which fall under the Danish government.³¹

The responsibilities for Arctic policies can differ according to the specific domain. Foreign and security policy falls under the jurisdiction of the Danish government. Research and education policies can be determined by the three regions individually. For Denmark, the responsibility for Arctic research falls under the Danish Agency for Higher Education and Science (DAHES) and the Ministry for Higher Education and Science (UFM). The Danish Ministry of Climate, Energy and Utilities (KFEM) funds the DANCEA programme which focusses on gathering knowledge on Arctic nature, biodiversity, environment, and climate issues.³²

4.1.2 Polar policies and strategy

A dedicated strategy for the Kingdom of Denmark on Arctic research and education does not exist. The Government of Denmark, the Government of the Faroes and the Government of Greenland have a joint Arctic Strategy 2011-2020, in which they set out the challenges and joint objectives in the region. A renewed strategy for the period 2021-2030 is currently in development. This is a predominantly political and economic strategy, but also has a significant focus on promoting research.³³ The Faroe Islands and Greenland have extensive self-government, which requires good cooperation and joint understanding of approaches, including its research objectives and ambitions. Work to develop a new Arctic Strategy 2021 - 2030 is currently ongoing between the three governments. According to news reports, work has been delayed through the outbreak of Covid-19³⁴. This could potentially also be a delicate exercise given recent announcements by Denmark to give Greenland bigger role in Arctic Council³⁵, and the announcement by Greenland to develop its own Arctic strategy³⁶. Additionally, increased international interests in the Arctic for economic opportunities (which includes the territory and seas of Greenland) leads to higher political tensions and interests. This underlines the significance of a Danish Arctic strategy.

In Denmark, all primary Arctic focused universities have their own Arctic research strategy.³⁷ The Greenland Research Council is preparing the establishment of a separate research strategy for their territory.³⁸

²⁹ EU-PolarNet (2022) [Catalogue of National Polar Programmes and Other Large-Scale Programmes](#).

³⁰ *Ibid.*

³¹ Stakeholder consultation.

³² EU-PolarNet (2022) [Catalogue of National Polar Programmes and Other Large-Scale Programmes](#).

³³ Ministry of Foreign Affairs of Denmark - [The Arctic](#).

³⁴ Arctic Today (2020) [A new Danish Arctic strategy is expected by end of year, despite coronavirus disruptions](#).

³⁵ Reuters (2021) [Denmark agrees to give Greenland front seat at Arctic table](#).

³⁶ High North News (2021) [Greenland Will Develop Arctic Strategy of Its Own](#).

³⁷ Stakeholder consultation.

³⁸ Greenland Research Council (2016) [Joint research strategy for research in Greenland](#).

4.1.3 Polar research funding

Arctic research funding can be applied for in a competitive system from the following public bodies:

- Danish National Research Foundation - For cutting-edge, curiosity-driven research-centres of excellence.
- Independent Research Fund - For specific research activities within all scientific fields and upon researchers' own initiatives.
- Innovation Fund Denmark - For advancing research into science and technology as well as facilitating innovative solutions that benefit Danish growth and employment.

Additionally, both general and Arctic research systems in Denmark are for a significant share funded by private philanthropic institutions. In the Danish system, the research itself is funded by the government (mainly UFM) but not the infrastructure and logistical operations. Much of the polar infrastructure has been established because of private foundation donations and the funding of the operations and access needs to be foreseen by the universities and research institutions. One exception is the funding for the operational costs of the Zackenberg Research Station in Greenland which is done by the UFM. Concerning Greenland, the main research funding agency is the Greenland Research Council with an additional focus on providing research-based advice to authorities and facilitating the interaction with international researchers and actors.³⁹

An approximation of the funding sources for the total polar research budget in Kingdom of Denmark is as follows:⁴⁰

- 79% - Public funding sources
 - 38% - Basic/core funding of research institutions from institutional budgets
 - 16% - Research Councils
 - 17% - Ministries
- 4% - Private funding
- 7% - Funding from business and industry
- 10% - Foreign funding sources

Even though there is no specific polar research programme, the UFM funds many initiatives and organisations in the Kingdom of Denmark that focus on Arctic research as well as promoting international collaborations. Some examples are the programme for Marine research in the North Atlantic Ocean run by the Research Council of the Faroe Islands, the Arctic Hub (financed jointly by Denmark and Greenland), Greenland Climate Research Centre and the International Network Programme (INP). The funding for PhD's and research projects is granted by the Greenland Research Council.⁴¹

4.1.4 International cooperation

The Kingdom of Denmark participates in several international programmes, initiatives and organisations such as the Multidisciplinary Drifting Observatory for the Study of Arctic Climate (MOSAIC) expedition, IASC, SCAR, FARO, Antarctic Treaty, EPB and INTERACT. The University of Copenhagen hosts the FARO secretariat. Additionally, Denmark is a member of the University of the Arctic. It has also established several Danish initiatives to increase international collaboration. For instance, in 2018 an agreement

³⁹ EU-PolarNet (2022) [Catalogue of National Polar Programmes and Other Large-Scale Programmes](#).

⁴⁰ EU-PolarNet (2022) [Directory of European Polar Research Funding Programmes](#).

⁴¹ *Ibid.*

came into force between Denmark and the other seven Arctic states to increase international research collaboration and to support easier movement of researchers and research equipment across the Arctic region.⁴² The most recent one is the Arctic Hub which is an international research hub set up by Denmark and Greenland together. It is based on principles and goals set out in the Arctic Council's Agreement on Enhancing International Arctic Scientific Cooperation and the Government of Greenland Research Strategy. Its purpose is to promote international collaboration and dialogue through facilitating access and opportunities to conduct research in and around Greenland. Therefore, the hub gathers all rules and requirements in Greenland and provides additional insights in how to make the administrative process easier for Arctic research.⁴³

4.1.5 Arctic institutes and networks

With the Polar Secretariat, a part of the Agency for Science and Higher Education, the Kingdom of Denmark has an important polar research entry point for authorities, ministries, researchers, foundations, etc. It aims to provide an overview of all polar research activities. Both the Forum for Arctic Researchers and the Isaaffik Arctic Gateway fall under the Secretariat's responsibilities. Another element in their mandate is to administer several Arctic research related grants. The tasks of the Polar Secretariat include:⁴⁴

- Gather knowledge on Arctic research and education both national and international.
- Position of collaborative partner for the Danish research institutions and authorities in the field of Arctic matters.
- To give the collected Arctic insights and knowledge to the Ministry of Higher Education and Science.
- Secretarial services for the Forum for Arctic Researchers.
- Represent Danish interests in international polar research fora.
- To allocate the budget appropriations in the Agency for Higher Education and Science for e.g. Greenland Institute of Natural Resources, Danish Arctic Institute, Cross-Cultural and Regional Studies Library and UArctic.

Isaaffik is the Greenlandic word for 'gateway'. It is a platform designed to support Arctic research and collaboration between researchers within the Kingdom of Denmark. Its purpose is to provide an overview of and facilitate collaboration in Danish research and infrastructure in the format of a user-driven web-portal. Behind Isaaffik is consortium of a large number of research-related institutions in the Kingdom of Denmark which include: Aarhus University, Aalborg University, Danish Meteorological Institute, the Danish Ministry of Higher Education and Science, Greenland Institute of Natural Resources, the Greenlandic Ministry of Education, Culture, Research and Church, Technical University of Denmark, University of Copenhagen, University of Greenland and University of Southern Denmark.⁴⁵ Isaaffik appears to be quite successful since researchers can more easily find expeditions to join and ongoing activities in the community.⁴⁶

Another important platform for research in Denmark and Greenland is the Forum for Arctic Research (FAF) which was established in 2014. Its main goal is to act as a coordinating body for all Arctic

⁴² Ministry of Higher Education and Science of Denmark (2020) [Agreement on Enhancing International Arctic Scientific Cooperation](#).

⁴³ EU-PolarNet(2022) [Catalogue of National Polar Programmes and Other Large-Scale Programmes](#).

⁴⁴ Ministry of Higher Education and Science of Denmark (2022) [The Polar Secretariat](#).

⁴⁵ Ministry of Higher Education and Science of Denmark (2019) [Isaaffik Arctic Gateway](#).

⁴⁶ Stakeholder consultation.

research activities and bring all stakeholders and researchers together. It is an online forum that allows to open discussions across disciplines and institutions and can provide conclusions and recommendations for authorities and other stakeholders based on these discussions.⁴⁷

4.2 Finland

4.2.1 Polar research in Finland as an Arctic country

Finland is an Arctic country with nearly one third of the country's landmass situated above the Arctic Circle. This region lies in the province Lapland which has a population of about 180 000 people as opposed to a total Finnish population of 5.5 million, which means the region is very sparsely populated.⁴⁸ Polar research and more specifically Arctic research is wide-spread and many facilities and stations can be found on Finnish territory. Even though Finland is an Arctic country, it does not possess a dedicated Arctic (or Antarctic) research programme, institute or secretariat. Therefore, polar research funding is granted on a competitive basis and comes from the general national research and infrastructure budgets of different ministries, academies, universities and EU programmes.⁴⁹

According to the EU PolarNet 2 (2022) overview, "Arctic research in Finland focuses on various fields related to climate change and globalisation, human health and wellbeing, sustainable resources extraction, Indigenous and Sámi cultures and resilience, Arctic governance and human rights, connectivity and digitalisation, Arctic atmospheric and space physics. Antarctic research strengthens cold climate expertise in Finland and in recent years' research has focused on geodesy and glaciology, soil, bedrock and marine geology and geophysics, bi-polar meteorological and space physics, marine and structural technology and oceanography and marine biology."⁵⁰

Finnish infrastructure contains multiple Arctic research stations and one on Antarctica, a research vessel and several icebreakers. The Finnish Meteorological Institute (FMI) hosts and operates the Arctic Space Center (FMI-ARC) in Sodankylä.⁵¹ Research stations in Lapland are operated by the Universities of Oulu, Helsinki and Turku. The Antarctic station is managed by the Finnish Antarctic Research Programme (FINNARP) office in cooperation with the FMI, which in turn gets their mandates from the Ministry of Transport and Communications. All researchers have access to these facilities, with the logistical details being handled by the infrastructure secretariats of the responsible actors.⁵²

4.2.2 Polar policies and strategy

There exists a Finnish Strategy for Arctic Policy which has recently been revised (2021) establishing the key objectives of Arctic affairs and the priority actions to achieve these.⁵³ The Arctic policies are strengthened and supported by the Arctic Advisory Board which is appointed by the Prime Minister of Finland. The board also unites the main Finnish Arctic actors. On the scientific front, the Finnish National Committee of Arctic and Antarctic Research aims to advance Finnish polar research and is composed of almost all institutions conducting polar research.⁵⁴

⁴⁷ Ministry of Higher Education and Science of Denmark (2021) [The Forum for Arctic Research](#).

⁴⁸ Arctic Council - [Finland](#).

⁴⁹ EU-PolarNet (2022) [Catalogue of National Polar Programmes and Other Large-Scale Programmes](#).

⁵⁰ *Ibid.*

⁵¹ FMI - [Arctic Space Centre](#).

⁵² EU-PolarNet (2022) [Catalogue of National Polar Programmes and Other Large-Scale Programmes](#).

⁵³ Finnish Government (2021) [Finland revised its Arctic policy strategy](#).

⁵⁴ EU-PolarNet (2022) [Catalogue of National Polar Programmes and Other Large-Scale Programmes](#).

All polar research either follows the policies set in Finland's Strategy for Arctic Policy or the Antarctic Research Strategy.⁵⁵ All universities and research institutions in Finland operate in the Arctic, since the whole country is referred to as an Arctic region. Certain Finnish universities have specific Arctic strategies and maintain infrastructure such as a dedicated research station.⁵⁶

4.2.3 Polar research funding

There is no Finnish organisation that gathers all information on polar research funding. Creating an overview of the resources spent on polar research was deemed to be impossible due to the very scattered funding sources. Some investors in Arctic research are EU institutions, Academy of Finland, Ministry of Agriculture and Forestry (MMM), Ministry of the Environment (YM), Ministry of Foreign Affairs (UM), Nordic funding sources, national private foundations, European Space Agency, and Business Finland (R&D innovations). The general main funding agency for Finnish research is the Academy of Finland. Here Arctic research is incorporated into the regular funding calls where it competes with other research topics. Antarctic research under the Academy is funded in specific calls for applications.⁵⁷ However, in accordance with Finland's Antarctic Research Strategy (2014), only projects that involve international collaboration are eligible for funding.⁵⁸

The core funding for Arctic research at the University of Oulu and University of Lapland is about 10 million euros annually for each one. Additionally, competitive funding schemes such as from the Academy, EU and Nordic sources, provide another several millions for Arctic research.⁵⁹

4.2.4 International cooperation

As an Arctic country, Finland is a founding and permanent member of the Arctic Council and held the Chairmanship both in 2000-2002 and 2017-2019. They also currently hold the Barents Euro-Arctic Council⁶⁰ Chairmanship (2021-2023) and under this Council they also chair one of the most active Working Groups being the one on the environment. Concerning Antarctic cooperation, Finland is a consultative party to the Antarctic Treaty. Further partnerships include: SCAR, IASC and the working groups, International Arctic Social Sciences Association (IASSA), WMO committees, Arctic Council Working Groups, INTERACT, EPB, Long Term Ecological Research Network (LTER Network) and Barents Euro-Arctic cooperation. All Finnish universities and research institutes often expect and require international collaboration in order for Finnish researchers to receive funding. These expectations are based on a long history of cooperation, in particular with other Nordic and Arctic countries.⁶¹

The following actors represent Finland in international cooperative bodies:⁶²

- Ministry of Foreign Affairs (UM) - Finnish representative in the Arctic Council Senior Arctic Officials and Antarctic Treaty Consultative Meetings (ATCM)

⁵⁵ Ministry of Education of Finland (2008) [Finland's Antarctic Research Strategy](#).

⁵⁶ EU-PolarNet (2022) [Directory of European Polar Research Funding Programmes](#).

⁵⁷ Academy of Finland - [Antarctic research](#).

⁵⁸ EU-PolarNet (2022) [Directory of European Polar Research Funding Programmes](#).

⁵⁹ *Ibid.*

⁶⁰ The Barents Euro-Arctic Council is the forum for intergovernmental cooperation on issues concerning the Barents region. Its members are Denmark, Iceland, Norway, Finland, Russia, Sweden and the European Commission. Currently, due to the Russian invasion of the Ukraine and the resulting Ukraine War, all activities involving Russia in the Barents Euro-Arctic cooperation have been suspended, as is the case with any work under the Arctic Council.

⁶¹ EU-PolarNet (2022) [Catalogue of National Polar Programmes and Other Large-Scale Programmes](#).

⁶² *Ibid.*

- Ministry of Social Affairs and Health (STM) - Finnish representative in the Arctic Council Working Groups: The Sustainable Development Working Group (SDWG) and its subgroup Arctic Human Health Expert Group (AHHEG)
- Ministry of Environment (YM) - Finnish representative in the Arctic Contaminants Action Programme (ACAP), the Arctic Monitoring and Assessment Programme (AMAP), the Conservation of Flora and Fauna (CAFF), the Protection of Arctic Marine Environment (PAME), and the Barents Euro-Arctic Council
- Ministry of Education and Culture (MinEdu) - responsible for negotiating “The Agreement on Enhancing International Arctic Scientific Cooperation” and represents Finland in the Arctic Science Ministerial meetings

4.3 Germany

4.3.1 Polar research in Germany

German polar research primarily focuses on improving the understanding of ongoing changes in the regions and monitoring and how the underlying processes and changes influence local, regional and global dynamics. This includes topics such as the optimisation of polar elements of climate and earth system models and providing projections for future developments. There exists a vast network of universities, research institutions and independent institutions in Germany that focus either entirely or partly on polar research, with the largest being the Alfred-Wegener-Institut (AWI).⁶³

Firstly, from a diplomatic and political point of view, the Federal Foreign Office (AA) represents Germany in both the Arctic Council and the Antarctic Treaty (ATS). Domestically, regulatory Antarctic operations are overseen and approved by the Federal Environment Agency (UBA). Second, from a scientific point of view, polar research is governed by the Federal Ministry of Education and Research (BMBF). They also fund institutions with a polar focus and represent Germany in the Arctic Science ministerial. Additionally, the Federal Ministry for Economic Affairs and Climate Action (BMWi) also supports and funds polar research through the Federal Institute for Geosciences and Natural Resources (BGR).

All these actors are interlinked to facilitate cooperation and increase coherence. AWI is the scientific point of contact for national environmental authorities such as UBA through their Office for Environmental Policy. Furthermore, meetings and regular exchanges between the different responsible authorities for Arctic and Antarctic affairs, that operate separately, are organized by the German Arctic Office.⁶⁴

4.3.2 Polar policies and strategy

Polar research in Germany is guided by the “Research Agenda Polar Regions in Transition” (2021) outlining the BMBF’s funding of polar research⁶⁵ and the German Research Foundation’s (DFG) polar research programme “Polarforschungsagenda 2030” published in 2017 determining the main research questions for both polar regions⁶⁶. Specifically for Arctic research, the government published the “Guidelines for German Arctic Policy” in 2019 to sustainably take international responsibility for the region⁶⁷.

⁶³ EU-PolarNet (2022) [Catalogue of National Polar Programmes and Other Large-Scale Programmes](#).

⁶⁴ Alfred-Wegener-Institut - [AWI Official Website](#).

⁶⁵ Beer, C. et al. (2021) [Research Agenda Polar Regions in Transition. Concept Paper of the Mare:N Scientific Advisory Board, Executive Summary](#).

⁶⁶ Deutsche Gesellschaft für Polarforschung e.V. (2017) [Polarforschungsagenda 2030](#).

⁶⁷ Government of Germany (2019) [Germany's Arctic Policy Guidelines](#).

4.3.3 Engagement in the polar regions

German scientists are highly active in both the Arctic and Antarctic regions and the surrounding oceans and seas. To facilitate this research, Germany has invested heavily in infrastructure and possesses several research vessels, aircrafts and even research stations on both poles (permanent and seasonal stations). For instance, they have the permanently staffed station AWIPEV in Ny-Ålesund on Spitsbergen, the Siberian research station Samoylov in the Lena Delta and the FRAM observatory in the Fram Strait for long-term data collection. These are operated and maintained by AWI, but usually in close cooperation with other international institutes. Furthermore, AWI is responsible for providing polar logistical support to all German scientists and even makes German infrastructure available for both national and international communities.⁶⁸

4.3.4 Polar research funding

Core funding for German polar research and institutes comes from the BMBF and the BMWi. Project specific funding can come from several other ministries, the German Research Foundation (DFG) and EU research programmes.⁶⁹ Funding and polar research support is given by the following ministries and organisations in Germany:

- Federal Ministry of Science and Education (BMBF)⁷⁰
 - Institutional Funding (AWI, GEOMAR, GFZ)
 - Helmholtz Association (HGF) - HGF also funds research projects
 - HGF-Research Programme: Changing Earth - Sustaining our Future
 - Research programme Mare:N - publishes calls for proposals, all German institutions can apply
- Federal Ministry for Economic Affairs and Energy (BMWi)⁷¹
 - Institutional Funding (BGR)
- Federal Ministry for Environment, Nature Conservation and Nuclear Safety (BMUV)⁷²
 - Portfolio funding
- German Research Foundation (DFG)⁷³
 - Priority Programme: Antarctic Research with Comparable Investigations in Arctic Sea Ice Areas
 - Collaborative Research Centre: Transregio Arctic Amplification
 - Regular (non-topical) funding based on science excellence

Polar funding can also be granted through competitive programmes in the form of project calls open to all German institutions which are managed by the Projektträger Jülich (PTJ) for the BMBF. The PTJ also plays an important role in supporting governments of Germany and EU Member States in achieving funding policy goals as well as supporting and coordinating the development of a German polar research strategy.⁷⁴ Alternatively, the DFG funds and manages individual research projects and individual science careers. Concerning international collaborations, there are several Foundations and the German

⁶⁸ Alfred-Wegener-Institut - [AWI Official Website](#).

⁶⁹ EU-PolarNet (2022) [Catalogue of National Polar Programmes and Other Large-Scale Programmes](#).

⁷⁰ Federal Ministry of Education and Research of Germany - [Official Website](#).

⁷¹ Federal Ministry for Economic Affairs and Climate Action - [Official Website](#).

⁷² Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection - [Official Website](#).

⁷³ Deutsche Forschungsgemeinschaft - [Official Website](#).

⁷⁴ Projektträger Jülich - [Official Website](#).

Academic Exchange Service which fund international scientists to work in Germany or Germans who want to work abroad in any topic.⁷⁵

4.3.5 International cooperation

Norway is a member of several international bodies both concerning the Arctic and Antarctic. Some examples are:

- Antarctic Treaty Consultative Meeting - Germany is a member
- Arctic Council - Germany is an observer
- International Arctic Science Committee (IASC)
- Scientific Committee on Antarctic Research (SCAR)
- EU-PolarNet 2 and European Polar Board (EPB)
- World Meteorological Organisation (WMO) committees with a polar focus
- Bilateral/multilateral collaborations on research and infrastructure
- Belmont Forum - Scientific knowledge collaboration for understanding, mitigating and adapting to global environmental change.⁷⁶

4.3.6 Alfred-Wegener-Institut (AWI)

The Alfred Wegener Institute for Polar and Marine Research (AWI, *Helmholtz Zentrum fuer Polar und Meeresforschung*) is the largest polar research centre in Germany. It manages and implements the National German Arctic and Antarctic Programme, conducts its own research and centralizes information while coordinating all German polar research activities. Their website contains an expert database which gathers information on researchers in all topics related to polar research and thus AWI functions as a network. In addition, it gathers all German and some international publications on polar research in their archive. AWI has an annual budget of 140 million Euros (2018) to perform all of its activities.⁷⁷

AWI also maintains most German infrastructure on both poles and assists scientists with logistical elements of field research. Furthermore, “AWI coordinates preparation and performance of expeditions, develops and realises technical projects for polar expeditions and cares medically for health and safety of the expedition participants, of whom more than 800 are intensively prepared and functionally equipped every year.” (EU PolarNet 2, 2022).⁷⁸ Legally speaking, AWI is a Foundation and they are a fully developed research institute with a directorate, secretariat and research departments. AWI hosts the EU Polar Net 2 and is the coordinating organisation for the day-to-day activities.⁷⁹

4.4 Norway

4.4.1 Polar research in Norway as an Arctic country

Norway has strong interests in the Arctic regions, especially since the Kingdom of Norway is an Arctic country. Their Arctic territory consists of two namely the Arctic and the High North, combined in the name North Norway. Norway considers the Arctic to refer to the sea and land mass between the North Pole and the Arctic Circle. The High North entails the sea and land mass between southern Helgeland, the western Greenland Sea and the Pechora Sea (the southeastern corner of the Barents Sea) in the

⁷⁵ EU-PolarNet (2022) [Directory of European Polar Research Funding Programmes.](#)

⁷⁶ Belmont Forum - [Official Website.](#)

⁷⁷ Alfred-Wegener-Institut - [AWI Official Website.](#)

⁷⁸ EU-PolarNet (2022) [Catalogue of National Polar Programmes and Other Large-Scale Programmes.](#)

⁷⁹ EU-PolarNet - [About.](#)

east.⁸⁰ The Arctic territory represents approximately half of Norway's landmass and has about 490,000 citizens, which is around 10% of the total Norwegian population. It consists of the two counties Nordland and the combined county of Troms and Finnmark on the mainland, the Svalbard archipelago and the island of Jan Mayen.⁸¹

From an economic and geopolitical point of view, Norway has a strong position and interest in Arctic affairs (internationally and domestically). The main industries of North Norway include fisheries and aquaculture, tourism, sustainable energy, natural gas, mining and transit. These sectors have a significant impact on Norway's economy. Some examples: Norway is the biggest producer of hydropower in Europe; fisheries and aquaculture are the largest exporting industry in North Norway; and coal mining is still a key sector in Svalbard.⁸²

Norway has a history of explorations in Antarctica and claimed several areas as dependent territories. They were one of the original signatories and organisers of the Antarctic Treaty and are highly engaged in ensuring the protection and preservation of Antarctica and their territories.⁸³ Norway is a steadfast promotor of international cooperation for peace, scientific research and environmental protection, mainly under the Antarctic Treaty in agreements such as the Antarctic Treaty's Environment Protocol. Therefore, Norway has incorporated these treaties in their own national legislation.⁸⁴

4.4.2 Polar policies and strategy

The legal framework for Norway's polar activities is based primarily on the United Nations Convention on the Law of the Sea. This convention constitutes that signing parties are responsible for promoting the sound and peaceful exploitation of marine areas, while simultaneously safeguarding the environment and other interests of general importance. Norway expects its international partners to adhere to and respect the international law and cooperation structures.⁸⁵

The Research Council of Norway, which is the governmental research agency under the ministry of Education and Research, have a specific portfolio focused on climate and polar research. These portfolios contain project and research calls on specific topics to invest in the advancement of these fields. It manages the funding for innovation and research of all the ministries and provides a strategic direction of Norwegian research.⁸⁶

Within the Norwegian legal framework, a strategy has been developed to guide polar activities on all fronts. The government's arctic policy contains several overarching goals:⁸⁷

- Peace, stability and predictability
- International cooperation and the international legal order
- Integrated, ecosystem-based management
- Increased job creation and value creation
- Closer cooperation between the business sector and knowledge institutions

⁸⁰ Norwegian Ministries (2020) [The Norwegian Government's Arctic Policy](#).

⁸¹ Arctic Council - [Norway](#).

⁸² *Ibid.*

⁸³ SCAR - [Members: Norway](#).

⁸⁴ Norwegian Ministry of Foreign Affairs (2015) [Norwegian Interests and Policy in the Antarctic](#).

⁸⁵ Norwegian Ministries (2020) [The Norwegian Government's Arctic Policy - People, opportunities and Norwegian interests in the Arctic](#).

⁸⁶ The Research Council of Norway - [Climate and polar research](#).

⁸⁷ Norwegian Ministries (2020) [The Norwegian Government's Arctic Policy - People, opportunities and Norwegian interests in the Arctic](#).

- Effective welfare schemes and ensuring that North Norway is an attractive place to live

In general, Norway's Arctic strategy rests upon the following pillars: foreign and security policy; climate and environment; social development of the North; value creation and competence development; infrastructure, transport and communications; and civil protection. Up until now, Arctic international cooperation functioned smoothly in many important areas. However, some challenges have been discovered mainly relating to defence and security. Furthermore, due to climate change and the melting of the ice in the Arctic Ocean, natural protection is disappearing at the northern coastlines of Russia, Canada and the United States. This could lead to changes in threat assessments and thus military-strategic thinking. Additionally, commercial activity is likely to increase because of easier accessibility to remote regions and the natural resources these contain. On a geopolitical level, Norway is especially concerned about Russia's increased interests and activities in the Arctic.⁸⁸

The following documents contain strategies and policies to guide polar research in Norway:⁸⁹

- The Strategy for research and higher education in Svalbard (2018)
- Norway's Arctic Strategy - between geopolitics and social development (2017)
- The Governmental White Papers Arctic and the High North: People, possibilities and Norwegian interests in the Arctic (2020-2021)
- Norwegian Interests and Policy in the Antarctic (2014-2015), and Svalbard (2015-2016) provide the national policy directions
- The place of the oceans in Norway's foreign and development policy (2016-2017)
- Climate plan for 2021- 2030 (2020-2021)
- Priority research needs of the Ministry of Climate and Environment (2016-2021)
- The Research Council of Norway (RCN)
 - Portfolio Plan for Climate and Polar Research
 - Research strategy for the Arctic and Northern Areas (2019)
 - RCN Policy for Norwegian polar research (2014-2023)
- The Ny-Ålesund Research Strategy (2019)
- Norway's research effort in Antarctica (2013-2022)
- The report Business development and polar research - commitment for a common future (2011)
- Follow-up plan of the Norwegian polar research evaluation (2020)
- Norwegian Roadmap for Research Infrastructure (2020)

4.4.3 Polar research funding

Several ministries and their subordinate agencies and institutions are jointly responsible for polar affairs and polar research funding. First of all, the Ministry of Education and Research (KD) coordinates the research policies and funds about 50% of all Norwegian research. For polar research, KD grants funds through the Research Council of Norway (RCN) as well as direct funding to universities and colleges such as University Centre in Svalbard (UNIS), the University of Tromsø - Arctic University of Norway (UiT) and the Nord University (NORD). Second, the Ministry of Environment and Climate (KLD) ensures integrated governmental climate and environmental policies. The Norwegian Polar Institute (NPI) is a subordinate directorate of KLD that focusses on environmental management research needs in

⁸⁸ Norwegian Ministries (2020) [The Norwegian Government's Arctic Policy - People, opportunities and Norwegian interests in the Arctic](#).

⁸⁹ EU-PolarNet (2022) [Directory of European Polar Research Funding Programmes](#).

polar regions. Another directorate under KLD, the Norwegian Environmental Agency (MDIR), governs national environmental monitoring programmes and is responsible environmental authority in Svalbard. The FRAM centre also falls under the KLD's responsibility. Third, the Ministry of Trade, Industry and Fisheries (NFD) governs industrial and seafood policy. Under its governance falls the national Institute of Marine Research (IMR) which operates vessels and a research programme in polar areas. The Ministry of Petroleum and Energy (OED) and Ministry of Foreign Affairs (MFA) provide some direct funding to companies and to RCN programmes.⁹⁰

The funding for polar and High North research in Norway comes from several sources:⁹¹

- 40% of total funding from Ministry of Education and Research
- 25% of total funding allocated by the Research Council of Norway (RCN) on a competitive basis
- Svalbard Science Forum (SSF) for international research cooperation and partnerships in Svalbard is hosted by RCN
- Svalbard Environmental Protection Fund under the Ministry of Climate and Environment and is in accordance with The Svalbard Act
- Norwegian Polar Institute (NPI) is the Norwegian host at the Ny-Ålesund Research Station and acts as the point of contact for scientific research, while the state-owned Kings Bay Company Kings Bay Company (KBAS) facilitates logistics, housing, lodging, construction work etc.

4.4.4 International cooperation

Norway is very involved in polar research on the international field, since they place a high emphasis on protecting the polar regions as an Arctic country. They participate in the following (non-exhaustive) international organisations and partnerships: SCAR, IASC, Arctic Council, Barents Euro-Arctic council, North Atlantic Marine Mammal Commission (NAMMCO) and FARO. Furthermore, The Norwegian FRAM institute hosts the secretariat of the Arctic Council.

4.4.5 FRAM - High North Research Centre for Climate and the Environment

The FRAM Centre consists of scientists from 21 different Norwegian research institutions. Members are for example the NPI and the Arctic University of Norway. The main purpose of the research centre is to facilitate interdisciplinary research and outreach in natural science, technology and social sciences in the High North area. Primarily, they focus on the sound management of natural resources and the environment. They aim to be a communicative focal point for authorities, business communities and the general public and provide a connection between research and education. Structurally, it contains several research groups and research programmes focusing on different interdisciplinary themes. It is supervised by a steering committee and has a secretariat to handle day-to-day activities. Furthermore, it hosts the Arctic Council secretariat.⁹²

4.4.6 Norwegian Polar Institute (NPI)

Norway has a full-fledged polar institute (NPI) which drives and combines Arctic and Antarctic research activities. It falls under the Ministry of Climate and Environment as a Directorate and focuses primarily on environmental management needs. Figure 4-1 illustrates how the different departments are connected and how the institute is structured. The institute has a research department where they study themes such as biodiversity, geological mapping, climate and pollutants and partake in

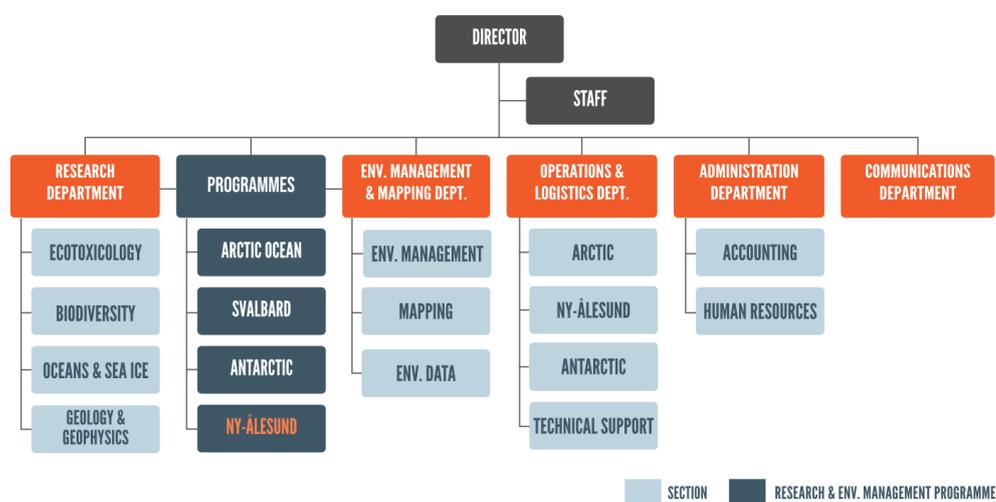
⁹⁰ EU-PolarNet (2022) [Directory of European Polar Research Funding Programmes.](#)

⁹¹ EU-PolarNet (2022) [Directory of European Polar Research Funding Programmes.](#)

⁹² FRAM - [High North Research Centre for Climate and the Environment \(The Fram Centre\).](#)

monitoring activities. Additionally, they provide advice to the Norwegian authorities on polar environmental issues. In the Arctic region they are partly responsible for activities and logistics, but in the Antarctic they bear the full responsibility. They cooperate with other national and international actors and present themselves as a point of contact within the scientific community. Furthermore, one of the institutes goals is to present and widely disseminate information on their research results and management tasks. A final part of the NPI's mandate is to organise the logistics Norwegian polar activities. Firstly, they are the organisers of major scientific expeditions to both Polar regions with invitations for cooperation possible for international researchers. Second, they own an important research vessel 'Kronprins Haakon'. Third, they run several research stations, two in Ny-Ålesund in Svalbard (Sverdrup and Zeppelin Observatory) and two in Antarctica (Troll and the field station Tor).⁹³

Figure 4-1 Structure of Norwegian Polar Institute



Source: <https://www.npolar.no/en/>

4.5 Poland

4.5.1 Polar research in Poland

Polar research activities in Poland are done in a dispersed system of organisations, universities and institutions. A strategic direction for the field is given by the Committee on Polar Research of the Polish Academy of Sciences (CPR PAS) which is supported in its mission by the Polish Polar Consortium (PPC), a consortium of 15 research institutions. There exists no centrally financed polar research programme or a centralised polar institution. Therefore, polar research is in regular competition with other research fields and falls under the overall research and innovation agenda. The national polar institutions that do exist, are responsible for the operations and logistics surrounding the Polish polar infrastructure.⁹⁴ There is for instance a Centre for Polar Studies (CPS) at the University of Silesia (Katowice) which focuses on education and provides internationally-open postgraduate courses.⁹⁵

The following are the key actors in polar affairs in Poland:

- Ministry of Education and Science (MEiN) - Main supervisor of polar research organisation and financing, provides strategic solutions and implements national and EU programmes.⁹⁶

⁹³ Norwegian Polar Institute - [Official Website](#).

⁹⁴ EU-PolarNet (2022) [Catalogue of National Polar Programmes and Other Large-Scale Programmes](#).

⁹⁵ University of Silesia - [Centre for Polar Studies](#).

⁹⁶ Government of the Republic of Poland - [Ministry of Science and Higher Education](#).

- Through the Polish Academy of Sciences, it finances Polish memberships and activities in international scientific polar organisations.
- Ministry of Foreign Affairs (MSZ) - Responsible for international aspects of polar research.⁹⁷
 - Represents Poland in intergovernmental organisations: Antarctic Treaty (Consultative Member), Arctic Council (Observer State) and Spitsbergen Treaty.
- Polar Task Force (PTF) - Inter-ministerial advisory group hosted by the MSZ.
 - PTF gathers ministerial representatives and representatives of CPR PAS, the Polish Polar Consortium (PPC) and operators of large polar infrastructures.
- Committee for the National Polar Policy - Inter-ministerial auxiliary body to the Council of the Ministers of the Republic of Poland led by the MSZ.
 - Gathers representatives of ministries responsible for higher education and science, climate and environment, economy, energy, marine economy, fishery, tourism and also the CPR PAS and the PPC.

4.5.2 Polar policies and strategy

In 2020 a national strategy for Poland was published - The Polar Policy of Poland: Resolution of the Council of the Ministers Republic of Poland No. 129/2020. To implement this strategy the Committee for the National Polar Policy was established in 2022 at government level. The overarching strategy was based on the existing policies “Strategy for Polish Polar Research - a concept for the years 2017-2027” and “Polish Polar Research: Green-and-White Paper”.⁹⁸

4.5.3 Engagement in the polar regions

Polish researchers conduct studies both about Arctic and Antarctic affairs. Therefore, Poland possesses several research stations and other infrastructure such as research vessels. Most infrastructure and its maintenance is funded by the Ministry of Education and Science (MEiN). The stations on both poles are either permanent or seasonal. Out of all the Polish Arctic research stations, one is permanent and four are seasonal. On the Antarctic front, Poland has one permanent and one seasonal station. The operation and logistical organisation of all infrastructure is coordinated by the Polish Academy of Sciences and some of its institutes, but also requires broad international collaboration.⁹⁹

4.5.4 Polar research funding

Polar research funding comes from the following sources in Poland:¹⁰⁰

- Ministry of Education and Science (MEiN) - Supports polar infrastructure, their maintenance, logistics and specialised research equipment.
- Subordinate financing agencies of MEiN provide funding for research and innovation where Polar research projects compete with the overall Polish research portfolio.
- National Science Centre (NCN) - Supports and funds basic research in Arts, Humanities and Social Sciences, Life Sciences and Physical Sciences, and Engineering.
- National Centre for Research and Development (NCBR) - Governmental executive agency for funding and supporting the development of innovative technological and social solutions, including implementation of EU financed programmes and instruments.

⁹⁷ Government of the Republic of Poland - [Ministry of Foreign Affairs](#).

⁹⁸ The Committee on Polar Research and the Polish Polar consortium - [Strategy for Polish Polar Research - a concept for the years 2017-2027](#).

⁹⁹ EU-PolarNet (2022) [Catalogue of National Polar Programmes and Other Large-Scale Programmes](#).

¹⁰⁰ EU-PolarNet (2022) [Directory of European Polar Research Funding Programmes](#).

- Polish National Agency for Academic Exchange (NAWA) - Coordinates state activities to internationalise Polish academic and research institutions.

Since the Polish national polar strategy has only recently been published and still needs to be published, there is currently no separate funding system for polar research. As elaborated above, the sources for research funding are ample, while the funding for infrastructure is provided by the MEiN. International scientists can apply for funding in Poland by applying together with Polish researchers, applying for selected projects by Polish agencies or use the Polish infrastructure through bilateral/multilateral agreements and MoUs. There is thus a big focus on the internationalization of the Polish research system.¹⁰¹

4.5.5 *International cooperation*

In the Arctic, long-term collaboration and infrastructure cooperation happens primarily with the following partners: UNIS - University Courses in Svalbard, Norwegian Polar Institute, University of Oslo (signed general MoUs) and other Norwegian and European research institutions. One of the main multilateral programmes for research & logistic cooperation is found with the SIOS - Svalbard Arctic Earth Observing System. Collaborative international research also takes place in Iceland, Greenland and Arctic Canada where Polish researchers use local infrastructure. Furthermore, the Polish research stations in the Arctic region host a multitude of international researchers. In the Antarctic, Poland has several long-term MoUs and collaboration agreements for their research stations with among others Peru, Brazil, Chile and Russia. Foreign researcher make extensive use of Polish Antarctic infrastructure, but Polish researchers also conduct fieldwork in other countries' stations and infrastructure.¹⁰²

Poland is part of several international cooperative bodies and organisations on Polar research. It is a full member of the Commission for the Conservation of Antarctic Marine Living Resources and an observer member of the Arctic Council. Furthermore, the CPR PAS represents Poland in the following international organisations: SCAR, COMNAP, ATCM, IASC, FARO, EPB and their relevant Working Groups. Through the MEiN, Poland is also part of several logistics, infrastructure and observing networks such as SIOS, SAON and INTERACT.¹⁰³

4.5.6 *Committee on Polar Research of the Polish Academy of Sciences (CPR PAS)*

The national Committee on Polar Research of the Polish Academy of Sciences (CPR PAS) was established in 1977 to provide coordination on the strategic level. It consists of 40 researchers and experts from diverse fields within polar sciences that are appointed by the President of the Polish Academy of Sciences. This committee has regular exchanges and cooperates extensively with the Polish Polar Consortium (PPC). This is a platform of 15 member universities and research institutes that encourages and facilitates collaboration in research projects and logistic supports. It is lead and hosted by the University of Silesia in Katowice.¹⁰⁴

The main tasks and responsibilities of the CPR PAS are the following:¹⁰⁵

- Gathering scientific polar research in one place and coordination the related activities.

¹⁰¹ EU-PolarNet (2022) [Directory of European Polar Research Funding Programmes.](#)

¹⁰² EU-PolarNet (2022) [Catalogue of National Polar Programmes and Other Large-Scale Programmes.](#)

¹⁰³ EU-PolarNet (2022) [Directory of European Polar Research Funding Programmes.](#)

¹⁰⁴ The Committee on Polar Research and the Polish Polar consortium - [Official Website.](#)

¹⁰⁵ The Committee on Polar Research of the Polish Academy of Sciences - [Official Website.](#)

- Facilitate and stimulate collaboration and dialogue between researchers and authorities, NGOs and the private sector.
- Editor of the peer-reviewed ‘Polish Polar Research’ journal and other periodical publications.
- Public outreach and popularization of the results of polar research.
- Representation of Poland in several international polar organizations.
- Organising polar symposia and international scientific conferences.
- Support and facilitate interdisciplinary research, both national and international.
- Promote and support the development of Polish research infrastructure in the Arctic and Antarctic (scientific stations and research vessels).
- Scientific patronage, support and cooperation with APECS Poland (Association of Polar Early Career Scientists) and the Polish Polar Consortium.

4.6 Sweden

4.6.1 Polar research in Sweden as an Arctic country

Many Swedish universities have researchers that focus on polar research considering Sweden is an Arctic country. Swedish polar researchers operate in the Arctic and Antarctica through research vessels, icebreakers and stations. These research activities and some of the infrastructure are overseen by the Swedish Polar Research Secretariat (SPRS) which is a governmental agency with the responsibility of coordinating and promoting Swedish polar research. They especially organise and support polar expeditions and manage Swedish infrastructure.¹⁰⁶ Some polar topics of interest for Sweden are natural and social science and humanities, i.e. climate change and its consequences, environmental pollutions, ecosystems, permafrost, Arctic Communities health, well-being and resilience and cold climate engineering, mapping of earth’s crust and deep-sea floor.¹⁰⁷

These are the key actors in polar affairs in Poland:

- Ministry of Foreign Affairs - Responsible for the international representation of Sweden in the Arctic Council, the Antarctic Treaty and the Barents Euro-Arctic Council (BEAC) and is also responsible for the Swedish Arctic strategy.¹⁰⁸
- Ministry of Education and Research - Responsible for the national research policy, Arctic science agreements and for universities and governmental agencies working with research funding and logistic support in polar regions.¹⁰⁹
- SPRS - Has the mandate to coordinate and promote Swedish polar research and operates the Antarctic stations Wasa and Svea, the Arctic ANS station (on Swedish land) and organises icebreaker expeditions.¹¹⁰
- Swedish Research Council - A main research funder in Sweden and nominates and supports Swedish representatives in IASC and SCAR.¹¹¹
- Ministry of the Environment - Represents Sweden in a working group of the BEAC working group and the government in environmental discussions.¹¹²

¹⁰⁶ Swedish Polar Research Secretariat - [Official Website](#).

¹⁰⁷ EU-PolarNet (2022) [Catalogue of National Polar Programmes and Other Large-Scale Programmes](#).

¹⁰⁸ Government Offices of Sweden - [Ministry of Foreign Affairs](#).

¹⁰⁹ Government Offices of Sweden - [Ministry of Education and Research](#).

¹¹⁰ Swedish Polar Research Secretariat - [Official Website](#).

¹¹¹ Swedish Research Council - [Official Website](#).

¹¹² Government Offices of Sweden - [Ministry of the Environment](#).

- Swedish Environmental Protection Agency - Participates in several Arctic Council working groups.¹¹³
- Swedish Agency for Marine and Water Management - Participates in an Arctic Council working group and represents Sweden in CCAMLR.¹¹⁴

4.6.2 Polar policies and strategy

The Swedish Arctic Strategy has been updated in 2020. This strategy place a great emphasis on the involvement of national, regional and local authorities, indigenous peoples' organisations, universities, companies, and other stakeholders. The overarching goal of Sweden is to have high-quality research and innovation that contributes to societal development and industrial competitiveness. The strategy also indicates an ambition to increase Sweden's international impact in polar research. Additionally, the following priority themes are identified in the strategy: international collaboration; security and stability; climate and the environment; polar research and environmental monitoring; sustainable economic development and business interests; and securing good living conditions.¹¹⁵

The main goals for Swedish polar research and monitoring are to:¹¹⁶

- Strengthen Arctic research, environmental monitoring and observation systems.
- Support and further develop international cooperation on polar research.
- Continue examining possible alternatives to access a heavy polar-classed, climate-neutral research vessel for year-round activities.
- Encourage knowledge exchanges between researchers and indigenous peoples while making traditional knowledge and scientific research mutually available.

4.6.3 Polar research funding

The funding for polar research in Sweden comes from the Swedish Research Council, the Research Council FORMAS and the Swedish National Space Agency. The research is then coordinated and promoted by the SPRS who's mandate is given by the government. The SPRS's main activity is to take care of the organisation of expeditions and the management of polar infrastructure. Other research funding originates from Sweden's innovation agency (VINNOVA), Swedish Environmental Protection Agency, the Swedish International Development Cooperation Agency (SIDA), Swedish Research Council for Health, Working life and Welfare (FORTE), Mistra, Riksbankens jubileumsfond, the Knut and Alice Wallenberg Foundation (KAW) and the Swedish Foundation for Strategic Research (SSF).¹¹⁷

Sweden has a streamlined process and framework to facilitate national and international support of planning and programmes, the so-called "Polar Research Process" adopted by the SPRS. Funding is granted after an evaluation by the Swedish Research Council, the Research Council FORMAS and the Swedish National Space Agency. Funding calls for infrastructure and the international access to the ANS station is the responsibility of the SPRS.¹¹⁸

¹¹³ Swedish Environmental Protection Agency - [Official Website](#).

¹¹⁴ Swedish Agency for Marine and Water Management - [Official Website](#).

¹¹⁵ Government Offices of Sweden - [Sweden's Strategy for the Arctic Region 2020](#).

¹¹⁶ EU-PolarNet (2022) [Catalogue of National Polar Programmes and Other Large-Scale Programmes](#).

¹¹⁷ EU-PolarNet (2022) [Directory of European Polar Research Funding Programmes](#).

¹¹⁸ Swedish Polar Research Secretariat - [Polar Research Process](#).

4.6.4 International cooperation

Since Sweden possesses Arctic and Antarctic infrastructure, there is much international interest in collaborations especially considering the Swedish focus on enhancing international relations. Sweden's main partners in polar research and infrastructure are Canada, Denmark, Finland, Germany, Norway, Russia, the UK and the United States. Many Swedish actors have MoUs or bilateral/multilateral agreements with international counterparts in order to facilitate the exchange of data, researchers, and resources.¹¹⁹

Sweden is a member of both the ATS and the Arctic Council. Antarctic logistical operations are often logistically happening through the frameworks of DROMLAN and DML. To bring international Arctic researchers together (including monitoring activities), Sweden partakes in initiatives such as the Barents-Euro-Arctic Council and the Northern Dimension. With relation to facilitating the collection of and access to data resources, Sweden participates in several international organisations: ARICE, INTERACT, SITES, ICOS, LTER, SIOS and SOOS. On the topic of scientific polar research, Swedish researchers participate in the working groups of IASC, SCAR and IODP.¹²⁰

Swedish polar scientists are often successful in procuring international funding through calls such as Horizon 2020, Belmont Forum and NordForsk. The access to these funding sources is coordinated and facilitated by the Swedish Research Council. Although the participation in the Belmont Forum is the responsibility of the Swedish research Council and the Research Council FORMAS. These funding sources increase the international dimension of Swedish research.¹²¹

4.6.5 Swedish Polar Research Secretariat (SPRS)

The Swedish Polar Research Secretariat is a governmental agency with the responsibility to coordinate and promote polar research in Sweden. Therefore, it organises and supports expeditions to the Arctic and Antarctic and manages Swedish research infrastructure. Besides facilitating fieldwork, the SPRS also supports and facilitates research that does not involve polar expeditions or infrastructure. They provide support to researchers from concept to publication, through research expeditions and other data collection, as well as making data available and communicating research findings which has been consolidated in the 'Polar Research Process'. Furthermore, the SPRS represents Sweden in international organisations and partnerships and facilitates negotiations.¹²²

The agency is governed by a Director-General with advice from an Advisory Council, as appointed by the Swedish government. The SPRS has about 30 employees that perform the tasks related to research planning, research infrastructure, communication and administration. For research planning, the secretariat works in cohesion with the Swedish Research Council. The SPRS is also responsible for dispensing permits in accordance with the Swedish Antarctic Act in order to improve environmental protection in the polar regions.¹²³

¹¹⁹ EU-PolarNet (2022) [Directory of European Polar Research Funding Programmes.](#)

¹²⁰ EU-PolarNet (2022) [Catalogue of National Polar Programmes and Other Large-Scale Programmes.](#)

¹²¹ EU-PolarNet (2022) [Directory of European Polar Research Funding Programmes.](#)

¹²² Swedish Polar Research secretariat - [About the secretariat.](#)

¹²³ *Ibid.*

4.7 Switzerland

4.7.1 Polar research in Switzerland

All universities and many institutions in Switzerland carry out polar research. Long-term research programmes about the polar regions exist in many prominent research centres and faculties such as the ETHZ, University of Zurich and University of Bern. In general, Swiss polar research is funded through the Swiss National Science Foundation (SNF) and the Swiss Polar Institute (SPI), which supports mainly field access, logistics and temporary infrastructure programmes. However, additional funding can also be received through EU programmes, mainly the European Research Council. The strategic coordination of Swiss polar research is provided by the Swiss Committee for High altitude and polar research - Swiss Academy of Science (SKPH). This body meets twice a year to give policy advice to the Swiss authorities.¹²⁴

Switzerland used to have a polar camp in Greenland, but this was dismantled in 2021 for security reasons and the infrastructure was taken over by Denmark. So, currently there is no permanent infrastructure owned by the Swiss in the Arctic or Antarctic. However, under the Swiss Polar Institute (SPI), access can be granted to do field research at foreign facilities through for example Memoranda of Understanding (MoUs). The SPI provides Flagship programmes which concentrate on a single site or region and provide temporary infrastructure for up to 5 years.¹²⁵

4.7.2 Polar policies and strategy

There is no official polar strategy in Switzerland, but one is expected to be published in 2022 by the government. However, some strategic documents containing strengths and ambitions of Swiss research exist such as the “Polar Science in Switzerland - proposed priorities for the SPI up to 2025 and beyond” published in 2019.¹²⁶ At a governmental level, the Federal Department of Foreign Affairs (FDFA) officially represents Switzerland in both Arctic and Antarctic affairs. In the domain of supporting research organisations, the State Secretariat for Education, Research and Innovation (SERI) is the competent body and sets research policy priorities and creates bilateral/multilateral relations for research.¹²⁷

4.7.3 Engagement in the polar regions

Switzerland is highly interested in polar affairs. They stated in 2017 that “Like in the Arctic, the temperature in the Alps rises twice as fast as the global average. Both the Arctic and the Alpine Region will therefore continue to warm more rapidly than the global mean.”¹²⁸ High-altitude regions are considered as the ‘third polar region’ by many Swiss researchers as they are equally vulnerable to climate change and important to monitor.¹²⁹ Swiss polar researchers work in the Arctic (Greenland, Siberia, Svalbard and Canada) and remote high-altitude regions such as the Himalayas and Andes and many also work in Antarctica. Considering there are no permanent Swiss research infrastructure or stations, work is carried out in collaboration with international and local groups.¹³⁰

¹²⁴ EU-PolarNet (2022) [Catalogue of National Polar Programmes and Other Large-Scale Programmes](#).

¹²⁵ *Ibid.*

¹²⁶ Swiss Polar Institute - [Strategic documents: Polar Science in Switzerland](#).

¹²⁷ EU-PolarNet (2022) [Catalogue of National Polar Programmes and Other Large-Scale Programmes](#).

¹²⁸ Arctic Council - [New Observer: Switzerland](#).

¹²⁹ Stakeholder consultation.

¹³⁰ EU-PolarNet (2022) [Catalogue of National Polar Programmes and Other Large-Scale Programmes](#).

4.7.4 Polar research funding

SERI is responsible for supporting research organisations, setting research policy priorities, and bilateral/multilateral relations for research. They have both an international collaboration division for bilateral collaborations and agreements and a division for Swiss participation in EU polar research programmes. In general, research funding organisations receive their budgets from the Parliament through four year bills, but operate independently from federal administrations.¹³¹

The Swiss National Science Foundation (SNSF) provides the main funding for public research. This research can be either in the form of individual projects or large collaborations. According to a survey by the EU PolarNet 2 (2022), the SNSF funded 37 projects (+ 27 careers mobility grants) related to polar and high-altitude research between 2018-2020. They fund any projects in a bottom-up approach, so there are no dedicated funding pools for polar or high-altitude research. Projects are attributed by scientific merit based on an external peer review process, thus polar projects need to compete with other scientific projects. The funding instruments of the SNSF are complemented by the SPI with a focus on supporting research elements such as logistics, safety, expeditions, dedicated funding and outreach. The synergy between the SPI and SNSF is optimized to avoid overlaps through regular information exchanges.¹³²

4.7.5 International cooperation

International partnerships are essential for the Swiss polar research community since they do not have national permanent facilities. Most collaborations are managed directly between researchers and their international partners, however the SPI website contains an overview of all funded projects in Switzerland to facilitate this process. Alternatively, the P3 database of the Swiss National Science Foundation (SNSF) lists all projects funded by them in Switzerland. Several MoUs and agreements have been set up by the SPI with polar operators for instance with Australia. Additionally, they organise international expeditions based on calls for proposals.¹³³

Switzerland is part of Arctic Council under the status of an observer (non-Arctic state). This represents their commitment to research and peaceful international cooperation. In addition, Swiss researchers have been part of approximately fifty international Arctic projects in the last decade.¹³⁴ Furthermore, Switzerland participates in the following international collaborations (non-exhaustively): FARO, COMNAP, IASC, SCAR, EU-PolarNet, Standing Committee of Antarctic Data Management (SCADM), Polar Data Discovery Enhancement Research (POLDER), Arctic Data Committee (ADC) and Southern Ocean Observing System (SOOS).

4.7.6 Swiss Polar Institute (SPI)

The Swiss Polar Institute (SPI) was created to provide services to and promote synergies within the polar community in Switzerland. It has the legal status of a foundation and was founded by several universities, with even more universities and research institutes currently being a member. The main funding for the SPI comes from the government with substantial aid from private investors and an additional stream coming from the membership fees paid by universities. They currently have a budget of 12 million Swiss Francs for a period of 4 years, but finding a stable and long-term funding stream is a challenge. The SPI is now considered as the national polar network for Swiss researchers and Swiss

¹³¹ EU-PolarNet (2022) [Directory of European Polar Research Funding Programmes.](#)

¹³² Swiss National Science Foundation - [Official Website.](#)

¹³³ EU-PolarNet (2022) [Catalogue of National Polar Programmes and Other Large-Scale Programmes.](#)

¹³⁴ Arctic Council - [New Observer: Switzerland.](#)

infrastructure. The SPI secretariat has about 7 employees that are occupied with the day-to-day management as well as the strategic planning.¹³⁵

The objectives of the SPI as established in the first SPI science plan “Polar Science in Switzerland - Proposed priorities for the Swiss Polar Institute (SPI) up to 2025 and beyond” (2019)¹³⁶ are the following:¹³⁷

- Strengthening Swiss polar science to address global challenges
- Facilitating access to infrastructure and polar science initiatives
- Creating new synergies
- Federating the Swiss polar science community
- Bringing polar science closer to the Swiss public
- Supporting innovative partnerships

The SPI is responsible for providing field grants to access polar region sites. From 2021 onwards, so-called Flagship programmes of the SPI will enable the Swiss community to use temporary infrastructure established on a site for up to 5 years. Since there are no Swiss research stations and infrastructure, a major part of the SPI’s mandate is to manage the Swiss MoUs and bilateral/multilateral agreements with other countries.¹³⁸ The SPI also offers services such as data management advice to field pharmacies, telemedicine support services and health and safety courses. The SPI receives federal funding from SERI for 2021-2024 and both FDFA and SERI are on the board of SPI. A substantial amount of funding of the SPI comes from private philanthropic organisations with major donors being the Swiss Polar Foundation and the Swiss BNP-Paribas Foundation.¹³⁹

4.8 United Kingdom

4.8.1 Polar research in the United Kingdom

The network of polar researchers in the United Kingdom (UK) is formed by governmental and non-governmental institutions, research institutions, universities, and industry partners. The main funding for polar research comes from the Natural Environment Research Council (NERC) which is a council overseen by the United Kingdom Research and Innovation (UKRI). The NERC in turn provides funding for on the one hand the British Antarctic Survey (BAS) which is responsible for the Antarctic infrastructure and research support and on the other hand the UK Arctic Office which supports research in the High North.¹⁴⁰

Virtually all polar research themes are studied by UK researchers, but the main focus is on climate change. In foreign affairs and international organisations, the UK’s Foreign, Commonwealth and Development Office (FCDO) Polar Regions Department represents the interests of the UK in both the Arctic and Antarctic. The FCDO also signed the Spitzbergen Treaty of 1920 and the Antarctic Treaty of 1959.¹⁴¹

4.8.2 Polar policies and strategy

¹³⁵ Stakeholder consultation.

¹³⁶ Swiss Polar Institute - [Release of the first SPI science plan](#).

¹³⁷ Swiss Polar Institute - [Official Website](#).

¹³⁸ Stakeholder consultation.

¹³⁹ EU-PolarNet (2022) [Catalogue of National Polar Programmes and Other Large-Scale Programmes](#).

¹⁴⁰ UK Research and Innovation - [Natural Environment Research Council \(NERC\)](#).

¹⁴¹ EU-PolarNet (2022) [Catalogue of National Polar Programmes and Other Large-Scale Programmes](#).

An official governmental strategy or national scientific programme for polar research does not exist in the UK. Each research council, such as NERC, which is part of the UKRI puts forward their own research policies and funding strategies. Under the NERC, polar research is regarded in competition with other research domains with no dedicated funding stream or priority for polar research.¹⁴² One relevant policy document is “Beyond the ice: UK policy towards the Arctic” published by the government in 2018. In this document the UK commits to promote Arctic science, while protecting the Arctic’s vulnerable environment and promoting prosperity in the region.¹⁴³

4.8.3 Engagement in the polar regions

The UK has historically claimed territory on Antarctica in 1908 in a region they called the British Antarctic Territory as a part of the British Overseas Territories. However, with the signing of the Antarctic Treaty, this region is no longer internationally considered as a claimed territory of the UK, since all territorial claims to Antarctica were put in abeyance. However, they preserve their Antarctic presence through the research stations and bases operated by BAS.¹⁴⁴

The UK has one seasonal research station in Ny-Ålesund in the Arctic; and two seasonal and two permanent research stations in the Antarctic, which are generally operated by BAS. Furthermore, the UK possesses several research vessels and aircrafts for either polar research, but also broader science projects and transport missions.¹⁴⁵

4.8.4 Polar research funding

Funding for polar research can come from any of the seven existing research councils, responsible for funding and coordinating academic research in the UK: Arts and Humanities Research Council; Biotechnology and Biological Sciences Research Council; Engineering and Physical Sciences Research Council; Economic and Social Research Council; Medical Research Council; Natural Environment Research Council; and Science and Technology Facilities Council. Additionally, some minor funding can be granted from non-governmental and philanthropic funds. However, the majority of funding is received from the NERC. Funding for the polar infrastructure also comes indirectly from NERC who distributes funds to the station operators BAS and the UK Arctic Office to cover all of their activities.¹⁴⁶

The NERC provides several funding opportunities every year for polar research, generally through competitive proposals. These funding sources can be in the form of strategic research calls, innovation funding, fellowships, capital funding, etc. Occasionally, the research councils of UKRI can establish targeted research programmes, mainly to address research questions which are of crucial importance for polar regions. For the Antarctic, sustainable funding can be received from BAS, with a major focus on long-term monitoring. Additionally, funding for specific projects can be procured through competitive grants, directed research programmes or discovery research. Concerning Arctic research, there are very few dedicated research programmes. Arctic funding usually originates from short-term competitive grants through directed research programmes or discovery research. Furthermore, Arctic activities are coordinated by the UK Arctic Office.¹⁴⁷

¹⁴² EU-PolarNet (2022) [Catalogue of National Polar Programmes and Other Large-Scale Programmes](#).

¹⁴³ UK Government - [Beyond the ice: UK policy towards the Arctic](#).

¹⁴⁴ British Antarctic Territory - [History of the Territory](#).

¹⁴⁵ EU-PolarNet (2022) [Catalogue of National Polar Programmes and Other Large-Scale Programmes](#).

¹⁴⁶ EU-PolarNet (2022) [Directory of European Polar Research Funding Programmes](#).

¹⁴⁷ *Ibid.*

When applying for research funding, the evaluation and selection process is based on scientific excellence. Proposals for both Arctic and Antarctic projects are anonymously evaluated by UK and international experts. Afterwards, a strategic selection panel consisting of UK scientists select the winning proposals. International collaboration is stimulated in the UK and thus international researchers can participate in UK polar research projects. Specifically for the Antarctic, BAS has several research programmes and long-term monitoring projects which are funded through an independent expert review process. After securing research funding, a request for access to the UK's Antarctic infrastructure can be issued at BAS. They prioritise UK researchers and international researchers collaborating with UK projects, but profoundly consider other international requests.¹⁴⁸

4.8.5 International cooperation

UK polar researchers are very internationally-minded and there are many relations and collaborations between UK researchers and foreigners. Furthermore, due to UK's logistic and scientific capabilities, and especially due to the British research stations, it has long-standing relationships with most countries performing polar research. The Research Councils that fund UK research also encourage international collaboration and most funding calls expected international involvement. However, due to the withdrawal of the UK from the European Union in 2020, all European collaborations had to be reviewed. Currently, the UK's participation in European initiatives is funded through the UK government and placed under UK-EU bilateral agreements. For instance, the NERC now provides the funding for the UK's participation to the Belmont Forum. Other international funding initiatives are generally governed by bilateral or multi-lateral agreements with those nations.¹⁴⁹

Furthermore, the UK participates in several international polar organisations and partnerships such as SCAR, COMNAP, IASC and EU PolarNet, Arctic Council, Antarctic Treaty, etc.

4.8.6 British Antarctic Survey

The British Antarctic Survey (BAS) is the institute that is responsible for all British polar research. It receives its mandate and is funded by the NERC which in turn is part of the UKRI. Although, other funding streams such as EU programmes and Foreign and Commonwealth Office revenues also provide a portion of BAS' budget. BAS operates on an annual budget of around £50 million. BAS hosts the UK Arctic Office, manages the NERC-funded Arctic Research Programme¹⁵⁰ and operates the UK Research Station at Ny Alesund. Therefore, it is involved in research on both poles and thus a broader region than solely the Antarctic.¹⁵¹ The Antarctic operations and science programmes of BAS are managed from Cambridge and the institute employs over 450 people to assist with the execution of all its activities. Under BAS' responsibility falls the management of six research stations, five aircrafts, and one vessel.¹⁵²

BAS has a science strategy to guide researchers and enhance the ability of research to predict environmental change, and inform the policy and economic decision making process that will help society adapt and thrive in the future. Additionally, they have an operational strategy which focuses on supporting polar research efforts in the UK by providing and managing large-scale polar infrastructure assets, services and facilities as cost-effective and efficient as possible.¹⁵³

¹⁴⁸ EU-PolarNet (2022) [Directory of European Polar Research Funding Programmes](#).

¹⁴⁹ *Ibid.*

¹⁵⁰ The Arctic Research Programme - [Official Website](#).

¹⁵¹ British Antarctic Survey - [Our organisation](#).

¹⁵² EU-PolarNet (2022) [Catalogue of National Polar Programmes and Other Large-Scale Programmes](#).

¹⁵³ British Antarctic Survey - [Our organisation](#).

BAS also plays an active role in the international polar research field, through shaping research programmes and delivering efficient operational support. It represents the UK at several international organisations such as SCAR, COMNAP, IASC and EU PolarNet. The other way around, many international polar communities are highly interested in collaborating with UK researchers and BAS due to the polar infrastructure they possess.¹⁵⁴

UK Arctic Office

The UK Arctic Office was established and is funded by the NERC and is hosted by BAS. The aim of this institute is to support UK researchers in the Arctic, give advice to policy makers and foster international collaboration on all aspects of Arctic research. Furthermore, they try to succeed in this by improving communication and connections; ensuring better representation and engagement; and delivering new research opportunities. The UK Arctic Office also manages the UK Arctic Research Station at Ny-Ålesund on Spitsbergen.¹⁵⁵

4.9 European Union

4.9.1 Polar research in the European Union

With three of its Member States being Arctic countries, the European Union has by default taken an interest in the Arctic region¹⁵⁶. With geopolitical relations changing in this region and climate change exacerbating this interest has certainly amplified within the past decade. The EU's policy and interest in Antarctica are less clear-cut, and is focussed more on ad-hoc engagement or specific initiatives such as the ongoing efforts to establish marine protected areas in the region through the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR).

4.9.2 Polar policies and strategy

EU policy on the Arctic region by contrast is even laid down in a dedicated Arctic Strategy, which has been recently updated in its Joint Communication by the European Commission and the High Representative for Foreign Affairs and Security Policy "A stronger EU engagement for a peaceful, sustainable and prosperous Arctic"¹⁵⁷ presented in October 2021. With this Strategy, the EU intends to pursue important objectives:

- Maintain peaceful and constructive dialogue and cooperation in times of change in order to keep the Arctic safe and stable
- Take strong action on climate change to increase Arctic's resilience, take concerted action on black carbon and permafrost thaw, and push for oil, coal and gas to stay in the ground
- Support inclusive and sustainable development of the Arctic region.

In this strategy, it was furthermore announced to establish a European Commission office in Nuuk, Greenland to raise the profile of Arctic matters in external relations. The EU is also intent to make funding more accessible for the regions, by promoting greater awareness through a dedicated online portal¹⁵⁸ and through dedicated action on sustainability through its funding programmes.

¹⁵⁴ British Antarctic Survey - [Our organisation](#).

¹⁵⁵ EU-PolarNet (2022) [Catalogue of National Polar Programmes and Other Large-Scale Programmes](#).

¹⁵⁶ European Union External Action - [The EU in the Arctic](#).

¹⁵⁷ JOIN(2021) 27 final - [A stronger EU engagement for a peaceful, sustainable and prosperous Arctic](#).

¹⁵⁸ European Union External Action - [EU Arctic funding/programmes](#).

4.9.3 International cooperation

The EU is furthermore engaged in several multilateral fora relevant for the region. EU policy in general is built upon the principles set out in the United Nations Convention on the Law of the Seas (UNCLOS), the Sustainable Development Goals, and through its work and engagement in the Arctic Council, the Barents Euro-Arctic Council, the policy framework of the Northern Dimension and the International Maritime Organisation (IMO). Within the Arctic Council, the EU - represented through the European Commission - has so far only been granted ad-hoc observer status despite repeated applications for observer status. The EU is however a full member in the Barents Euro-Arctic Council.

Arctic research is regarded by the EU as a diplomatic tool, expressed through bilateral Science and Technology Cooperation Agreements with Canada, Russia and the United States and via efforts within the Arctic Science Ministerial meetings, but also in its endeavor to create an All Atlantic ocean research alliance from Pole to Pole.

4.9.4 Polar research funding

Horizon Europe is an important funding instrument to promote science and innovation in the region. The Horizon-funded EU-PolarNet 1 and 2 projects aiming to coordinate and co-design the European Polar Research Area contribute significantly to an enhanced coordination amongst EU polar researchers. Further examples for research projects in the area are ARICE (optimal use and sharing of research icebreakers to access the Arctic Ocean) or APPLICATE (research into predictability of Arctic climate and its impact on climate and weather at lower altitudes).

4.9.5 European Polar Board

The European Polar Board (EPB) is an independent organisation which focuses on the strategic priorities as determined by the EU in the Arctic and Antarctic. Its mission is to improve research coordination through increased sharing of information, optimizing the use of EU infrastructure and set up joint initiatives between EPB members. Additionally, the EPB is a single contact point for the broader polar, research and policy communities. For instance, it contains the European Polar Infrastructure Database, with a range of partners and details of all European polar infrastructure.¹⁵⁹

Out of the 28 European institutions, logistics operators, funding agencies, scientific academies and government ministries which are a member of the EPB, the following are related to countries discussed in our study:¹⁶⁰

- Sweden: Arctic Research Centre at Umeå University (ARCUM) and Swedish Polar Research Secretariat (SPRS)
- Denmark: Danish Agency for Science and Higher Education (DASHE)
- The Netherlands: Dutch Research Council (NWO)
- Germany: Helmholtz Association (HGF)
- Norway: Institute of Marine Research (IMR) and Research Council of Norway (RCN)
- United Kingdom: Natural Environment Research Council (NERC)
- Poland: Polish Academy of Sciences (PAN)
- Switzerland: Swiss National Science Foundation (SNF)
- Finland: Thule Institute, University of Oulu

¹⁵⁹ European Polar Board - [Official Website](#).

¹⁶⁰ European Polar Board - [Membership](#).

The EPB has established several priority areas for its operations: European coordination, international cooperation, policy advice and minimizing environmental impacts. The EPB gathers its members frequently to discuss and exchange polar information and best practices. Furthermore, it is leading the process to develop a European Polar Coordination Office (EPCO) as part of the EU-PolarNet 2 project. The EPB has several groups that are occupied with different themes the following are some examples. First, an Action Group on International cooperation organises and implements international partnerships. Second, a Policy Advisory Group responds to all policy advice requests received directly by the EPB or via larger initiatives in which it participates. Third, an Action Group on Environmental Impacts of Polar Research and Logistics identifies environmental best practices for both research and logistics and to develops recommendations and easy-to-use guidelines for researchers and infrastructure.¹⁶¹

The EPB has a strategy for the period 2017-2022 which envisions a Europe with a strong and cohesive polar research community, wherein decisions affecting or affected by the polar regions are informed by independent, accurate, and timely advice from the EPB. This Strategy gives the EPB a leading role to drive the momentum and address emerging priorities and developments, with an open and participatory approach. The Strategy for the period 2023-2028 is currently being developed.¹⁶²

The EPB has Memoranda of Understanding with key organisations in the global polar research community in order to facilitate sharing expertise around and establishing interdisciplinary relations to promote and enrich polar research. It organizes and manages formal agreements / MoUs with the following organisations: SCAR, IASC, European Space Agency (ESA), SOOS, APECS and European Climate Research Alliance (ECRA).¹⁶³

¹⁶¹ EU-PolarNet (2022) [Catalogue of National Polar Programmes and Other Large-Scale Programmes](#).

¹⁶² European Polar Board - [Strategy](#).

¹⁶³ EU-PolarNet (2022) [Catalogue of National Polar Programmes and Other Large-Scale Programmes](#).

5 Recommendations

The overall aim of this study was to identify and recommend ways to improve the polar research system within the Netherlands, including by considering the option of a dedicated polar research centre (virtual or physical).

To summarise, the Dutch polar research system is characterised by important factors: the field is small and the number of actors is fairly limited, it is historically grown, successful and effective. The network approach has generated good connections and established well-functioning informal communication channels. Recently, improvements have been made to rationalise the use of limited resources and to better align science and policy, however the system remains dependent on a core group of energetic and dedicated actors and leaves insufficient space for newcomers. It is hence vulnerable to change.

For this reason and on the basis of the insights that we have generated throughout this study, we put forward the following mix of overarching and specific recommendations:

Overarching recommendations:

1. Maintain the strengths of the current system, however take measures to adjust to ensure its long-term sustainability.
2. Nurture existing international partnership and pursue intended strategy for further diversifying and exploring new partnerships.
3. Pay particular attention to the next generation of polar researchers, as essential factors for maintaining and expanding expertise and for future-proofing the research system.

Specific recommendations:

We have identified three themes where we recommend to make improvements to the research system: science-policy interface, access to information and long-term sustainability of the system. By looking into various ways of how to address these themes, we have developed a menu of options for further consideration (see table below as replicated from Table 3 - Areas for improvement and scenario correlation).

Theme	Area for improvement	Scenario
Science-policy interface		
Sub-theme: Multi-level cooperation	Better and more cooperation between different researchers, and better integration of newcomers/“outsiders”	Scenario I, IIA, IIB
	Logistical/infrastructure support	Scenario IIA, IIB
	Better cooperation between government and research community	Scenario I, IIA, IIB
Sub-theme: Enhance communication within the research community and externally	More communication about ongoing activities of academia in polar research	Scenario I, IIA, IIB

Theme	Area for improvement	Scenario
Science-policy interface		
	More active exchange on engagement in multilateral policy fora	Scenario I, IIA, IIB
	More engagement of the public and promotion via media	Scenario IIA and IIB
Sub-theme: Funding design and priorities	Evaluation and implementation of the NPP	General recommendation
Access to information		
	See also: Sub-theme Communication	
	More active information about (alternative) funding streams, possibilities for engagement and infrastructure	Scenario I, IIA, IIB
Long-term sustainability of polar research in NL		
	Reduce reliance on individual while increasing the resilience of the network	Scenario IIA and IIB
	Actively promote a new generation of researchers	Scenario I, IIA and IIB

When looking more specifically into the options of a dedicated polar research centre, we recommend taking into account the following insights when considering or taking any decision on such a centre:

- A virtual polar centre could work in the current system and added value can be identified, in particular when framed as a virtual hub that supports the network. If such a centre were to be set up, it however needs to meet certain conditions as identified in Chapter 0. It needs to clearly be able to demonstrate a service to the community, otherwise there is the risk of stranded costs. If it is successful then there is potential for its role to grow in the future.
- A physical centre without its own research staff is also an option that could be made to fit within the current system. It could be regarded as a further development or evolution of the virtual centre, especially when certain economies of scale can be achieved (e.g. co-location with existing institutions). However, it would require substantially more funding than any of the earlier scenarios, and a real necessity has not been identified, certainly in an environment where the world has become more independent from physical office space over the past two years.
- A physical centre with its own research staff is an option where no real added value was identified. There is currently no demand among the research community. It would also equal a major overhaul of the research landscape that would in all likelihood be so disruptive that no positive effects were generated. Funding requirements would be exponentially larger than for previous scenarios.
- In terms of funding, the project team has identified with each scenario a range of costs and possible funding sources. In essence, we recommend to consider a mix of potential sources:

public funding, shifting of existing resources (secondments and in-kind contributions), membership fees and possibly philanthropic donations. We see in other countries that donations often go hand in hand with specific objectives, regularly connected to expeditions. To the extent that more promotion activities can be undertaken for projects such as SEES.nl, it can also be expected to attract more public interest and potential private donors.

- For any additional governance systems we recommend a light-weight approach that however foresees representation of all actors involved in order to avoid disbalances in decision-making in the future.

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